IFRS 9: Addressing Validation and Benchmarking challenges
Roshni Patel
Associate Director – Stress Testing, Portfolio & Capital Management Specialist
Moody’s Analytics - London

Alexis Hamar
Director – Portfolio and Finance Analytics
Product Management
Moody’s Analytics - France
1. Current Challenges and growing demands

2. IFRS 9 2018 themes

3. Model Validation and Benchmarking

4. Assessing the Impact of IFRS 9 on Earnings Risk and Portfolio Strategies

5. Summary
Current challenges and growing demands
IFRS 9 & Beyond

Overall Objective: Finalize IFRS 9 project and move into BAU mode

IFRS 9 methodologies
- Fine-tune lifetime PD and LGD methodologies
- Finalize stage allocation criteria
- Set-up approval and review committees
- Coverage of smaller/specialized portfolios (treasury/investment, structure finance)
- Parallel run
- Latecomers for IFRS9 tactical implementation

2017 H2

IFRS 9 Compliance
- Parallel run
- Validation/Benchmarking
- Discussion with external auditor
- User training for IFRS 9 in the BAU
- Familiarity of senior management with impairment methodologies, dynamics and volatility
- Preparation of 2018 ST and ICAAP exercises

2018

IFRS 9 & Beyond
- Ongoing validation/monitoring
- Tactical into strategic IFRS 9 implementation
- Managing the volatility that IFRS 9 brings
- Integration of IFRS 9 with stress testing
- Capital and business planning under IFRS 9
- Submit results for local regulators ST and ICAAP exercises (linkage to TRIM)
Current Challenges

Analytics Model Parameterization
- Forward-Looking Parameterization
- Macro Variable Selections
- Correlation Estimates and Regime Dynamics
- Inclusion of Credit Migration
- Staging Logic Criteria
- Quantitative & Qualitative Criteria
- Ratings vs Absolute PDs

Data and IT
- Data Governance
  - Macro Scenarios Update
  - Frequency of Updates
  - Quality Checks
  - Data coverage for materiality
- Architecture
  - Tactical “Light Weight” vs Strategic deployments
  - Centralized vs Decentralized
  - Stress Testing Models
  - Leverage

Governance & Automation
Use test and Appropriateness of results
Industry Growing Demand with Model Risk

Regulatory Pressure
One of the most persistent and important drivers for model risk management across financial services is regulatory pressure (e.g. TRIM)

Stakeholder Pressure
Stakeholders are paying closer attention to the process of managing risk, especially the use of risk models
Management of business volatility

Managing Reputation
Firms realize that model failures could cause significant reputational damage and want to be able to include reputation as part of model risk assessment
The Challenge of Volatility under IFRS 9

“75% of the banks anticipate that IFRS 9 impairment requirements will increase volatility in profit or loss.”

Report on Results from EBA Impact Assessment of IFRS 9, EBA, 2016

“Volatility of loan-loss provisioning from new accounting standard demands additional own-funds protection, say banks.”

Banks mull dedicated IFRS 9 capital buffers
Risk.Net, May 15, 2017
2

IFRS 9 2018 Themes
## Bank Challenges in the post-IFRS 9 World

### Regulatory requirements and challenges

<table>
<thead>
<tr>
<th><strong>IFRS 9</strong></th>
<th><strong>Stress Testing</strong></th>
<th><strong>Integration</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Fine-tune ECL methodologies for all portfolios</td>
<td>- P&amp;L impact will need to be quantified in terms of IFRS 9 numbers from 2018</td>
<td>- Integrate scenario-based analysis across the institution to include a unified framework for Stress Testing, IFRS 9, and Business/Capital Planning</td>
</tr>
<tr>
<td>- Fine-tune stage allocation criteria</td>
<td>- Forecasting stocks and flows of stage 1, 2 and 3 assets under stress</td>
<td>- Centralize scenario generation process across all areas and link to business planning</td>
</tr>
<tr>
<td>- Governance</td>
<td>- Scenario design</td>
<td>- Unify and ensure consistent data for modelling, reporting and business decision making</td>
</tr>
<tr>
<td>- Parallel run</td>
<td>- Heavy reporting requirements</td>
<td>- Risk-based culture and integration compliance-related risk initiatives in decision-making</td>
</tr>
<tr>
<td>- Validation/benchmarking</td>
<td></td>
<td>- Optimization of balance sheet</td>
</tr>
<tr>
<td>- Managing volatility</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Market comments
Views on IFRS9 validation/benchmarking

