

# Community Bank Stress Testing

## What You Need to Know

**Jay D. Wilson, CFA, ASA, CBA**

Mercer Capital

wilsonj@mercercapital.com | 901.685.2120

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[http://www.boston.com/bostonglobe/editorial\\_opinion/outofline/2009/02/bank\\_stress\\_test.html](http://www.boston.com/bostonglobe/editorial_opinion/outofline/2009/02/bank_stress_test.html)

# What Is Stress Testing?

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A **risk management tool** that consists of **estimating the bank's financial position** over a **time horizon** – approximately two years – under **different scenarios** (typically a baseline, adverse, and severe scenario)

While there is no legal requirement for community banks to stress test, recent regulatory guidance suggests that community banks should be developing and implementing some form of stress testing and/or scenario analyses on at least an annual basis

# Why Is It Important?

## Regulatory

“

Community banks, regardless of size, should have the capacity to analyze the potential impact of adverse outcomes on their financial conditions...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.

Community Bank Stress Testing: Supervisory Guidance (October 18, 2012)  
<http://www.occ.gov/news-issuances/bulletins/2012/bulletin-2012-33.html>

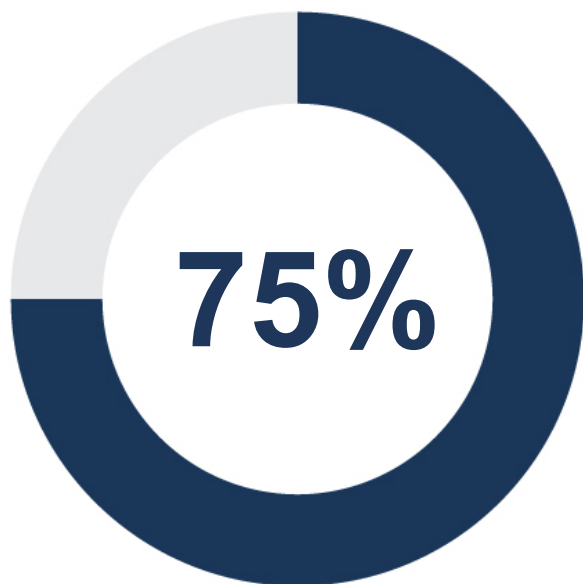
“

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.**

Federal Reserve Governor Daniel K. Tarullo speaking at the Federal Reserve Third Annual Stress Test Modeling Symposium, Boston, Massachusetts Jun 25, 2014. Emphasis added.  
<http://www.federalreserve.gov/newsevents/speech/tarullo20140625a.htm>

# Why Is It Important?

## Regulatory



75% of bank and credit union respondents (99% of which were below \$1 billion in assets) are either **already implementing stress tests**, have been asked to **expand their stress testing** or have been asked to **start stress testing** by examiners.

2015 Sageworks Exam Survey

<https://www.sageworks.com/pressreleases.aspx?article=321&title=Sageworks-Survey:-What-Examiners-Are-Examining&date=July-22-2015>

# Why Is It Important?

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Enhancing  
**strategic decisions**



Improving **risk**  
**management** and  
**capital planning**



Enhancing the  
**value of the bank**

**If weakness indicated**, consider

M&A, capital/debt issuance, exiting/shrinking certain business lines, consider changing underwriting profile to take less credit risk and/or be compensated more for credit risk being taken (i.e., higher interest rates)

**If strength indicated**, consider

M&A as acquirer, special dividends, share buybacks, consider changing underwriting profile to take more credit risk

# Why Is It Important?

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1 Satisfy regulatory pressures / expectations

2 Enhance strategic decision making

Sharpens focus on the most relevant, highly-impactful decisions over the short, medium, and long-term planning horizon

3 May strengthen the case for shifting or improving risk- and/or capital-management and planning

If weakness indicated, consider M&A, capital/debt issuance, exiting/shrinking certain business lines, consider changing underwriting profile to take less credit risk and/or be compensated more for credit risk being taken (i.e., higher interest rates)

If strength indicated, consider M&A as acquirer, special dividends, share buybacks, consider changing underwriting profile to take more credit risk

4 Can be value enhancing for the bank

5 Head start on CECL (Current Expected Credit Loss) preparation

# What Are the Types of Stress Testing Methods?



## Top Down

Estimate stress loss rates under different **adverse scenarios** on **pools of loans** with common characteristics



## Bottom Up

Estimate loan losses for each loan, assessing the results of **individual transaction level stress tests** then aggregate results



## Reverse

Consider the events that would “**break the bank**” and what contingency plans should be made to **mitigate the risks**



## Enterprise-Wide

Analyze “**multiple types of risk** and their **interrelated effects** on the **overall financial impact**”



# What Are the Types of Stress Testing Methods?

## Transaction Level

**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

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 as either:

**Bottom Up** – Assessing the results of individual transaction level stress tests and then aggregating the results

**Top Down** – Estimating stress loss rates under different adverse scenarios on pools of loans with common characteristics

# What Are the Types of Stress Testing Methods?



## Enterprise-Wide Level

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**” <sup>1</sup>

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

A specific adverse outcome is assumed 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, how likely those conditions/events are, and what **contingency plans or additional steps** should be made to **mitigate this risk**

<sup>1</sup> 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](http://www.occ.gov/news-issuances/bulletins/2012/bulletin-2012-33)

# Types of Portfolio Stress Testing

## Key Steps

### TOP DOWN

1. Determine Economic Scenario
2. Segment Portfolio & Estimate Losses
3. Estimate Impact of Scenario on Earnings
4. Estimate Impact of Scenario on Capital

### BOTTOM UP

- 3&4. Estimate Impact of Scenario on Earnings/Capital
2. Estimate Loan Losses Incl. Stresses on Key Variables  
Expected Loss = Prob. of Default x Loss Severity
1. Gather/Organize Key Data on Loans/Segments (DSCR, LTV, Risk Rating)

# Top Down Stress Testing

## TOP DOWN

1. Determine Economic Scenario
2. Segment Portfolio & Estimate Losses
3. Estimate Impact of Scenario on Earnings
4. Estimate Impact of Scenario on Capital

“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”

– OCC Supervisory Guidance  
Community Bank Stress Testing

# Determine Economic Scenario

## Step 1

Determining the appropriate stress event to consider is an important element of the process

Little guidance was provided to this end for community banks

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

A severe recession

A downturn in the local economy and/or loss of a major employer

Economic weakness across a particular industry for which the bank has a concentration issue

