Basel III & Stress Testing for Community Banks

May 17, 2013

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Agenda

Section 1: Basel III
- Regulatory update
- Overview of proposed rules
- Implications and impact of capital proposals
- What should community banks do now?
- What should community banks consider doing?

Section 2: Stress Testing
- Overview of rules
- Key components of an enterprise-wide stress test
- Challenges for community banks
- What should community banks do now?

Section 3: Questions

Today’s KPMG LLP presenters

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Advisory Services

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Capital Management

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Tax - Financial Services

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Capital Management
Polling question 1

What is the asset size of your institution?

- $500M – 1B
- $2B – $5B
- $6B – $10B
- $11B – $15B
- $15B and higher

Section 1 – Basel III for Community Banks
Impact of current political/legislative environment on bank regulation

The current regulatory environment for the banking industry remains very politically charged.

- Delay in fully implementing key parts of Dodd-Frank Act of 2010
  - Volcker Rule on proprietary trading and fund activities
  - Enhanced capital standards – “Basel III capital rule”
  - Enhanced prudential standards for systemically important financial institutions (“SIFIs”)

- Ongoing debate about whether financial reform has gone far enough to end the risk that some banks are “too big to fail”
  - Senators Brown-Vitter Terminating Bailouts for Taxpayer Fairness Act (“TBTF Act”) would ramp up capital leverage ratios to 15% for big banks (greater than $50B in assets)

- Fed’s controversial foreign bank Intermediate Holding Company (“IHC”) proposed regulation that is meant to “level the playing field”

The challenge is that proposed regulation may have unintended consequences in terms of impact on economic growth and competition and end up hurting banks of all sizes.

Regulatory environment update

New capital requirements are just one of a number of areas the prudential regulators are focused on for community bankers:

- Heightened Safety & Soundness (S&S) and Compliance Examination Expectations – OCC, Fed, FDIC, CFPB
- Fed “heightened expectations” and OCC “get to strong” principles for large banks have a trickle down effect to regional and community banks:
  - Board Oversight
  - Risk Management/Compliance – Functioning “three lines of defense” risk management framework
  - Risk Appetite
  - Enterprise Risk Management
  - Operational Risk Management, including RCSA
  - Internal Audit – effective challenge
- Other key areas of S&S examination focus:
  - Capital, Liquidity and Stress Test requirements (CapPR, CCAR)
  - “Living wills” - recovery and resolution plans
  - Accuracy of underlying “risk data” and model risk management
  - Executive compensation link to risk/compliance
  - Vendor risk management
  - Information security
  - Regulatory reporting
  - Regulation W / intercompany transactions
- CFPB and the bank regulators have raised the bar on testing and documenting compliance with consumer protection laws and rules, including reporting
Polling question 2

Which of the following is viewed as the biggest challenge ahead for your organization:

- Regulatory Compliance
- Revenue Replacement
- Increasing Market Share
- Cost Management
- Geographic Concentration Economy
- Human Resources (staff retention and quality staff growth)
- General lack of stability of the work financial markets
- Other
- N/A

Overview of proposed rules

Strengthening Capital Management through Basel III as proposed for community banks:

- Revises the definition of regulatory capital components and related calculations
- Strengthens risk coverage
- Supplements Basel II with leverage ratio
- Promotes capital buffers for use in positive economic environments and stress events
- Introduces minimum liquidity standard
- Enhances the supervisory process and market discipline
- Provides a transition period for several aspects of the proposed rule
Overview of proposed rules (continued)

- Basel III focuses on the numerator of the regulatory capital calculation, eliminating or reducing previously allowed hybrid capital instruments.
- Deductions from capital result in some items would be risk-weighted at 1250%.
- The proposed rule also strengthens the capital required by increasing the regulatory capital ratios on both tier 1 and tier 2, as shown on the timetable on the next slide. These capital components can be viewed as:
  - Tier 1 (Going Concern)
  - Tier 2 (Gone Concern)
- Other capital requirements that we will discuss are:
  - Capital Conservation Buffer
  - Countercyclical Capital Buffer* 

* Countercyclical buffer only applicable to Advanced Approach Banks.