- Benchmarking analysis should leverage “representative, comparable, up to date data”
- Linkages of model validation / benchmark in context of IFRS9, ST and TRIM
- Providing linkages of results to Capital Planning, ICAAP and Business strategies
- One validation framework does not fit all
  Differences in portfolio
- Belief an annual external service for data and models
- Senior Management clarity on provision levels and their alignment to market benchmarks
- Understanding the gaps in historical data and scenario estimates for forward looking component
- Top-down view of new portfolio strategies on impairments from an external view
- Validation on data and models is useful, however comparison of data/models to external sources resonates better with auditors and senior management
Linkage to Stress Testing

Stress Testing emergence

» IFRS 9 reinforces the necessity for projecting assets values and their corresponding loss allowances in conjunction to future CET 1 requirements

01

Key components

» Enable banks to have a forward looking understanding of the risk and earnings profile based on business and regulatory stress scenarios

» Project Capital and Regulatory ratios

02

Impacts

» Volatility measurement and impacts under IFRS9

» Understanding the behaviour or earnings and risk under distressed conditions allows for connecting the capital « reserves » and surplus to the earnings and losses

03
Stress Testing in context of Model Validation for IFRS 9

May 2017- Guidelines on credit institutions’ credit risk management practices and accounting for expected credit losses
Page 31: 4.2.5 Paragraph 64 – ECL model validation: “ECL assessment and measurement may involve models and assumption-based estimates for risk identification and measurement. Models may be used in various aspects of the ECL assessment and measurement process at both the individual transaction and overall portfolio levels, including credit grading, credit risk identification, measurement of ECL allowances for accounting purposes, stress testing and capital allocation. ECL assessment and measurement models (“models”) should consider the impact of changes to borrower and credit risk-related variables such as changes in PDs, LGDs, exposure amounts, collateral values, migration of default probabilities and internal borrower credit risk grades based on historical, current and reasonable and supportable forward-looking information, including macroeconomic factors.

June 2017 - 2018 EU-Wide Stress Test
Page 13 Paragraph 25 : “This means that for banks commencing to report under IFRS 9 in 2018, the 2018 EU-wide stress test takes the impact of the introduction of IFRS 9 into account in starting point data as well as in the projections of banks”

Page 21 Paragraph 39 : “Banks are requested to forecast credit impairments influenced by the materialisation of a set of single scenarios (baseline and adverse) on the basis of IFRS 9 as prescribed in the methodology laid down in this section.”
Linkages with broader regulations
Targeted Review of Internal Models

Key TRIM activities:
» Provide overview of regulatory compliance with the model framework, including compliance to estimation of PD and LGD (based on EBA guidelines)
» Produce evidence of adequate model validation processes
» Show policies and procedures for model governance and data systems, including audit trails

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Decision making influence on processes and models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top-down strategy linkages</td>
</tr>
<tr>
<td></td>
<td>Volatility management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Governance &amp; Processes</th>
<th>Documentation reviews and details on management overrides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Process for early warning indicators</td>
</tr>
<tr>
<td></td>
<td>IT system robustness</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Models</th>
<th>Modelling techniques/approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Best practice consideration /benchmark</td>
</tr>
<tr>
<td></td>
<td>Validation and model governance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data &amp; IT</th>
<th>Appropriateness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Representativeness</td>
</tr>
<tr>
<td></td>
<td>Quality</td>
</tr>
<tr>
<td></td>
<td>BCBS 239</td>
</tr>
</tbody>
</table>
3
IFRS 9 Model Validation and Benchmarking
Model Validation and Governance