# Determine Economic Scenario

## Step 1

Some cues from the economic scenarios published by the Federal Reserve

### Scenarios

Baseline, Adverse, &  
Severely Adverse

**Baseline** tends to be in line with economist/market expectations at time of release

**Adverse** tends to vary from year to year

**Severely Adverse** tends to be recession type scenario similar to Great Recession

### Domestic Aspects

US-based scenarios are most relevant for community banks

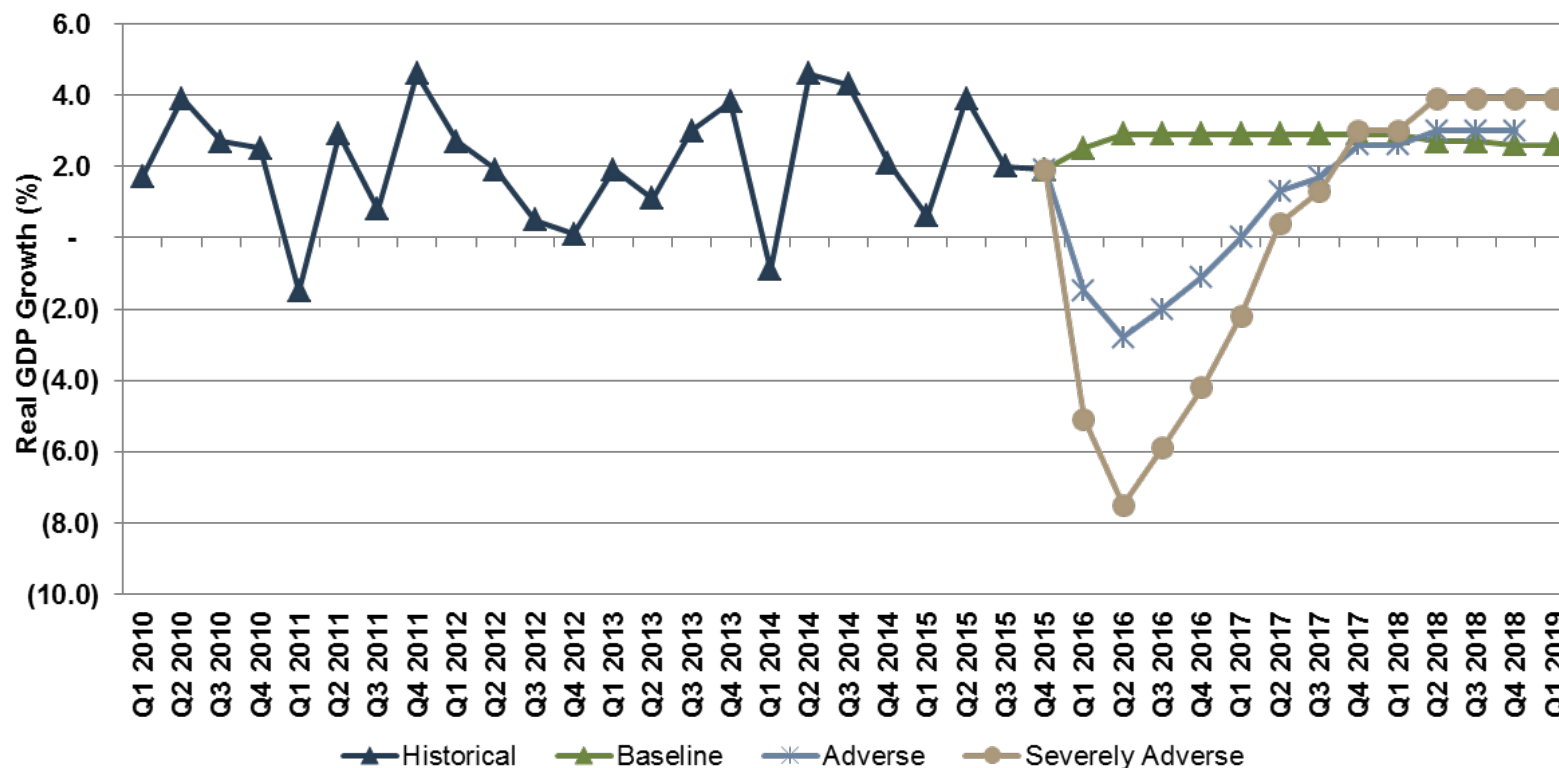
#### 16: Domestic Economic Variables

- 6: Real Economic Activity & Inflation
- 6: Interest Rates
- 4: Asset Prices

# Determine Economic Scenario

## Step 1

2016 Supervisory Economic Scenarios Overview

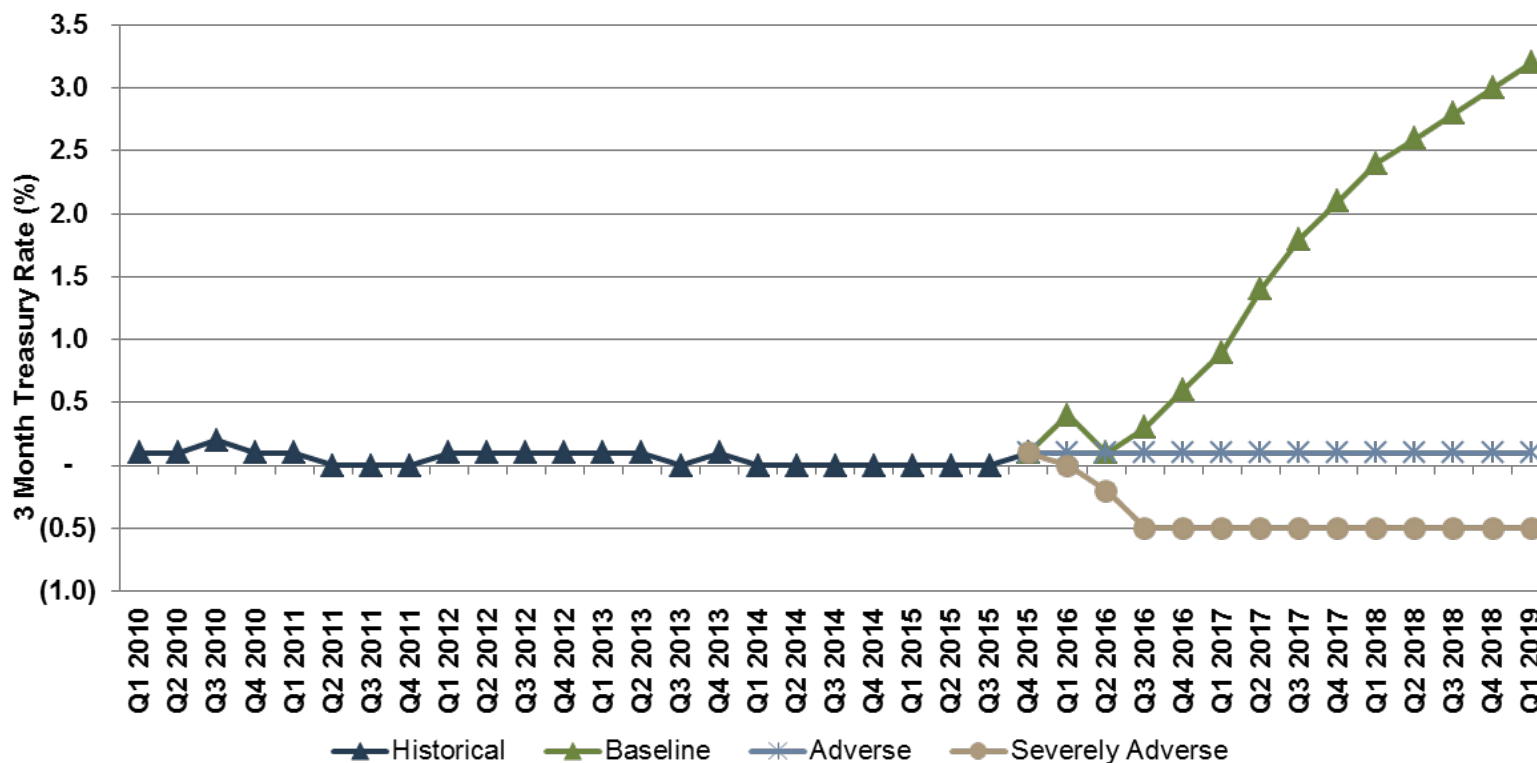


2016 Supervisory Scenarios for Annual Stress Test Required under the Dodd-Frank Act Stress Testing Rules and Capital Plan Rule dated January 28, 2016