Timeline for increased ratios

<table>
<thead>
<tr>
<th>Year</th>
<th>Minimum Tier 1 Capital (CET 1)</th>
<th>Tier 2 Capital</th>
<th>Other Tier 1 Capital</th>
<th>Capital Conservation Buffer</th>
<th>Total Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>2.00%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>2.00%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>4.50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>4.50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>4.50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>2.00%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>2.00%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>2.00%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Implications

1. Increased quality of capital
The NPRs contain various measures aimed at improving the quality of capital with the ultimate aim to improve loss-absorption capacity in both going-concern and liquidation scenarios

<table>
<thead>
<tr>
<th>Description of key changes</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common equity and retained earnings should be the predominant component of Tier 1 capital instead of debt-like instruments</td>
<td>Measures already discounted by markets so banks are likely to clean up their balance sheets (already seeing a significant reduction by Banks of MSR holdings)</td>
</tr>
<tr>
<td>Full deduction for capital components with little loss-absorption capacity, such as minority interests, holdings in other financial institutions, DTAs, and MSRs</td>
<td>Likely to see significant capital raising by banks along with retention of profits and reduced dividends</td>
</tr>
</tbody>
</table>

2. Increased quantity of capital
The NPRs contain various measures aimed at increasing the level of capital held by institutions, as well as providing counter-cyclical mechanisms

<table>
<thead>
<tr>
<th>Description of key changes</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1 Common ratio: increases from 3.5% – 4.5%</td>
<td>Banks will face significant capital requirements and the bulk of this shortfall will need to be raised as common equity or otherwise by retaining earnings (i.e. dividends)</td>
</tr>
<tr>
<td>Total Tier 1 ratio: increases from 8% – 10.5%</td>
<td>In principle, banks will be able to draw on the capital conservation buffer during periods of stress, but this will impact their ability to distribute earnings</td>
</tr>
<tr>
<td>Timeframe: gradual increases over 2013 – 2019</td>
<td>Consequently, banks are likely to target a higher common equity ratio and currently market expectations for CET 1 appear to be moving towards approximately 9%</td>
</tr>
<tr>
<td>Regulatory adjustments and deductions phased out by 20% per year beginning in 2014</td>
<td></td>
</tr>
<tr>
<td>Introduction of Conservation and Countercyclical Capital Buffers (an additional 2.5% by 2019)</td>
<td></td>
</tr>
<tr>
<td>Trust Preferred Securities downgraded to Tier II</td>
<td></td>
</tr>
</tbody>
</table>

* Countercyclical buffer only applicable to Advanced Approach Banks.

Polling question 3

What is your functional area?
- Risk
- Compliance
- Tax
- Internal Audit
- Legal
- Finance
- Other
Basel III – NPR and deferred taxes

Basel III provisions

- DTAs (net of allocated DTLs) dependent on the future profitability of the bank, such as DTAs arising from NOLs or credit carry forwards, are to be subtracted from CET1.
- DTAs arising from temporary differences are treated as good assets if they:
  - Can be netted against DTLs, provided they are “levied by the same taxation authority and offsetting is permitted”; and
  - Do not exceed the 10% and 15% caps set in the Threshold Deductions calculations.
- Allocation and netting of DTLs – DTLs are to be allocated between DTAs arising from NOLs and tax credit carryforwards and those arising from temporary differences on a pro rata basis. Only DTAs and DTLs that relate to taxes levied by the same taxation authority and that are eligible for offsetting by that authority may be offset for purposes of determining deduction from capital.
- Transition rules:
  - In general, the new provisions are to be phased in over five years beginning in 2014 in 20% increments.
  - The exact transition rules are left to each implementing government to prescribe.

