



# Stress Testing and Model Governance



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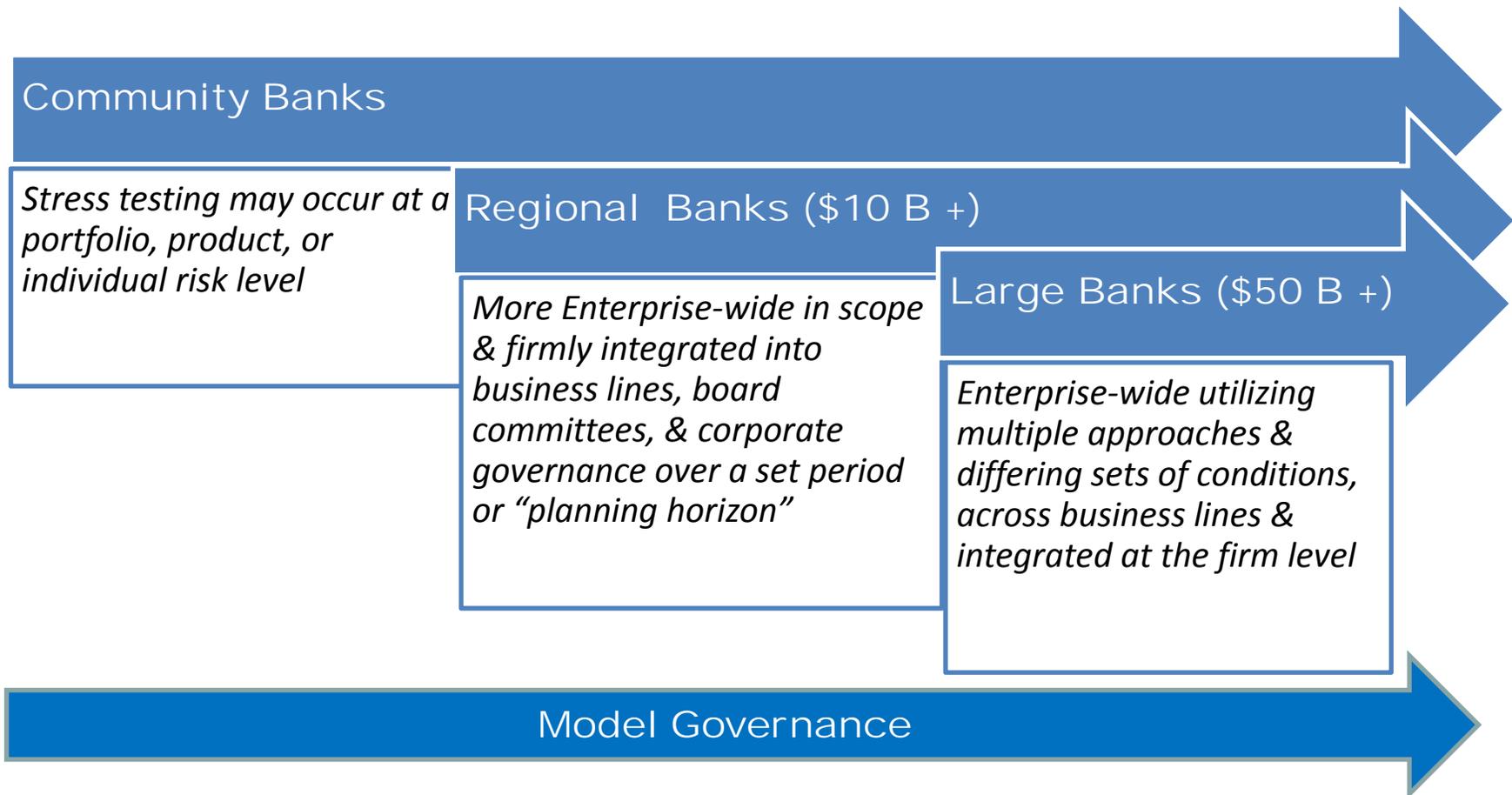