# Determine Economic Scenario

## Step 1

2016 Supervisory Economic Scenarios Overview



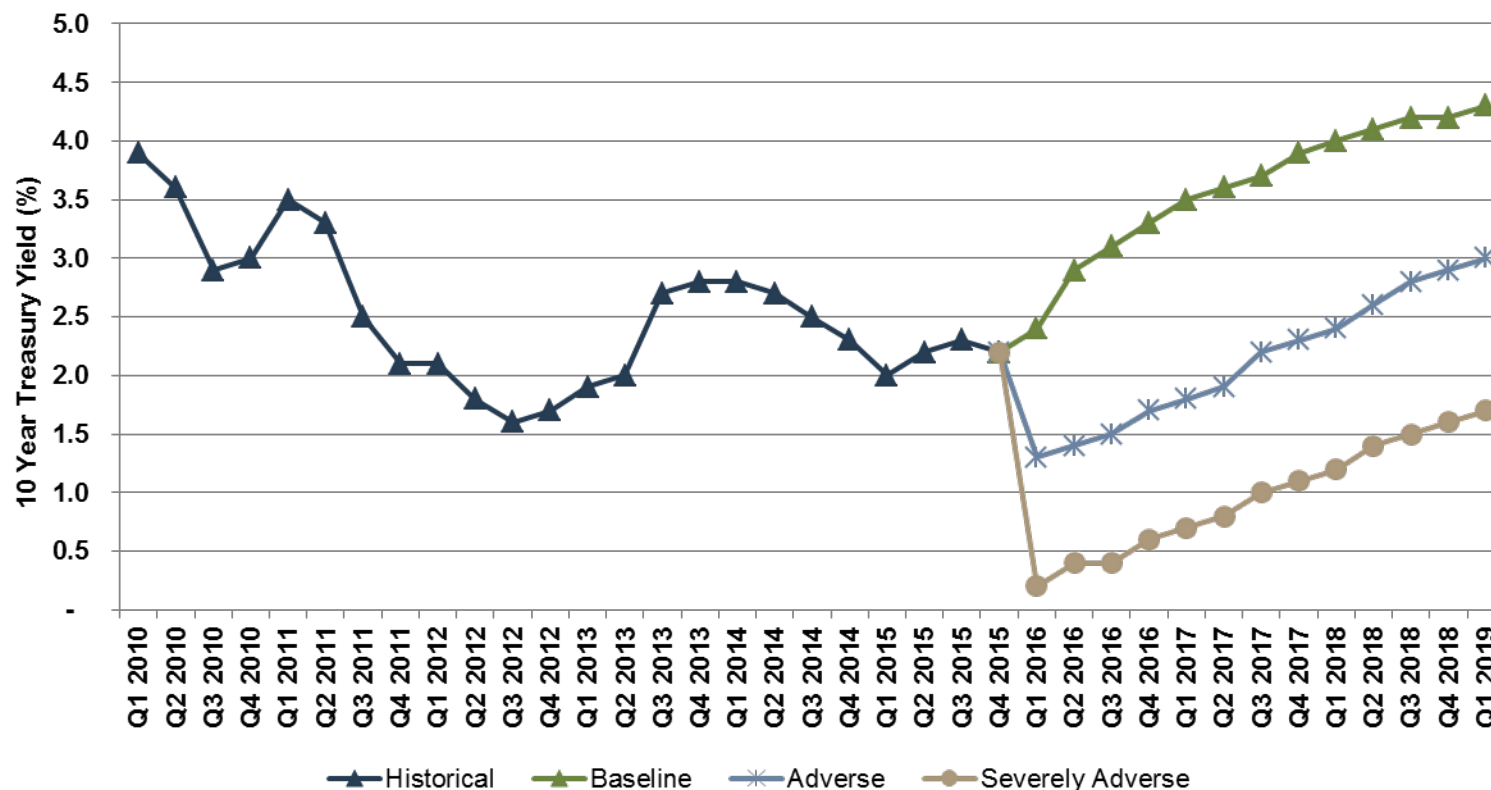
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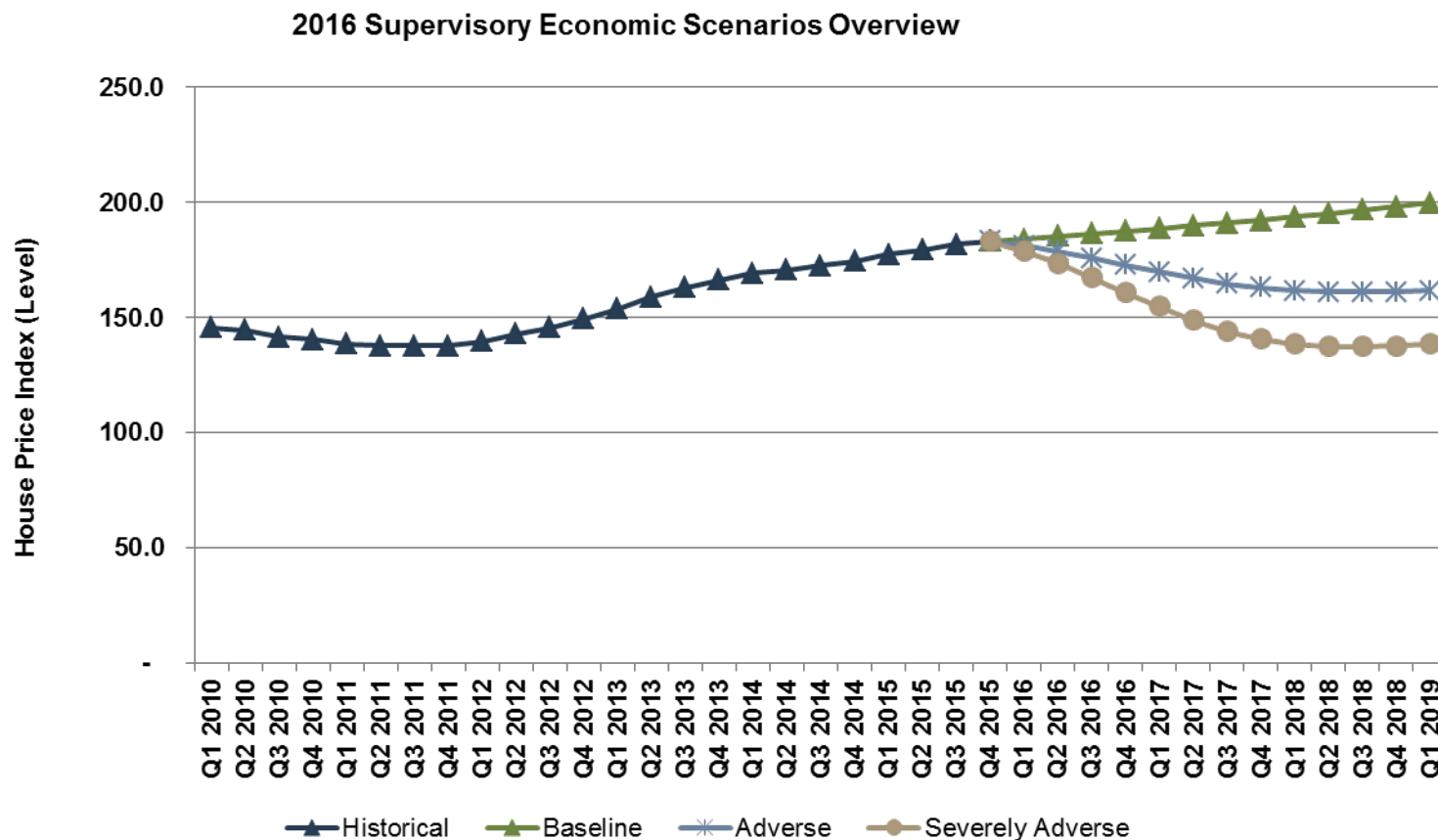
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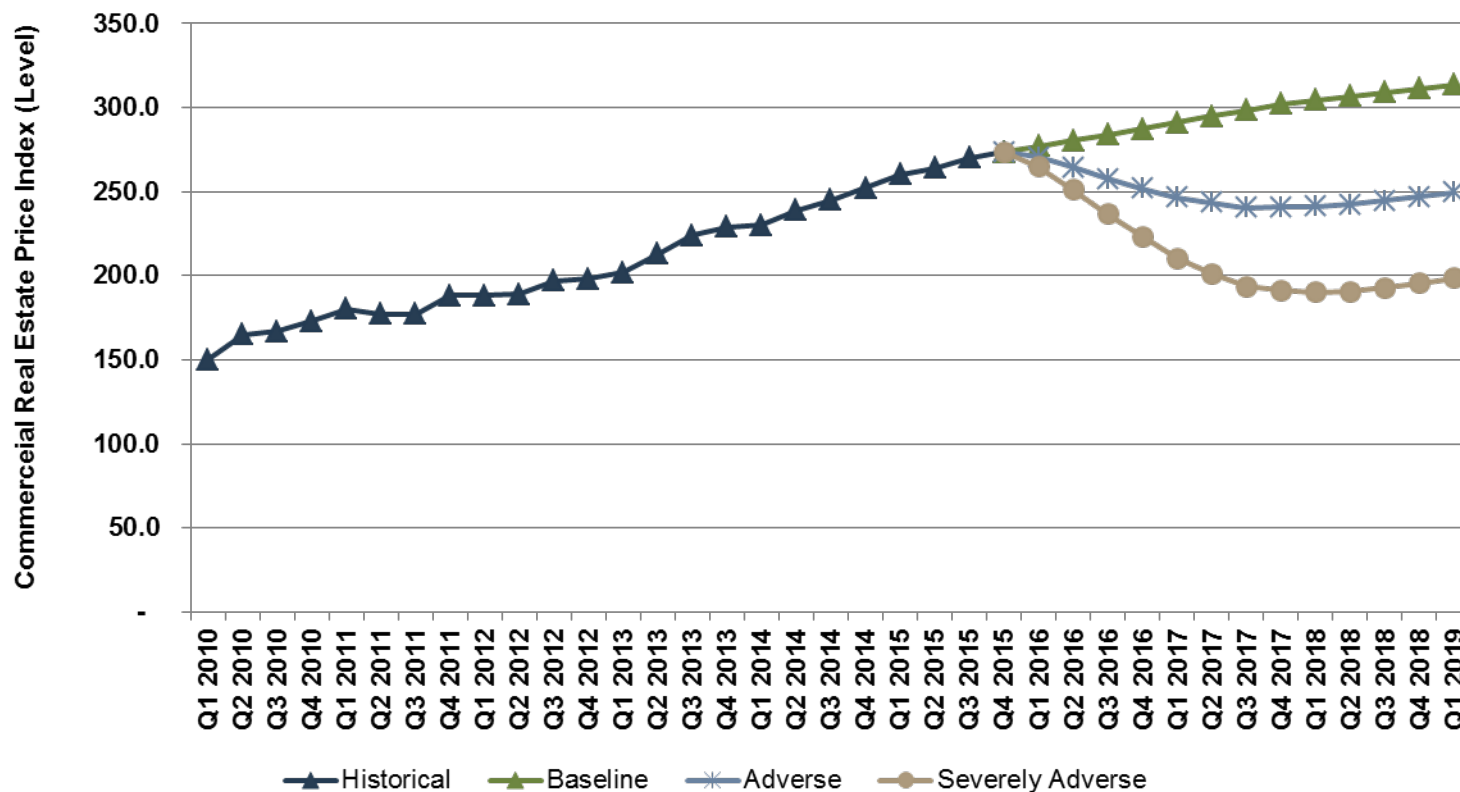