Deferred Tax Interaction With Other Regulatory Adjustments

- Threshold Deductions – DTAs, MSRs and Significant Investments are treated as good assets to the extent that (i) they each are less than 10% of adjusted CET1, and (ii) collectively are less than 15% of adjusted CET1. Any amounts in excess of these limits are written off.
- Net of taxes – Most of the deductions and adjustments made to regulatory capital are “net of associated deferred tax liabilities” (or, in the case of cash flow hedges, “net of applicable tax effects”). Any such deferred tax items netted against other regulatory items are not included in the deferred tax disallowance calculation itself.
Basel III – NPR and deferred taxes (continued)

NPR DTA provisions

- The provisions in the NPR dealing with DTAs (DTA NPR) closely parallel the DTA provisions in Basel III. The DTA NPR rules appear to be designed to completely replace the current rules.
- DTAs relating to NOL and tax credit carryforwards (net of allocated DTLs) are to be written off against CET1 without any provision justifying the treatment of these assets as good assets.
- Other significant proposed changes from the current rules:
  - Following the Basel III provisions, DTLs can only be netted against DTAs when they are levied by the same tax authority and offsetting is permitted.
  - Carryback rules remain in place but with silence as to the continuation of the assumption that all DTAs automatically reverse at the report date as under the Current Rules.
  - The Basel III provision on temporary differences that subjects these DTAs to the Threshold Deductions calculations replace the provision in the current rules looking at the next 12 months projected income to justify DTAs.

Basel III – NPR and deferred taxes (continued)

DTA NPR transition rules

- The NPR was intended to take effect generally on January 1, 2013 but has been delayed. Many now expect it to be effective in 2014. Most of its provisions are subject to a variety of transition rules. By the beginning of Year 6 after the first effective year, the major provisions are intended to be fully effective.
- There are two different transition provisions for DTAs:
  - For DTAs relating to NOL and tax credit carryforwards, 100% of these DTAs are deducted from Tier 1 capital (which includes elements in addition to common equity) in Year 1; thereafter, these DTAs are deducted in 20% increments from CET1 and the balance from Tier 1 capital until 100% of them are deducted from CET1 in Year 6.
  - For DTAs relating to temporary differences, the excess of these DTAs over the Threshold Deductions limits are to be deducted in 20% increments from CET1 beginning in Year 2 until 100% are deducted in Year 6.
- It appears relatively clear that banks evaluate DTAs solely under the NPR beginning in Year 1 (i.e., ignoring the Current Rules altogether).
- The interaction of the transition rules relating to other regulatory adjustment items and the tax effects associated with these items and the more general transition rules for deferred taxes is not totally clear. The best guidance appears to be the example provided in the preamble to the NPR.
RWA – Key changes for community banks

Changes to Calculation of Risk Weighted Assets

The NPRs introduce more rigorous and more calibrated capital measurements in an effort to encourage prudent lending and other banking business.

<table>
<thead>
<tr>
<th>Description of key changes</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following are the key changes for Basel I banks as a result of the standardized proposal:</td>
<td></td>
</tr>
<tr>
<td>Residential Mortgages:</td>
<td></td>
</tr>
<tr>
<td>– Introduction of two categories: Cat 1 and Cat 2</td>
<td>Overall, banks are required to demonstrate their knowledge of the assets on their balance sheet to a much higher degree, be able to prove this, and use the underlying asset characteristics to determine the appropriate risk weights under each new proposed scheme</td>
</tr>
<tr>
<td>– Cat 1 – satisfy certain key criteria such as duration of loan, requires regular periodic payments (no deferrals, neg-am), no balloons, bank must hold 1st Lien, ARM loans may not increase by more than 6% over life of loan (RW: 35% – 100%)</td>
<td></td>
</tr>
<tr>
<td>– Cat 2 – all others (RW: 100% – 200%)</td>
<td></td>
</tr>
<tr>
<td>Loans that move from Performing to Non-Performing are automatically moved to Cat 2</td>
<td></td>
</tr>
<tr>
<td>Risk Weights are now a function of LTV (the higher the LTV, the higher the RW)</td>
<td></td>
</tr>
<tr>
<td>Removal of PMI from determination of LTV</td>
<td></td>
</tr>
</tbody>
</table>

Securitizations:

<table>
<thead>
<tr>
<th>Description of key changes</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal of Ratings Based Approach (RBA) in determining the appropriate RW, in favor of:</td>
<td></td>
</tr>
<tr>
<td>– ‘Gross-Up Approach’</td>
<td></td>
</tr>
<tr>
<td>– ‘Simplified Supervisory Formula Approach’ (SSFA)</td>
<td></td>
</tr>
<tr>
<td>Introduction of Operational Requirements</td>
<td></td>
</tr>
<tr>
<td>Introduction of Due Diligence</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Category 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 60%</td>
<td>35%</td>
</tr>
<tr>
<td>&gt;60% to &lt;=80%</td>
<td>50%</td>
</tr>
<tr>
<td>&gt;80% to &lt;= 90%</td>
<td>75%</td>
</tr>
<tr>
<td>&gt; 90%</td>
<td>100%</td>
</tr>
</tbody>
</table>