# Stress Testing Rationale

- **The financial crisis demonstrated how rapid deterioration in economic and market conditions can strain a bank's financial condition and viability, particularly with respect to asset concentrations and volatile liquidity and funding sources.**
- **Stress testing enhances the ability to understand risks and the potential impact of stressful events on a bank's financial condition.**
- **This presentation aims to show the range of benefits, requirements, and expectations for banks of varying sizes and complexity.**



# Varying Degrees of Stress Testing





# Stress Testing Benefits

- **Stress testing assists management in becoming more forward looking.**
- **Stress testing is a useful tool in risk management and strategic planning.**
- **Stress testing helps identify what events could threaten viability.**

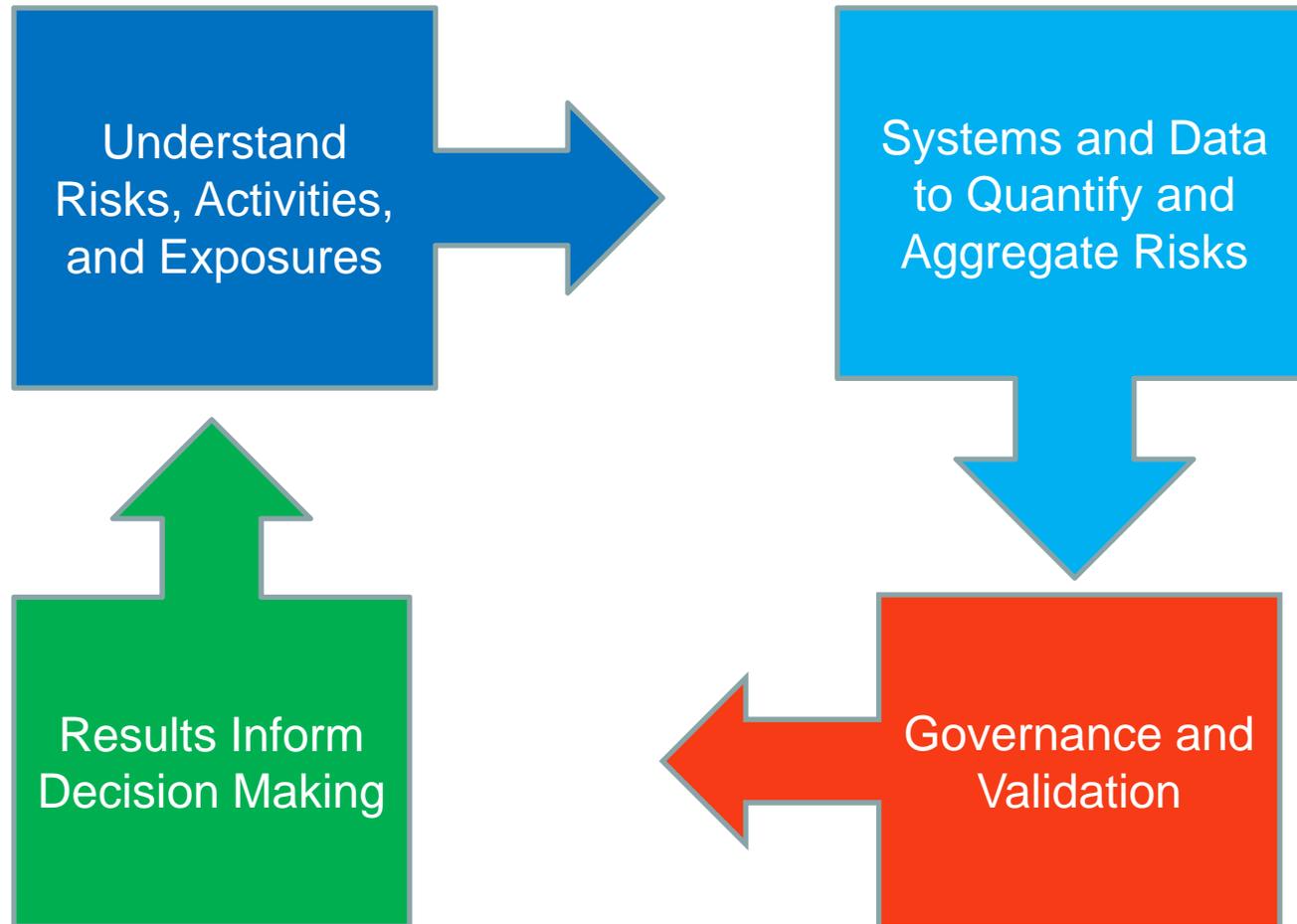


# Stress Testing Definition

- **Stress testing are exercises used to conduct a forward-looking assessment of the potential impact of various adverse events and circumstances on a banking organization.**
- **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.**



# Stress Testing: Risk Management Tool





# Stress Testing Results and Risk Mitigation

- **The results of stress tests should be evaluated and measured against an institution's risk tolerance thresholds and capital.**
- **If stress testing results reflect a level of risk in excess of the institution's risk tolerance and capital levels, management should develop a plan to mitigate the risk.**
- **Risk mitigation can include raising capital, adjusting business strategies, curtailing exposed portfolios or activities, etc.**



# Community Bank Stress Testing

- **Community banks are not required or expected to conduct the enterprise-wide stress tests required of larger organizations.**
- **The Agencies issued a Statement to Clarify Supervisory Expectations for Stress Testing by Community Banks in May 2012.**
- **Community banks may find the implementation of an effective stress-testing process will help the board and senior management better understand the potential impact of adverse scenarios.**