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# Determine Economic Scenario

## Step 1

2016 Supervisory Economic Scenarios Overview



2016 Supervisory Scenarios for Annual Stress Test Required under the Dodd-Frank Act Stress Testing Rules and Capital Plan Rule dated January 28, 2016

# Segment Portfolio & Estimate Loan Losses in Economic Scenarios

## Step 2

Cited in OCC guidance, **segment the loans** through **Call Report categories** in Schedule RC-C

Additional segmentation may be needed

**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 at “loan level” to determine their likely loss rate in a stress environment)

### **Call Report Category Segment Examples**

Construction & Development  
Agricultural,  
Commercial Real Estate

### **Additional Segmentation Examples**

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)

# Segment Portfolio & Estimate Loan Losses in Economic Scenarios

## Step 2

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

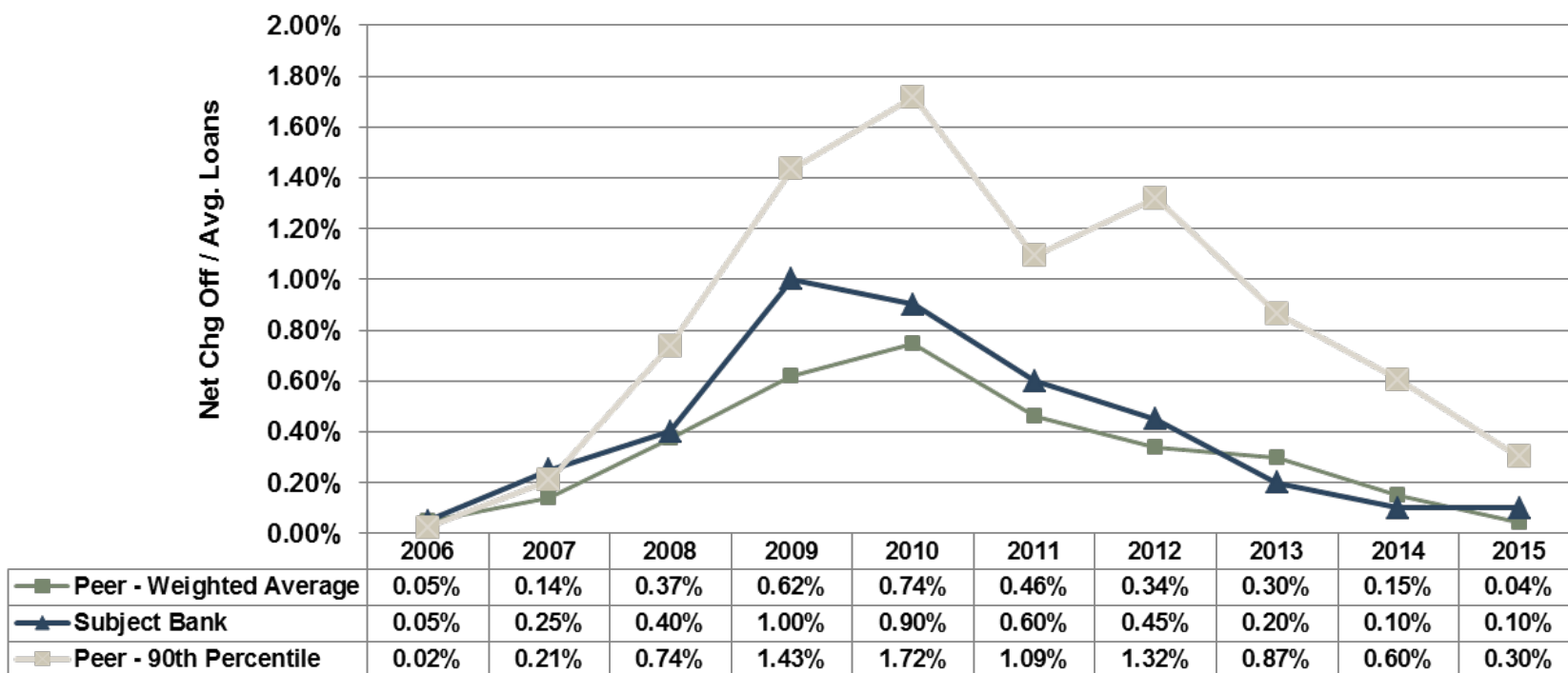
OCC guidance suggests using the **bank's historical default and loss experience during prior recessions or financial stress periods** as a starting point