RWA (continued)

MBS Example

- Emphasis is now on the quality and seniority of the tranche
- More complicated calculation required under the Proposed Rule
- Challenges for ‘Privately Held’ securities – obtain required information from the Trustee

<table>
<thead>
<tr>
<th>Tranche</th>
<th>Current Credit Support</th>
<th>Current Ratings (M/S/F)</th>
<th>Composite Rating</th>
<th>Basel I Capital Charge</th>
<th>Basel II Capital Charge</th>
<th>Basel III SSFA Capital Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-4</td>
<td>30.06</td>
<td>Aaa/AAA/AAA</td>
<td>AAA</td>
<td>8%</td>
<td>1.60%</td>
<td>1.60%</td>
</tr>
<tr>
<td>A-B</td>
<td>19.16</td>
<td>Aaa/AAA/AAA</td>
<td>AAA</td>
<td>8%</td>
<td>1.60%</td>
<td>2.11%</td>
</tr>
<tr>
<td>B</td>
<td>14.53</td>
<td>A2/A/A/AA</td>
<td>AA</td>
<td>8%</td>
<td>1.60%</td>
<td>11.50%</td>
</tr>
<tr>
<td>C</td>
<td>11.15</td>
<td>A2/A/A</td>
<td>A</td>
<td>8%</td>
<td>4.00%</td>
<td>30.71%</td>
</tr>
<tr>
<td>D</td>
<td>6.01</td>
<td>Baa/BBB-BBB-</td>
<td>BBB-</td>
<td>8%</td>
<td>8.00%</td>
<td>81.13%</td>
</tr>
<tr>
<td>E</td>
<td>4.51</td>
<td>Ba2/BB/B</td>
<td>BB</td>
<td>8%</td>
<td>28.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>F</td>
<td>3.01</td>
<td>B2/B/B</td>
<td>B</td>
<td>8%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
RWA (continued)

MSR example

- Some assets potentially will now come with a higher capital cost to the Bank
- Impact on Bank’s earning potential – lower ROE & ROA for most assets
- Challenge to maintain previous performance metrics

Capital charge and performance impact on $100 MSR Asset

<table>
<thead>
<tr>
<th></th>
<th>Under Basel I</th>
<th>Under Basel III</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSR Fair Market Value</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>10% Deduction from Capital</td>
<td>$10</td>
<td>N/A</td>
</tr>
<tr>
<td>100% Risk Weight</td>
<td>$90</td>
<td>N/A</td>
</tr>
<tr>
<td>250% Risk Weight</td>
<td>N/A</td>
<td>$250</td>
</tr>
<tr>
<td>10% Capital Charge for ‘Well Capitalized’</td>
<td>$9</td>
<td>N/A</td>
</tr>
<tr>
<td>10.5% Minimum Requirement</td>
<td>N/A</td>
<td>$26.25</td>
</tr>
<tr>
<td>Total Capital Required</td>
<td>$19.00</td>
<td>$26.25</td>
</tr>
<tr>
<td>Leverage Ratio</td>
<td>81%</td>
<td>73.8%</td>
</tr>
<tr>
<td>ROE (assuming 8.5% yield and 3.5% cost of financing)</td>
<td>29.8%</td>
<td>22.5%</td>
</tr>
</tbody>
</table>

Assumptions:
1 Assumes no countercyclical buffer, implementation date of 2015
2 Comprised of CET1 and Tier 1 RBC (4.5% + 6.0%)

Issues to consider:
- Carry out appropriate scenario planning and impact assessments to drive the development of a successful capital strategy
- Identify which businesses have the most attractive fundamentals under Basel III, and which businesses should be considered for exiting/divestiture
- Ensure management is adequately incentivized to optimize use of capital
- Define consistent, quantifiable capital objectives applied throughout the portfolio
- Identify what levers can be pulled if needed to fine-tune/lower capital consumption
- Ensure the organization is geared up to deliver measurement and management of the capital position and requirements on a timely basis
- Consider how to address the pricing implications arising from changes in the capital requirements for certain products
- Review whether the same business models continue under a different structure, minimizing capital penalties (e.g., branch versus subsidiary)
- Prepare to be able to meet more accelerated implementation timescales (if required)
### Issues to consider:

**Liquidity Management**

- Ensure understanding of current liquidity position in sufficient detail and know where the stress points are.
- Ensure management is sufficiently incentivized to optimize use of liquidity.
- Consider the impact of new liquidity rules on profitability and whether it has been factored into key business processes and pricing.
- Check that liquidity planning, governance, and modeling are in line with leading industry practice.
- Determine an appropriate series of *liquidity stress tests* and how these will change over time.
- Gain awareness of the likely implementation timetables for different elements of the global and national frameworks being proposed.
- Assess liquidity strategy in light of the existing legal and regulatory structure of the organization and identify whether systems, data, and management reporting are adequate to meet the requirements.

**General Capital Planning**

- Ensure understanding and charge businesses correctly for capital costs, focusing business models on less ‘capital intensive’ areas.
- Ensure that Basel III capital implications are taken into account for new businesses and consider how existing long-dated businesses can be revisited.
- Examine how non-core businesses, insurance subsidiaries, and other financial institutions can be sold or re-structured.
- Consider the introduction of external capital into specialist structure models to mitigate the capital impacts arising.
- Examine the performance of existing assessment methodologies (e.g. IRB models).
- Review existing data quality – potential to lose benefits from collateral information or improved re-rating of obligors due to inferior or ‘less applicable’ data sets.
What should community banks consider doing?

Firms that wish to succeed in a post-Basel III environment should have started to consider the implications of Basel III. Below is a roadmap for consideration. Even though there is still some uncertainty, there is no time to waste! Early impact analyses, evaluation of strategic options, and robust planning and preparation phases are all crucial to success. Also, banks should remain flexible to adapt to subsequent changes and new developments.

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact analysis</td>
<td>Basel III ratio analysis (OCC Calculator)</td>
<td>Forward looking capital planning</td>
<td>Earnings projections/scenario analysis</td>
<td>Adjusted RWA calculations</td>
<td>Profitability and Value Added analysis</td>
</tr>
<tr>
<td></td>
<td>Development and implementation of key stress tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation of strategic options</td>
<td>Examine capital and liquidity management strategies</td>
<td>Capital market transactions</td>
<td>Exit/divestments/restructurings</td>
<td>Develop or enhance capital and liquidity management framework</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Design enhanced capital and liquidity management framework</td>
<td>Plan for funding diversification and improved liquidity profile</td>
<td>Product redesign</td>
<td>Prepare for adjusted external reporting</td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td>Ongoing monitoring of Basel III parameters (through key risk indicators)</td>
<td>Communication with stakeholders (supervisors, shareholders, department heads)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td>Baseline compliant liquidity and funding</td>
<td>Basel III reporting</td>
<td>Process redesign</td>
<td>Business line integration/termination</td>
<td></td>
</tr>
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<td></td>
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</tr>
</tbody>
</table>

Polling question 4

How prepared are you for the implementation of these changes to regulatory capital reporting?
- Completed initial gap analysis, and no known issues
- Completed initial gap analysis, and some issues identified
- Completed initial gap analysis, and major issues identified
- Have not completed initial gap assessment
- N/A
Section 2 – Stress Testing for Community Banks

Overview of rules

Firms with assets between $10B and $50B are required to conduct annual stress tests:

- 3 scenarios:
  - Baseline, Adverse, Severely Adverse
  - Scenarios provided by November 15
- Actuals as of September 30, 9 quarter forecast
- Forecast losses, pre-provision net revenues (PPNR), net income, provision for loan and lease losses and the impact on regulatory capital ratios
- Submission requirements:
  - Results for each scenario reported in a series of prescribed schedules
    - Income Statement, Balance Sheet, Capital Worksheets, etc
    - A description of the types of risks being included in the stress test
    - A summary of stress test methodologies
    - An explanation of drivers of changes in regulatory capital ratios
- Submission due March 31, 2014
- Summary of results published June 2015
Elements of a robust stress testing program