# Community Bank Stress Testing

- **While community banks are not required to conduct enterprise-wide stress tests, sensitivity analysis and stress testing requirements have been included in various regulatory guidance issued over the past decade:**
  - ◆ Interagency Policy Statement on Interest Rate Risk (1996)
  - ◆ Interagency Policy Statement on Funding and Liquidity Risk Management (2010)
  - ◆ Guidance on Concentrations in Commercial Real Estate, Sound Risk Management Practices (2006)
  - ◆ Expanded Guidance for Subprime Lending Programs (2001)



# Community Bank Stress Testing

- **When an institution is subject to a supervisory expectation (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. This approach can assist institutions in strengthening credit risk management practices.**



# Potential Stress Factors

- **The following are potential stress factors:**
  - ◆ GDP growth
  - ◆ Disposable income trends
  - ◆ Unemployment rates
  - ◆ Inflation rate / Interest rates / Price indexes
  - ◆ Delinquency rates / Loss rates / Recovery rates / Prepayment rates
  - ◆ Shifts in yield curve or demand curves
  - ◆ Absorption rates / Vacancy rates / Capitalization rates
  - ◆ Collateral Values
  - ◆ Input or Production costs (maintenance or labor costs)
  - ◆ Regional/local economic, financial, or other factors



# Credit Stress Testing Methods

- **The FDIC does not endorse a prescribed method for stress testing – various approaches exist:**
  - ◆ Transactional Sensitivity Analysis
  - ◆ Loan Migration Analysis
  - ◆ Stressed Portfolio Loss Rates
  - ◆ Scenario Analysis
  - ◆ Reverse Stress Testing



# Credit Risk Stress Test Example – Capital

<i>1. Estimate Portfolio Losses Over the Stress-Test Horizon</i>					
		Stress Period Loss Rates Over Two Years		Stress Period Losses Over Two Years	
	Estimated Portfolio Balances, in \$	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



# Credit Risk Stress Test Example - Capital

<i>2. Estimate Revenues and Impact of Stress on Earnings</i>		
	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)



# Credit Risk Stress Test Example - Capital

<i>3. Estimate Impact of Stress on Capital</i>		
	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
<i>Estimated Tier 1 Leverage Ratio</i>	10%	7%