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 periods that are correlated to the scenarios considered

# Segment Portfolio & Estimate Loan Losses in Economic Scenarios

## Step 2

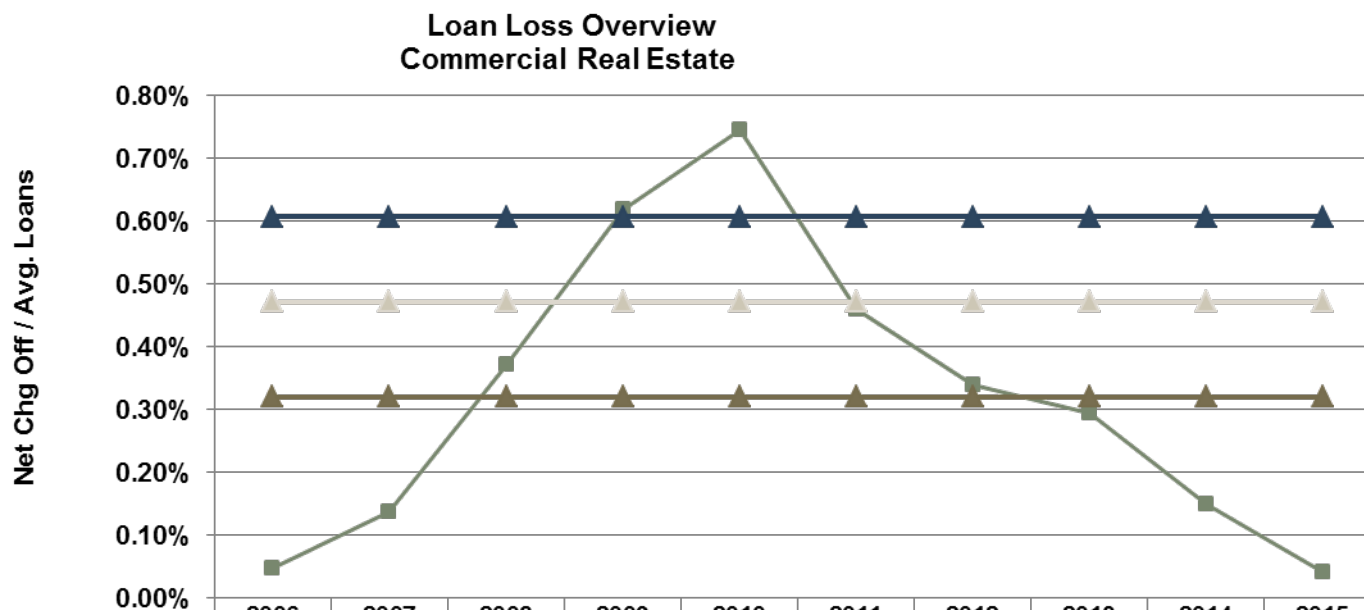
Loan Loss Overview  
Commercial Real Estate



Peer Levels Calculated Using Data Per SNL Financial

# Segment Portfolio & Estimate Loan Losses in Economic Scenarios

## Step 2



	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%

Peer Levels Calculated Using Data Per SNL Financial

# Segment Portfolio & Estimate Loan Losses in Economic Scenarios

## Step 2

Figure 2: Estimating Stress Period Losses

Loan Portfolio Segment	Baseline Scenario			Adverse Case			Severely Adverse Scenario		
	Actual Balances (\$M)	Two-Year Stress Period Loss Rate (%)	Two-Year Stress Period Losses (\$M)	Actual Balances (\$M)	Two-Year Stress Period Loss Rate (%)	Two-Year Stress Period Losses (\$M)	Actual Balances (\$M)	Two-Year Stress Period Loss Rate (%)	Two-Year Stress Period Losses (\$M)
Construction & Development	50,000	2.00%	1,000	50,000	5.00%	2,500	50,000	7.00%	3,500
Residential Real Estate - Closed-End	150,000	0.50%	750	150,000	1.00%	1,500	150,000	1.50%	2,250
Residential Real Estate - HELOCs	25,000	1.50%	375	25,000	3.00%	750	25,000	5.00%	1,250
Commercial Real Estate	100,000	0.60%	600	100,000	0.90%	900	100,000	1.20%	1,200
Multifamily	50,000	0.50%	250	50,000	1.00%	500	50,000	1.50%	750
Commercial & Industrial	50,000	1.00%	500	50,000	2.00%	1,000	50,000	3.00%	1,500
Farmland	25,000	0.10%	25	25,000	0.25%	63	25,000	0.50%	125
Agricultural Production	25,000	0.50%	125	25,000	0.75%	188	25,000	1.25%	313
Consumer	15,000	1.50%	225	15,000	2.00%	300	15,000	3.00%	450
Municipal	5,000	0.25%	13	5,000	0.50%	25	5,000	1.00%	50
Other Loans	5,000	0.25%	13	5,000	0.50%	25	5,000	1.00%	50
<b>Total</b>	<b>500,000</b>	<b>0.78%</b>	<b>3,875</b>	<b>500,000</b>	<b>1.55%</b>	<b>7,750</b>	<b>500,000</b>	<b>2.29%</b>	<b>11,438</b>



# Estimate Earnings Impact of Economic Scenarios

## Step 3

### **Estimate pre-provision, pre-tax income** in the different economic scenarios

This 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

### **Then, estimate the appropriate provisions** in the economic scenarios

The provision can be broken into two components: the provision necessary to cover losses estimated in Step 2 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

# Estimate Earnings Impact of Economic Scenarios

## Step 3

**Figure 3. 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)	15,000	15,500	11,500	8,500
Less: Provision to Cover Two Year Losses	(750)	(3,875)	(7,750)	(11,438)
Less: Provision to Maintain Adequate ALL	(250)	(500)	(750)	(1,000)
<i>Pre-Tax Income</i>	14,000	11,125	3,000	(3,938)
Income Tax (Expense) / Benefit	(4,900)	(3,894)	(1,050)	1,378
<b>Net Income</b>	<b>9,100</b>	<b>7,231</b>	<b>1,950</b>	<b>(2,559)</b>