“All banking organizations should have the capacity to understand fully their risks and the potential impact of stressful events and circumstances on their financial condition” – SR Letter 12-7

<table>
<thead>
<tr>
<th>General Stress Testing Principles</th>
<th>Elements of a Robust Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Includes activities and exercises that are tailored to and sufficiently capture the banking organization’s exposures, activities, and risks.</td>
<td>Includes credit, market, operational, interest-rate, liquidity, geography, strategic, and reputational risk.</td>
</tr>
<tr>
<td>2. Employs multiple conceptually sound stress testing activities and approaches.</td>
<td>Uses scenario, sensitivity, enterprise-wide, and reverse stress testing approaches.</td>
</tr>
<tr>
<td>3. Is forward-looking and flexible.</td>
<td>Incorporates changes in the organizations activities, portfolio composition, asset quality, operating environment, business strategy, and other risks that arise over time.</td>
</tr>
<tr>
<td>4. Ensures results are clear, actionable, well supported, and inform decision making.</td>
<td>Includes regular, documented communication to Board, management, and staff.</td>
</tr>
<tr>
<td>5. Includes strong governance and effective internal controls.</td>
<td>Requires critical review of key assumptions, uncertainties, and limitations.</td>
</tr>
</tbody>
</table>

Enterprise wide stress testing framework

The stress testing framework should be designed to ensure a firm maintains adequate capital through a range of stressed macroeconomic environments and should include clearly defined objectives, well-designed scenarios, well-documented assumptions, ongoing review, and recommended actions.
Polling question 5

Do you have a defined function devoted to Regulatory Reporting and analysis of the upcoming changes to the business?
- Yes
- No
- No, but we plan to
- N/A

Scenario based stress testing

While most mid-sized financial firms have sensitivity based stress testing capabilities for specific portfolios, estimating the impact of macroeconomic scenarios across the balance sheet, income statement, and capital ratios requires significant enhancements for most firms.

<table>
<thead>
<tr>
<th>Stress Testing Scope</th>
<th>Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category 4</strong></td>
<td><strong>Category 1</strong></td>
</tr>
<tr>
<td>Broader form of a sensitivity based stress testing which can include multiple segments/portfolios</td>
<td>Defined as scenario based which could affect several lines of business and even entire bank.</td>
</tr>
<tr>
<td>- 100% drop in interest rates</td>
<td>- 100% increase in stock market volatility</td>
</tr>
<tr>
<td>- 100% decrease in long term lending rates</td>
<td>- 100% decrease in GDP</td>
</tr>
<tr>
<td>- 200% decrease in GDP</td>
<td>- 200% decrease in Commercial Real Estate Price Index</td>
</tr>
<tr>
<td><strong>Category 3</strong></td>
<td><strong>Category 2</strong></td>
</tr>
<tr>
<td>Narrow sensitivity based stress tests focused on specific segments or portfolios</td>
<td>Scenario based stress testing at a portfolio level for a single risk factor</td>
</tr>
<tr>
<td>- 100% increase in prepayments in commercial portfolio</td>
<td>- 100% increase in default rates</td>
</tr>
<tr>
<td></td>
<td>- For Residential/Commercial etc.</td>
</tr>
</tbody>
</table>
Credit loss forecasting

Sample Portfolio Loss History

Develop model to determine correlation between loss history and macroeconomic variable

\[ R^2 = \text{Correlation Coefficient} \geq 0.8 \]

Future Losses will be projected based on historical correlations

Sample historic time series data of macroeconomic variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPI</td>
<td>3-month Treasury</td>
</tr>
<tr>
<td>HPI</td>
<td>Developing Asia Inflation</td>
</tr>
<tr>
<td>Real GDP</td>
<td>Unemployment</td>
</tr>
</tbody>
</table>

Future Losses will be projected based on historical correlations

Projection of pre-provision net revenue

While many banks have model-based methodologies for estimating losses, but estimating PPNR and Net Income remains largely based on expert judgment.