# Using Stress Testing 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.**



# Sound Practices

- **When choosing to employ stress testing, community banks may benefit from the following sound practices:**
- **Governance & Controls**
  - ◆ Board & senior management establish expectations
  - ◆ Policies describe and set forth purpose, frequency, and range of actions for results
  - ◆ Components of the analytical approaches, both quantitative and qualitative, are fully documented and transparent
  - ◆ Scenarios are justified in the context of the current economic and financial conditions
  - ◆ Independent evaluation of the program and model
  - ◆ Controls are set to verify data inputs and review the accuracy of outputs
- **Inputs**
  - ◆ Bank considers a range of differing degrees but plausible scenarios
  - ◆ Key assumptions defined
  - ◆ As conditions change, assumptions and scenarios are reevaluated
  - ◆ Bank considers which scenarios might threaten viability
  - ◆ Bank should use their own experience whenever appropriate
  - ◆ Gaps in data quality are identified and action plans are developed to remediate



# Sound Practices

## ■ Use of Vendor Models

- ◆ Management can explain the role of vendor models and how they are utilized.
- ◆ In-house expertise with a fundamental understanding of methodology, construction, and capabilities.
- ◆ Periodic evaluation by Management / Board and ensures validation work is performed.

## ■ Output

- ◆ Results are regularly discussed with managers / departments who make key strategic decisions.
- ◆ Results are subjected to sensitivity analysis of key model assumptions.
- ◆ Results are benchmarked against outcomes of other available stress-tests.
  - Benchmarks can aid in evaluating the reasonableness of stress-testing outcomes; however, they should not be overly relied upon to support the accuracy or robustness of model.



# Sound Practices

## ■ Review & Actions

- ◆ Results feed into critical planning and decision-making processes:
  - Strategic business decisions
  - Capital adequacy
  - Contingency funding
  - Exposure limits
- ◆ Process feedback: Evaluate results to determine if additional scenarios or approaches are needed.



# Examiner Role

- **Examiners will evaluate the reasonableness of stress testing practices used by management in relation to the size, complexity, and nature of risks at the bank.**
  
- **Recognize requirements versus sound practices:**
  - ◆ Interest Rate Risk Management
  - ◆ Liquidity Contingency Funding Planning
  - ◆ CRE and Subprime Lending
  
- **Focus on the effectiveness of board oversight and direction, policy guidance, and internal control and validation processes.**
  
- **Examiners will work with banks as they seek to improve their stress testing process and may offer recommendations as appropriate to help enhance practices.**

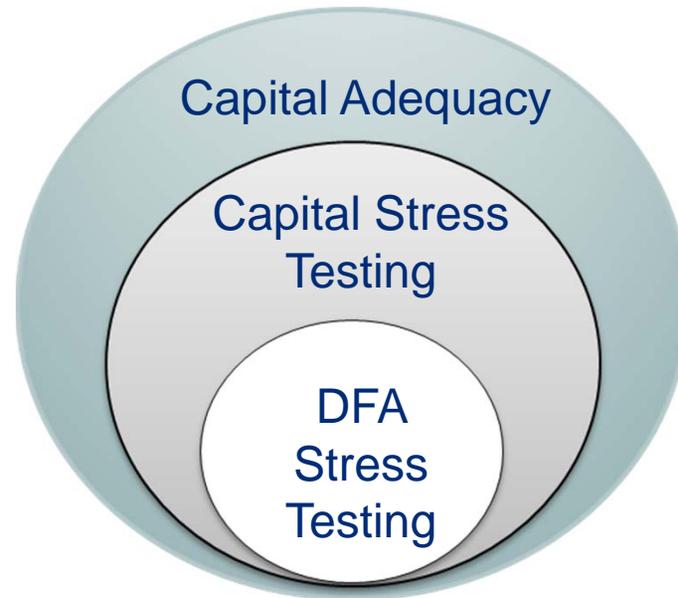


# Stress Testing at Regional and Large Banks

- **One result of the financial crisis is prominently emphasized in the supervision of large banks, through the requirements of Section 165 under Dodd-Frank (DFA):**
  - ◆ Enterprise-wide stress tests required of large organizations under the Capital Plan Rule,
  - ◆ Rules implementing DFA stress testing requirements,
  - ◆ Stress testing guidance for organizations with more than \$10 billion in total consolidated assets.