# Estimate Capital Impact of Economic Scenarios

## Step 4

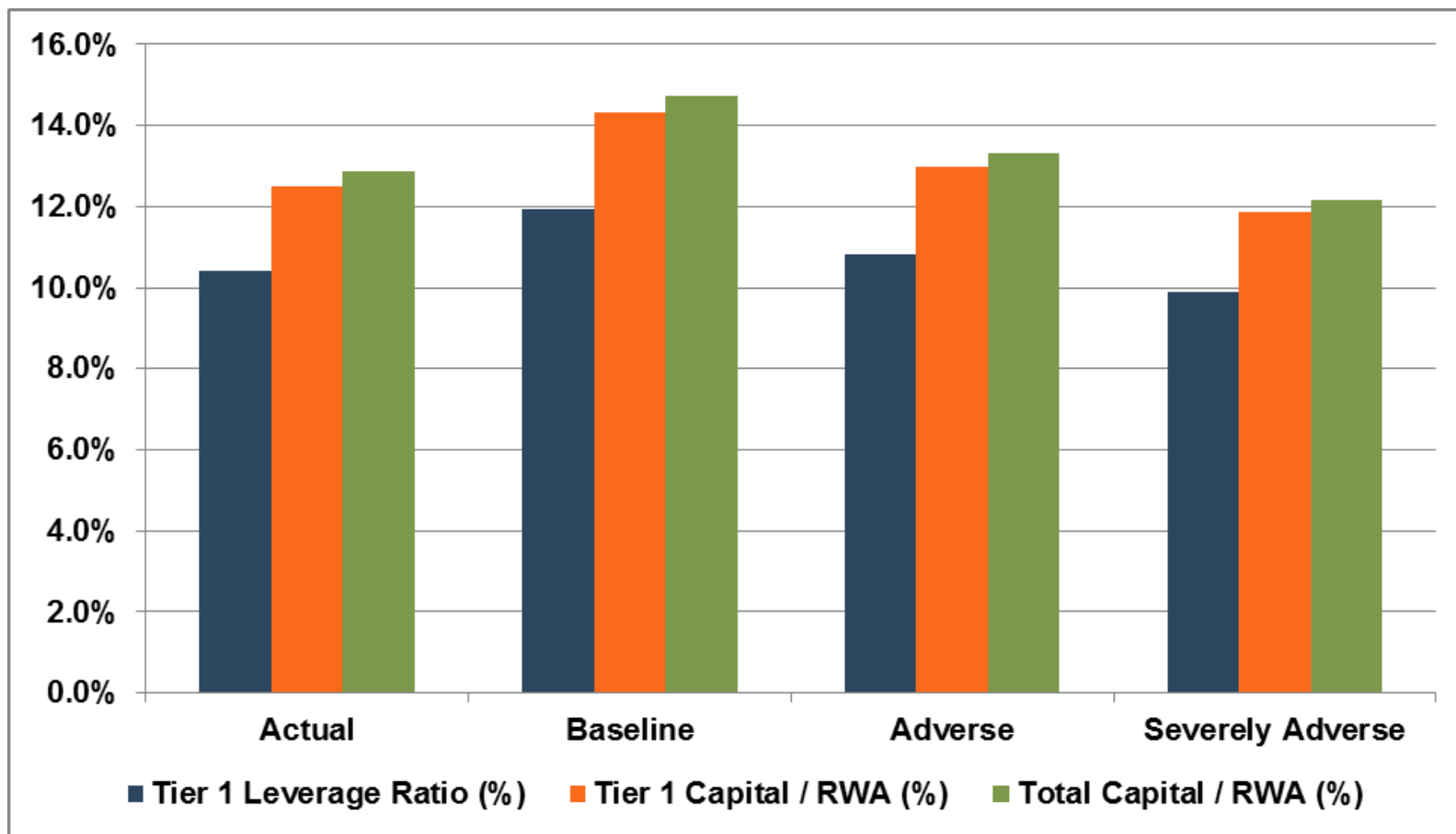
**Estimate the bank's capital ratios at the end of the stressed period**

To accomplish this, the estimated changes in equity, Tier 1 Capital, average assets, and risk-weighted assets during the stressed period should be considered

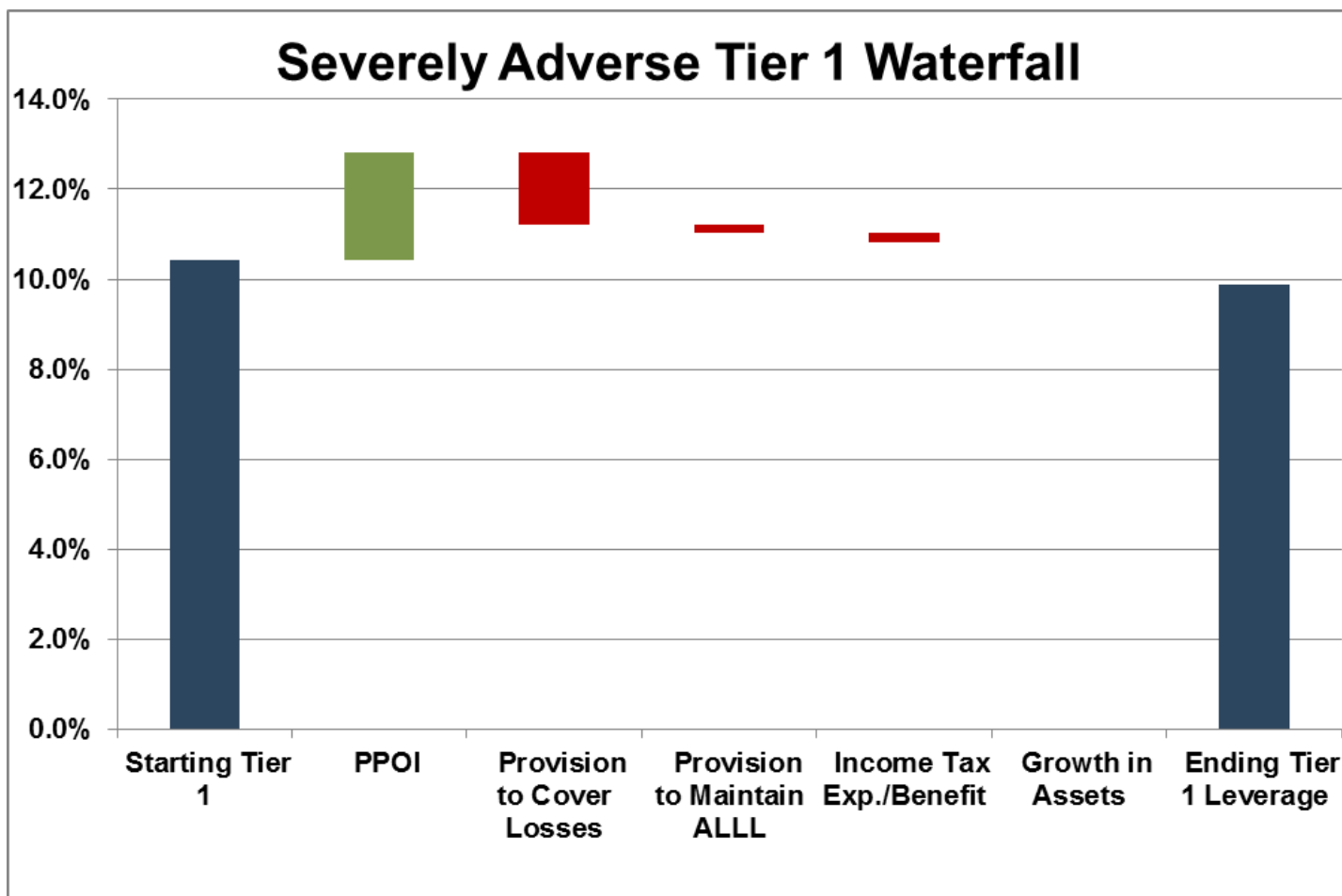
### 4. Estimate Impact of Stress on Capital