Net Interest Income + Non-interest Income – Non-Interest Expense = Pre-provision Net Revenue (PPNR)

PPNR + Other Revenue – Provisions – AFS/HTM Securities Losses (Gains) – Trading and Counterparty Losses – Other Losses (Gains) = Pre-tax Net

Pre-tax Net Income – Taxes + Extraordinary Items Net of Taxes = After-tax Net Income

After-tax Net Income – Net Distributions to Common and Preferred Shareholders and Other Net Reductions toShareholder’s Equity = Change in Equity Capital

Change in Equity Capital – Deductions from Regulatory Capital + Other Additions to Regulatory Capital = Change in Regulatory Capital
Polling question 6

Has your organization engaged in any form of Balance Sheet Stress Testing or Capital Planning Scenario Analysis to date?

- Yes, we have performed a complete run-through of the proposed Regulatory Annual Stress Testing
- Yes, we have performed limited stress testing analysis driven by internal assumptions and scenarios
- No, we have not performed any stress testing to date
- N/A

Common challenges

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description of Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roles, Responsibilities, and Resources</td>
<td>Lack of documentation to demonstrate management has the appropriate management oversight, adequate staffing, and proper segregation of duties for certain key departments involved in the stress testing process</td>
</tr>
<tr>
<td></td>
<td>Lack of quantitative resources to support model development, analysis of results, and model validation</td>
</tr>
<tr>
<td>Data Quality and Data Management</td>
<td>Limited historical data availability</td>
</tr>
<tr>
<td></td>
<td>Data integrity issues make reconciliation and audit difficult and can limit the power of models</td>
</tr>
<tr>
<td></td>
<td>Changes in certain key assumptions may have a cascading effect in other areas not easily reconcilable across disparate systems</td>
</tr>
<tr>
<td>Risk Identification and Communication</td>
<td>Limited documentation to show key stakeholders are considering significant business decisions that may have an impact on the capital planning process (e.g., Risk Appetite Statement, and New Initiatives Review)</td>
</tr>
<tr>
<td>Board Review of Capital Forecast</td>
<td>The bank’s Board and executive management may not be provided with sufficient and consistent information to effectively evaluate the capital plan</td>
</tr>
<tr>
<td>Process and Model Imprecision</td>
<td>Models may not be fully back-tested and validated</td>
</tr>
<tr>
<td></td>
<td>Imprecision in models or data quality may need to be accounted for in a “buffer” (i.e. an additional amount of capital reserved for planning imprecision)</td>
</tr>
<tr>
<td>Process Sustainability</td>
<td>Incomplete design and installation of suitable controls to fully integrate a sustainable, end-to-end stress testing process in the Company’s financial, operational, and enterprise risk management framework</td>
</tr>
</tbody>
</table>
Model governance and validation requirements

- The Stress Testing process is heavily reliant on models
- Certain models may be used for other purposes – consistency and suitability for use must be evaluated
- Banks have struggled to consistently produce robust model documentation and complete all validation activities

Model Cycle

- The term “model” is broadly referred to as a quantitative approach, method, framework, or system that applies statistical, economic, financial, mathematical, or computational/numerical theories, techniques, and assumptions to process input data into quantitative estimates.

- “Models are simplified representations of real-world relationships and dynamics among observed characteristics, values, and events.” By design, they are not perfect and are meant to operate in a very “specific” environment.

Effective challenge and documentation transparency

Management judgment plays an important role in the development of baseline and stress projections. Judgment can be interjected in a variety of ways throughout the projection process and can vary across baseline and stress results. It’s important to understand and document how management views impact forecasts.

Illustrative Projection Process

Functional areas involved in projection process:
- Lines of Business
- Risk Analytics
- Treasury
- Financial Planning

Challenge/Review Process

Outcome
- Regulatory schedules with stress test results
- Return to ‘Sensitivity Analysis’ step
- Return to ‘Inputs’ step
Integrating stress testing into management processes

Many banks struggle with incorporating stress testing into their risk management framework and business planning cycle.