Model Verification
- Analytical & Numerical Methods
  - Implementation
- Correct Application to Risk and Pricing

Model Governance
- Benchmarking
- Automation
- Evolution

Model Validation
- Calibration
- Financial Soundness and Correctness
- Economic Intuition
- Reality Check
- Stress Testing
Validation and refinement of IFRS 9 models
A multi-faceted requirement

Quantitative
- Validate macro models used to generate scenarios and Scenario probabilities
- Credit risk models used to generate lifetime PD, LGD, EAD
- Lifetime EL
- Staging criteria

Independence
- Clear roles and responsibilities
- Adequate independence from development process
- Prompt and timely reporting
- Institution to ensure the work done by the external party meets the elements of a sound model validation framework

Qualitative
- Model specification, assumptions and design
  - Econometric modelling technique
  - Model Inputs / Data quality
- Review of the model validation process
  - Documentation quality
  - Regulatory compliance

Documentation
- Document the procedures
- Changes in validation methodology and tools,
  - Range of data used
- Results and any remedial actions
- Regularly reviewed and updated
Validation and refinement of IFRS 9 models
A holistic solution for validation and benchmarking

- Raw data
  Default & Recovery Database
- Credit Models
  RiskCalc, CreditEdge
- ECL Methodologies
  ImpairmentCalc

Validation/ benchmarking service to cover:
- Conditional & unconditional PD, LGD and ECL
- TTC to PI credit parameter conversion
- Sensitivity to scenarios and stage allocation rules

- Framework
  Design validation and ongoing monitoring framework
- Modelling
  Bespoke modelling using banks’ and Moody’s data

Unbiased and quantitative scenario forecasts including:
- Baseline, IFRS 9, Stress Testing and Planning scenarios
- Severity and probability of realization for each scenario
Validation and refinement of IFRS 9 models

A holistic solution for validation and benchmarking

- Raw data
  - Default & Recovery Database
- Credit Models
  - RiskCalc, CreditEdge
- ECL Methodologies
  - ImpairmentCalc

Credit Research Database (CRD™)

- World's largest historical time series of private firm loan data for C&I borrowers
- 18 million borrowers globally with over 2.2m private company defaults
- CRD contains borrower financial statements, facility and loan information
  - Facility information: origination date/amount, contractual maturity, unpaid balance
  - Borrower information: internal rating/PD, industry, geographical info, size, etc.
  - Forward looking, PIT PD term structures from Moody's Analytics RiskCalc™

The Default & Recovery Database is an expansive data set that allows you to slice data in a way that is relevant to your needs while still having enough observations to create meaningful results. The DRD consist of the following:

- Over 550,000 individual debt securities
- 60,000 distinct issuers
- Corporate and sovereign coverage
- Historical defaults back to 1920
Validation and refinement of IFRS 9 models

A holistic solution for validation and benchmarking

Validation/ benchmarking service to cover:

- Conditional & unconditional PD, LGD and ECL
- TTC to PiT credit parameter conversion
- Sensitivity to scenarios and stage allocation rules

Expected Credit Loss Calculation

Calculations steps

TTC rating
- TTC assignment of insolvency risk
- Rating based on financial condition of the obligor

TFC PD calculation
- Calculate TFC PDs by TTC PDs for each obligor
- Assumes obligor needs to use the historical default experience of the bank

Forward-looking PiT PDs
- Adjust TTC PDs for the point in time
- TFCs typically do not have enough data to conduct the model
- Moody's can use its data with a historical experience to get forward-looking estimates

Translation to PiT PDs
- Combines with macroeconomic variables and forward-looking to get forward-looking estimates

Macroeconomic Scenarios

Input PD/LGD

Macro scenario 1

Macro scenario 2

Scenario 1 – Conditional PD/LGD

Scenario 2 – Conditional PD/LGD

Scenario 3 – Conditional PD/LGD

Forward-looking adjustments

- The methodology utilizes a scenario-based model to convert input PD/LGD to conditional PD and LGD term structure for a single or multiple sets of macroeconomic scenarios. These conditional PD/LGD values are utilized for IFRS 9 stage allocation and impairment calculations.
IFRS9 Validation / Benchmarking case studies

Current examples of IFRS9 validation and benchmarking services across EMEA and Asia.