	Actual (\$M)	Pro Forma Baseline (\$M)	Pro Forma Adverse (\$M)	Pro Forma Severely Adverse (\$M)
Tier 1 Capital	50,000	50,000	50,000	50,000
Net Change in Tier 1 From Stress	N/A	7,231	1,950	(2,559)
<b>Adjusted Tier 1 Capital</b>	<b>50,000</b>	<b>57,231</b>	<b>51,950</b>	<b>47,441</b>
Tier 2 Capital	1,500	1,500	1,500	1,500
Net Change in Tier 2 From Stress	N/A	250	(250)	(250)
<b>Adjusted Total Capital (Tier 1 + Adj. Tier 2)</b>	<b>51,500</b>	<b>58,981</b>	<b>53,200</b>	<b>48,691</b>
Assets for Leverage Ratio	480,000	480,000	480,000	480,000
<b>Tier 1 Leverage Ratio (%)</b>	<b>10.4%</b>	<b>11.9%</b>	<b>10.8%</b>	<b>9.9%</b>
Risk Weighted Assets	400,000	400,000	400,000	400,000
<b>Tier 1 Capital / RWA (%)</b>	<b>12.5%</b>	<b>14.3%</b>	<b>13.0%</b>	<b>11.9%</b>
Total Capital (Tier 1 + 2)	51,500	58,981	53,200	48,691
<b>Total Capital / RWA (%)</b>	<b>12.9%</b>	<b>14.7%</b>	<b>13.3%</b>	<b>12.2%</b>

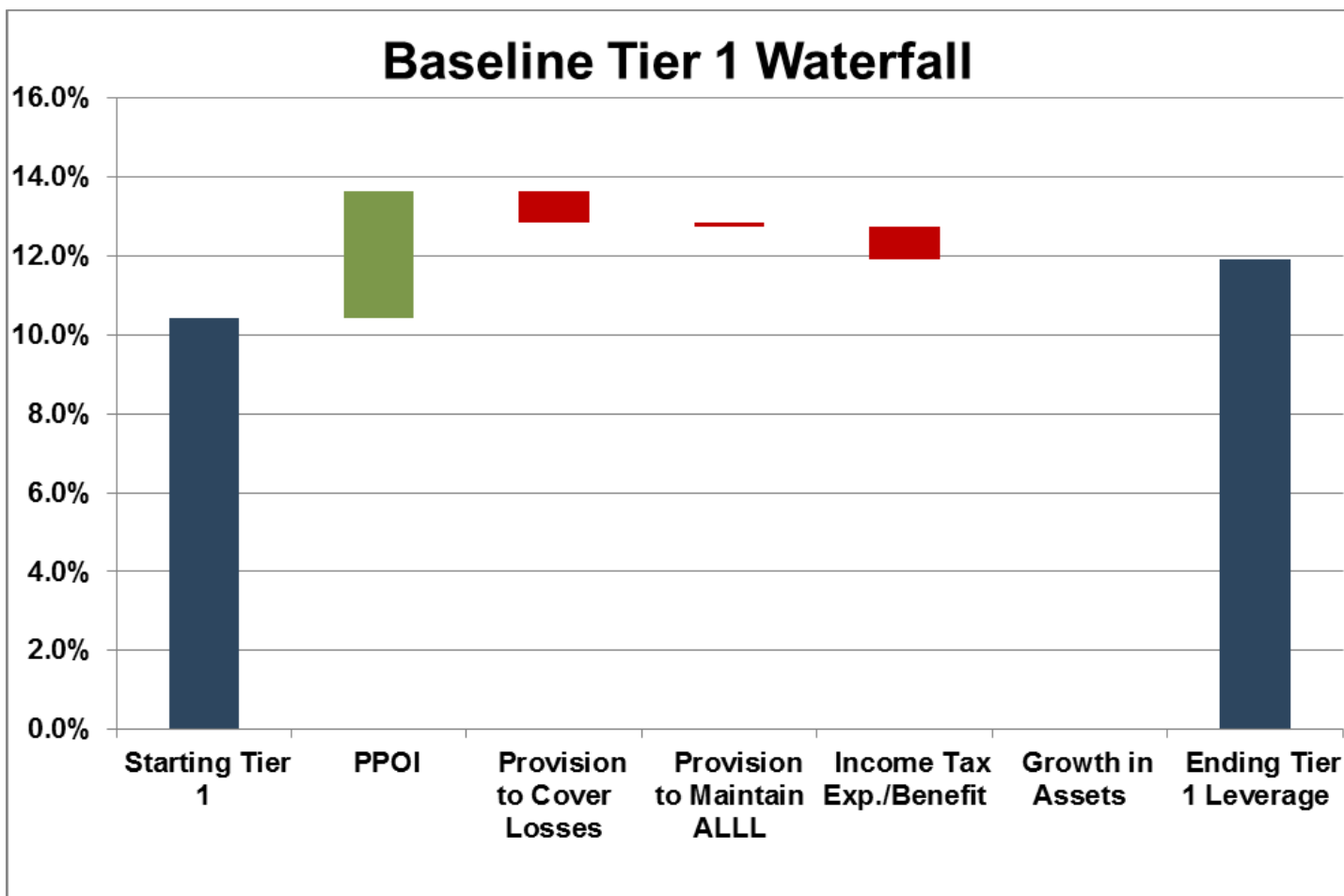
# Analyze Results



# Analyze Results



# Analyze Results



# What Should We Do with the Results?

## Strong Bank

Could provide adequate support to regulators and board with evidence that capital is adequate and can be utilized for a variety of activities (M&A, S/H buyback, elevated dividend)

Do we have “excess” equity and/or loan loss reserves?

Frank & Ernest



<https://dummr.wordpress.com/tag/bank-stress-test/>

## Weak Bank

May lead to the need for requesting a more robust stress test be performed on certain loan segments

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

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

# Should You Engage an Outside Vendor? If So, In What Capacity?

Well, it depends.

With expertise & experience, an outside vendor can

- assist in areas where the bank is weak
- speed up the process
- strengthen the process

“

You know, we're supposedly several years out of the recession—but it doesn't really feel that way. If something happens, it would be nice to have some knowledge that could direct your actions two years from now. It might be the cheapest money we ever spent, quite frankly.