Tools and vendors to support stress testing

Data is not limited to structured data only – nor is it limited to model inputs and outputs

- Structured data (assumptions, positions, portfolios, reference data, time series data, etc.) are complicated aspects of CCAR/DFAST data management
- Unstructured data (model and tool inventories, model documentation, policy documentation, credible challenge documentation, CCAR/DFAST playbooks, etc.) are as important to the process – yet are more complicated to maintain and retain
- Each of these requires separate solutions

Analytic and data vendors also do not solve the challenge of executing a firm-wide, cross-functional process – and having transparency around execution, review and sign-off

Silver bullets do not exist – but an integrated suite of solutions can support the organization if considered in the context of a broader target operating model
Polling question 7

What is the biggest challenge your organization is currently facing with regard to implementing the required Stress Testing processes?

- Lack of historical data
- Lack of skilled professionals to perform the required historical data correlation to regulatory macro-economic variables
- Lack of an integrated platform to perform the stress testing
- Uncertainty over the source of the required data
- Lack of clarity in the Stress Testing rule itself
- Other
- N/A

The Banking Book: Comparing Basel I and Basel II to Basel III

In general, for wholesale exposures, the capital changes reflected a net reduction in capital for investment grade credits, and punished speculative grade credits.*

The dollar and percentage impacts of the AVC are inversely correlated.

Basel III has narrowed that gap for certain classifications of exposure with the introduction of the AVC charge.

*For purposes of example only – the actual cross-over point is dependent upon the assigned PD of the obligor or, potentially, the guarantor or seller of CDS protection, the assigned LGD, M, the type and amount of collateral, the type of counterparty, and the method approved by the regulators for the treatment of purchased protection to the extent there is any. Note that CDSs with certain features can lower the weight of risk in cases where exposure net of collateral is not subject to constraints of the rating site, in zero.

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NDPPS 168059
Impacts of calculation changes magnified by changes in capital structure

The cumulative impact of the changes in the RWA calculations is exacerbated by further changes around the amount of capital institutions are required to hold, and restrictions as to what constitutes capital.

The implication is that institutions must rethink their business in the context of Basel III – and take proactive steps to optimize on a Basel III basis.

A Framework for capital optimization

A deliberate and systematic approach is advised to avoid unnecessary curtailment of legacy businesses, and to drive improvements in risk infrastructure in line with heightened regulatory expectations around risk management.

- **Infrastructure improvements** drive more accurate RWA estimates, and improved risk and capital insights.
- More sophisticated **analytics** yield more accurate RWA results.
- More appropriate **application of the rule-set** to more nuanced transaction sets to reduce RWA profile.
- **Rebalancing of the business** (customers, markets, structuring, hedging, transaction venue) with Regulatory Capital as the constraint.
- Re-visit **legal entity framework, and how business is booked** to optimize.

Institutions must consider not only the capital framework, however, as it is in many cases value destructive. Therefore, economic risk and performance, and business model and strategy must also be considered.
What should community banks do now?

<table>
<thead>
<tr>
<th>Mobilize:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify a primary coordinator of stress testing and capital planning activities and assign initial supporting resources</td>
<td></td>
</tr>
<tr>
<td>Conduct preliminary gap assessment</td>
<td></td>
</tr>
<tr>
<td>Educate stakeholders across the organization about requirements</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Framework:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop stress testing/capital planning framework</td>
<td></td>
</tr>
<tr>
<td>Document framework and gain approval of executive management, socialize with the Board</td>
<td></td>
</tr>
<tr>
<td>Develop and document stress testing playbook</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Roles and Responsibilities:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialize stress testing framework with stakeholders across the organization</td>
<td></td>
</tr>
<tr>
<td>Ensure clear accountabilities</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Models:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess current model inventory to determine which models can be used to support stress testing, some may require adjustment</td>
<td></td>
</tr>
<tr>
<td>Assess data available to support models</td>
<td></td>
</tr>
<tr>
<td>Prioritize model development efforts based on materiality and data availability</td>
<td></td>
</tr>
<tr>
<td>Develop modeling plan, including model build, documentation, and validation</td>
<td></td>
</tr>
<tr>
<td>Conduct stress test dry run</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Documentation:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Create inventory of documentation that will be needed to support stress testing results</td>
<td></td>
</tr>
<tr>
<td>Conduct gap assessment and prioritize gaps for closure</td>
<td></td>
</tr>
<tr>
<td>Create as much documentation as possible before scenarios released in November</td>
<td></td>
</tr>
<tr>
<td>Create documentation repository</td>
<td></td>
</tr>
</tbody>
</table>
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