- Provision communications
- Understanding IFRS9 Volatility case studies
- Impact on business strategies
- Linkage of capital management from board level
- Workshops
- Top down analytical level business impacts

- Implementation Testing (portfolio segmentation, inputs, sources, adjustments)
- Data quality, history and use in context of portfolio materiality
- Robustness and adaptability checks
- Outcome analysis
- IT infrastructure review (BCBS 239 principles)

Wholesale (dedicated Advisory team)
- SME (big ticket size)
- Middle Market Enterprise
- Large Corporates
- Commercial Real Estate
- Project finance
- Banks / Sovereigns (+ Local Governments)
- Private Banking Loans

Retail (dedicated team with economists)
- SME Loans (low ticket size)
- Credit cards
- Personal / Mortgage Loans
- Auto Loans
- Secured and unsecured lending portfolio

Credit Policy
- Group policy alignment
- Regulatory alignment
- Regulatory understanding

France
Netherlands
Portugal
South Africa
Middle East (UAE, Qatar)
Asia (Japan, Malaysia)

Organisation
Governance & Process
Data & IT
Models

- Management Override process
- Watch lists governance
- Model documentations
- Compliance with external requirements (e.g. accounting and regulatory requirements)
- Early Warning Indicators
- Forward looking implications

- PD, LGD, EAD Models including for Low Default Portfolios
- Benchmarking Ratings/PDs of Public and Private Firms
- Stress Testing / IFRS 9 linkages
- Model and Basel Pool Validation
- Compliance in accordance with TRIM
Stress Testing Focus as a validation tool

» Stress Testing as a model validation tool where the process includes:
  – Model Assumptions
  – Stressability of Projections

1. Model Assumptions characterize the scope of stress
  › Market Conditions: macro and financial variables selection and applied shocks
  › Risk Parameters /Identification: PD, LGD, Correlations, Migrations;

2. “Stressability” of Projections:
  › Loss Estimation
  › Credit Earnings and Volatility of ECLs to identify
  › Regulatory Capital and Tier 1

» Main Objectives are:
  – Capture/Manage Volatility Magnitude over time
  – Identify and Understand Portfolio Vulnerabilities
  – Take actions for managing volatility
An Integrated and Holistic Approach to Data Governance

The solution should ensure the appropriate data is in the right place at the right time, provide control of the reporting by making it easy to collect, consolidate and submit reports correctly.
Assessing the Impact of IFRS 9 on Earnings Risk and Portfolio Strategies
Business Impact of IFRS 9

What do the banks say?

Impact on Capital

![Impact on Capital Chart]

New issuance of debt or capital

Source: Moody’s Investors Service Survey: Capital Impact of IFRS 9
Impact on Earnings and Capital Volatility

Stage allocation and the state of the credit cycle can lead to capital shortfalls

Sources: Moody’s Analytics, CreditEdge™, ImpairmentCalc™

Simplified Example
- 1% coupon rate
- 40% LGD
- Profits held as surplus capital
- $1 million initial capital surplus

MOODY’S ANALYTICS
Existing Capital Buffers Need to Be Reassessed

» Level

– The higher level of loss allowance at origination reduces available capital under CECL and IFRS 9 compared to incurred loss.

» Volatility

– Increased earnings volatility IFRS 9 due to loss allowance raises the additional capital buffer needed.
Summary
Assess, Communicate, Act

IFRS 9 would imply impacts in respect of:
» More volatile provisions
» More volatile P&L
» Higher probabilities of recapitalization needs
» Higher cost in pricing and generally more competition on pricing

IFRS 9 would imply a strong Governance around:
» Method, Model and Risk Parameters consistent with Stress Test analytics/processes
» Validation / Benchmarking against market best practices / peers
» Process Automation
» New Paradigm designed behind a strong reinforcement on stress testing