– Will Chase,  
President & CEO of Triumph Bank

<http://bankingjournal.aba.com/2015/10/stress-testing-feeling-the-pressure/>



# Mercer Capital's Stress Testing Services



## **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

# Conclusion

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Stress testing is a **growing part** of the banking regulatory lexicon, and we don't expect this trend to wane going forward

Stress testing should be viewed as **more than a check-the-box** regulatory exercise as it can **enhance decision making and risk management**

Stress testing can be a **complex exercise** and banks should start to **build their expertise** in this area sooner rather than later

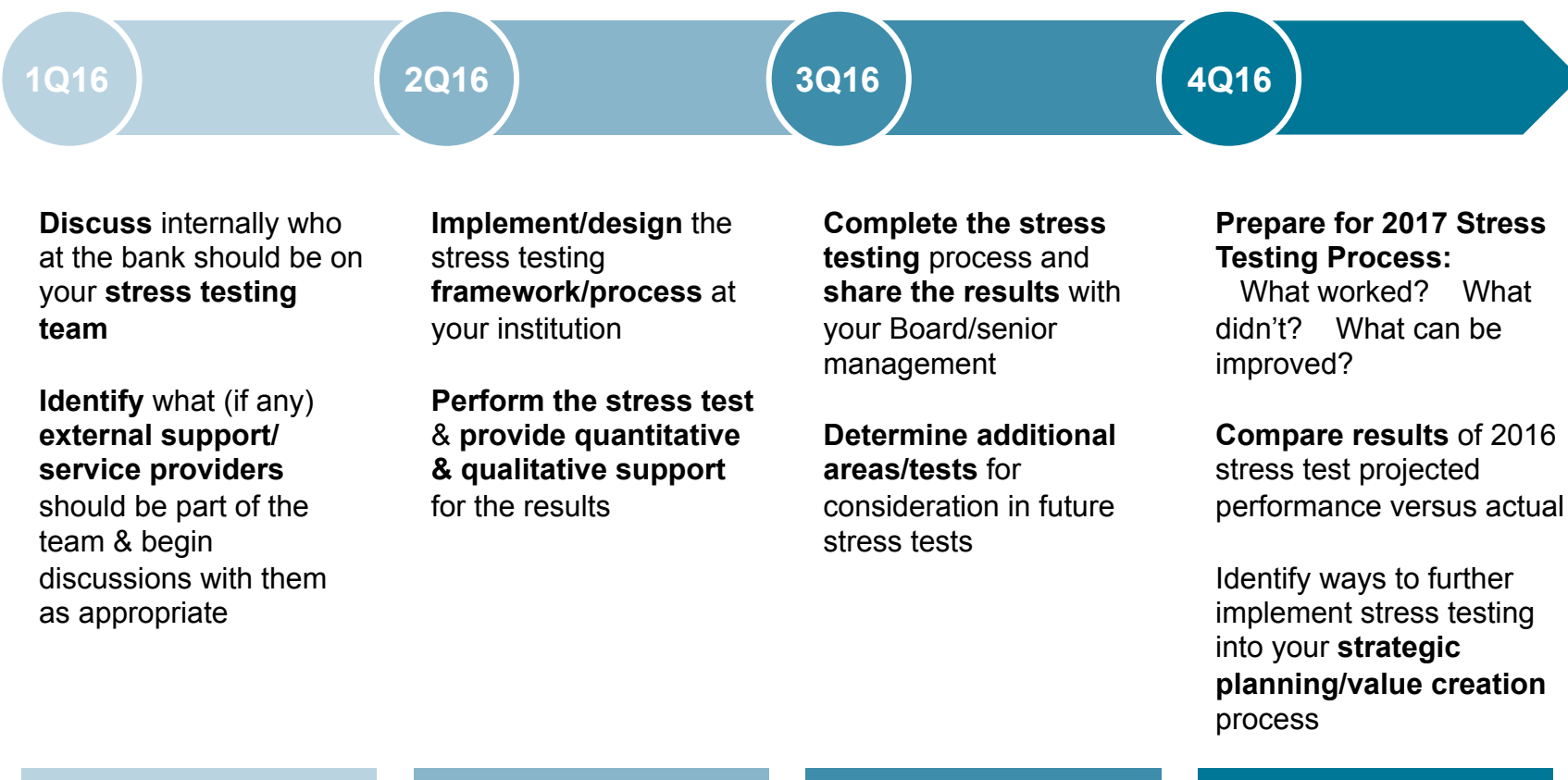
The qualitative aspects/support for the test are often as important if not more important than the quantitative aspects

There are a **variety of potential stress testing methods**, and it is important to prepare your bank's stress test in light of your bank's **unique financial position and strategy**

Developing a stress testing framework and process requires **coordination within your bank** as well as **potentially with outside vendors**

# Example Timeline

## 2016 Stress Testing



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

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wilsonj@mercercapital.com  
901.685.2120

## **Mercer Capital**

Memphis | Dallas | Nashville

5100 Poplar Ave., Suite 2600  
Memphis, TN 38137

[www.mercercapital.com](http://www.mercercapital.com)

Jay D. Wilson, vice president, is a senior member of Mercer Capital's Depository Institutions practice. Jay also leads Mercer Capital's Financial Technology industry team and publishes research related to the FinTech industry.

Jay is involved in the valuation of banks, thrifts, and credit unions for purposes including ESOPs, mergers and acquisitions, profit sharing plans, estate and gift tax planning, compliance matters, and corporate planning.

He has extensive experience providing public and private clients with fair value opinions and related assistance pertaining to goodwill and intangible assets, stock-based compensation, loan portfolios, and other financial assets and liabilities. Jay also directs projects in a litigated context, including tax disputes, dissenting shareholder actions, and ESOP related matters.

Designations held include Chartered Financial Analyst (CFA) from the CFA Institute, Accredited Senior Appraiser (ASA) from the American Society of Appraisers, and the Certified Business Appraiser (CBA) from the Institute of Business Appraisers.

For more information, view his complete CV at [www.mercercapital.com](http://www.mercercapital.com).

# About Mercer Capital

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**Mercer Capital is a national business valuation and financial advisory firm.  
Financial institutions are the cornerstone of Mercer Capital's practice.**

Founded in 1982, in the midst of and in response to a previous crisis affecting the financial services industry, Mercer Capital has witnessed the industry's cycles. Today, as in 1982, Mercer Capital's largest industry concentration is financial institutions.

Despite industry cycles, Mercer Capital's approach has remained the same – understanding key factors driving the industry, identifying the impact of industry trends on our clients, and delivering a reasoned and supported analysis in light of industry and client specific trends. The Financial Institutions Group of Mercer Capital provides a broad range of specialized advisory services to the financial services industry.

The Financial Institutions Group broadly assists:

- » Depository institutions
- » Insurance companies
- » Investment funds
- » Private equity, hedge funds, and traditional asset managers
- » Specialty finance and real estate investment companies

The unifying element of Mercer Capital's services for financial institutions is its in-depth industry knowledge, gleaned from 30 years of experience and over 1,000 engagements.

# Mercer Capital's Core Services for Financial Institutions

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## Advisory Services

- Stress Testing
- Strategic consulting
- Buy-side and sell-side financial advisory services
- Fairness opinions
- Advisory and consultation regarding capital transactions (raising, deploying, and restructuring capital)

## Corporate Valuation Services

- Equity transactions (share repurchases, issuances, and conversions)
- Corporate transactions (recapitalizations, divestitures, reorganizations, and the like)
- Employee benefit plans (ESOPs, KSOPs, stock option plans, and restricted stock)
- Tax compliance (income, estate, and gift)
- Buy/sell agreement consulting and the valuation of securities with contractual restrictions on transfer
- Valuation of complex securities (convertibles, options, warrants, and the like)
- Valuation of securities with impaired marketability
- Litigation support

## Financial Reporting Services

- Purchase price allocations (ASC 805)
- Stock-based compensation (ASC 718)
- Goodwill impairment (ASC 350)
- Illiquid financial instruments (ASC 820)
- Portfolio investments held by business development companies, private equity firms, and the like