# DFA Stress Testing in Context



DFA Stress Tests are one component of a broader stress testing program and do not capture:

- All idiosyncratic risks,
- Other sources of stress, such as funding and interest rate risk (other than interest-rate paths specified in the supervisory scenarios).



# DFA Stress Testing Timeline

<b>Process Overview of Annual Stress Test (using data as of September 30th)</b>		
<b>Step</b>	<b>Timeframe for Over \$50 Billion Covered Banks</b>	<b>Timeframe for \$10 Billion to \$50 Billion Covered Banks</b>
FDIC provides scenarios for annual stress tests	No later than November 15th	No later than November 15th
Covered banks submit required regulatory reports to the FDIC on their stress tests	No later than January 5th	No later than March 31st
Covered banks make required public disclosures	Between March 15th and March 31st	Between June 15th and June 30th

*First Required  
June 2015*



# DFA Stress Testing Rule

## Projected Losses

Loan Losses  
Commitment & Contingent Obligations  
Losses on AFS/HTM  
Losses on Trading Book  
Counterparty Credit  
Other Losses

## PPNR

Net Interest Income  
+ Non-Interest Income  
- Non-Interest Expense  
Excluding:  
Own debt FV adjustments  
Goodwill adjustments  
One-time exclusions

## Loan Loss Reserves

Changes in ALLL  
  
(Need to consider periods beyond 9Q horizon)

## Capital Levels

Tier 1 Capital  
Total Capital  
Leverage Ratio  
Basel III Ratios (future)

*Incorporate the effects of any capital actions*



# DFA Stress Testing Rule

- **Each company must establish and maintain a system of controls, oversight and documentation, including policies and procedures, that are designed to ensure processes are effective in meeting the rule requirements.**
  - ◆ Policies and procedures must, at a minimum, describe the company's stress testing practices and methodologies, and the processes for validating and updating practices and methodologies consistent with applicable laws, regulations, & supervisory guidance.
  - ◆ The board of directors, or a committee thereof, must approve and review the stress testing policies and procedures as frequently as economic conditions or the condition of the company may warrant, but no less than annually.



# Proposed Guidance \$10B-\$50B

- **Proposed DFA Stress Test Guidance for Medium-sized Firms was issued July 30, 2013:**
  - ◆ Supervisory Scenarios
  - ◆ Data Sources and Segmentation
  - ◆ Loss Estimation
  - ◆ Pre-Provision Net Revenue (PPNR)
  - ◆ Balance Sheet and Risk-Weighted Assets
  - ◆ Governance and Controls
  
- **Request for Comment by September 25, 2013**



# DFA Preparedness Steps

- **Develop gap analysis & remediation plans vis-à-vis the DFA stress test final rules (including preamble) and stress testing guidance.**
- **Build sound governance structures around stress testing, including DFA stress tests.**
- **Review data & information to be used as inputs for DFA & other types of stress testing.**
- **Ensure sound risk management to support stress testing (e.g., sound credit risk rating systems or other risk identification).**
- **Evaluate resources needed for DFA & other stress testing.**
- **Ensure conformance with model risk management guidance for those models to be used in stress testing (including any sub-models).**
- **Review scenarios issued for large BHCs/banks last fall and begin to consider how those might be applied to a \$10-50bn firm.**



# Examiner Role

- **Examiners are currently engaged in discovery work**
- **Focus areas:**
  - ◆ Governance structures around stress testing
  - ◆ Data & information used as inputs
  - ◆ Soundness of risk management to support stress testing
  - ◆ Resources available for DFA & other stress testing
  - ◆ Conformance with model risk guidance
  - ◆ Use of stress testing in overall capital planning & risk management
- **Evaluate firms' use of consultants/vendors**
- **Examiners will convey initial concerns about stress testing practices either in an informal manner, via supervisory correspondence, or if a safety & soundness concern, may convey formally.**



# Model Governance

- **Although modeling involves the opportunity for error, strong governance procedures can help minimize model risk by:**
  - ◆ Providing reasonable assurance the model is operating as intended;
  - ◆ Contributing to ongoing model improvement to maintain effectiveness; and
  - ◆ Promoting better management understanding of the limitations and potential weaknesses of a model.



# Model Governance Expectations

- **The board establishes policies providing oversight throughout the organization that are commensurate with overall reliance on models.**
- **Business line management or senior management provides adequate controls over each model's use, based on the criticality and complexity of the model.**
- **Bank staff or external parties with appropriate independence and expertise periodically validate that the model is working as intended.**
- **Internal audit tests individual model control practices as well as the model validation procedures used to ensure compliance with established policies and procedures.**



# Components of a Model and Validation Process

- **Three components:**
  - ◆ Input
  - ◆ Processing
  - ◆ Reporting
  
- **Identify models across the organization and those for a particular purpose, such as stress testing**
  
- **Models should be grouped by importance to the organization**
  
- **Effective challenge**
  
- **Independent from model development and use**



# Elements of Model Validation

- **Three core elements of model validation:**
  - ◆ Evaluation of conceptual soundness and developmental evidence
  - ◆ Ongoing monitoring
  - ◆ Outcomes analysis



# Resources

- **Interagency Policy Statement on Funding and Liquidity Risk Management (2010) – (applies to all insured depository institutions)**
- **Interagency Policy Statement on Interest Rate Risk (1996) & 2010 IRR Advisory**
- **Guidance on Concentrations in Commercial Real Estate, Sound Risk Management Practices (2006: institutions with CRE concentrations)**
- **Expanded Guidance for Subprime Lending Programs (2001: institutions with concentrations in subprime lending programs)**
- **Interagency Loan Loss Allowance Guidance for Junior Lien Portfolios (FIL)**
- **Joint Release: Agencies Clarify Supervisory Expectations for Stress Testing by Community Banks – press release dated May 14, 2012**



## Resources (continued)

- **Managing Commercial Real Estate Concentrations, Supervisory Insights, FDIC, Winter 2007**
- **Stress-testing Credit Risk at Community Banks, Supervisory Insights, FDIC, Summer 2012**
- **The Case for Stress Testing at Community Banks, Conference of State Bank Supervisors, October 2010**
- **Model Governance, FDIC Supervisory Insights, Winter 2005**
- **FRB and OCC Guidance on Model Risk Management, April 2011**
- **Supervisory Guidance on Stress Testing For Banking Organizations with More Than \$10 Billion in Total Consolidated Assets, May 2012**



# Upcoming Outreach Events

- **San Francisco Region FDIC Information Session on Interim Final Capital Rule**
  - ◆ Wednesday, August 7, 2013, 9am – 11am Pacific
  - ◆ Audio Presentation:
    - 1 (800) 369-1796 Participant Passcode 1995923#
    - Session Materials and Community Bank Guide available at [www.fdic.gov/regulations/capital](http://www.fdic.gov/regulations/capital)
  
- **National FDIC Teleconference for Community Banks on Interim Final Capital Rule**
  - ◆ Thursday, August 15, 2013, 8:00am – 9:30am Pacific
  - ◆ Audio Presentation:
    - 1 (888) 455-0408 Participant Passcode 7886320#
    - Questions may be submitted at [regulatorycapital@fdic.gov](mailto:regulatorycapital@fdic.gov)