The Commonwealth Bank of Australia

Scenario Analysis Workshop

Bank of Japan

18 July 2006
The Commonwealth Bank is one of Australia's leading financial institutions with businesses in New Zealand, Asia and the United Kingdom. We are positioned for future growth, and aim to provide accessible banking and financial services for all Australians; fair, safe, challenging and rewarding employment for staff and to reward all shareholders through dividends and capital growth.

Profile
We're one of Australia's leading providers of integrated financial services including retail, premium, business and institutional banking, funds management, superannuation, general and life insurance, broking services and finance company activities.

Strategy
To be Australia's finest financial services organisation through excelling in customer service.

Structure
We combine product development and service delivery with customer segment requirements, bringing us closer to our customers and helping us to meet customers' needs.

Our Leaders
It's our team of leaders who ensure the business works together to support staff and grow the business.

Our People
Our staff are committed to helping our customers manage and build wealth. With more than 35,000 staff, we're one of Australia's largest employers and we support our staff through a range of benefits and services.

Funding
We raise and maintain the Bank's wholesale debt and capital in both the domestic and international capital markets in a cost efficient manner.

Facts and figures
With over 130,000 distribution points across the country and businesses overseas, we're a diverse organisation with a long history in the Australian banking industry.

History
The Commonwealth Bank was founded under the Commonwealth Bank Act in 1911 and commenced operations in 1912. The Bank was empowered to conduct both savings and general banking business. Today, we've grown to a business with over 700,000 shareholders, offering a full range of financial services to help every Australian build and manage wealth.
Agenda

- Operational Risk Framework

- Scenario Analysis – Quantitative Risk Assessments (QRA)
  - Advantages and Challenges
  - Preparation, Assessment & Validation
  - A practical example

- Technical Issues
  - QRA Exposure Aggregation
  - Portfolio Review Metrics
The Bank’s Operational Risk & Control Process

1. Assess Risk & Controls
2. Test Key Controls
3. Monitor Risks & Controls
4. Analyse Incidents & Weaknesses
5. Design Processes & Controls
6. Escalate Remediate & Improve
Operational Risk – AMA Data Flows

Quantitative Risk Assessment (Scenario Analysis) → Materiality Assessment

External Loss Data (ELD) → Internal Loss Data (ILD)

Indicator Data

Insurance judgments

Correlation judgments

Capital model
- Fitting distributions
- Running simulations
- Calculating measures

Risk Management Information

Capital model

Regulatory capital

Economic capital (Target Equity)
AMA Granularity

The Bank applies a Business / Risk Type ("BuRT") level dimension to Materiality Assessment; Scenario Analysis and Internal Loss Data collection.

The Risk Type hierarchy is aligned to Basel II risk hierarchy.

The Business hierarchy is based on 60 business divisions with the Bank’s Business Units:
- Premium Business Services
- Retail Banking Services
- Wealth Management
- International Financial Services (including ASB)
- Enterprise IT
- Finance & Risk Management
- People Services
- Office of the CEO

<table>
<thead>
<tr>
<th>Level 1 Risk Type</th>
<th>Level 2 Risk Type</th>
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<tbody>
<tr>
<td>Personnel Malpractice</td>
<td>Unauthorised Activity</td>
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<tr>
<td>Theft &amp; Fraud</td>
<td>Systems Security</td>
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<tr>
<td>External Fraud</td>
<td>Employee Relations</td>
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<td>Diversity &amp; Discrimination</td>
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<tr>
<td>Employment Practices &amp; workplace Safety</td>
<td>Safe Environment</td>
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<td>Disasters and Other Events</td>
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<tr>
<td>Business Disruption &amp; Systems Failure</td>
<td>Systems/ IT Infrastructure Failure</td>
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<tr>
<td>Execution Delivery and Process Management</td>
<td>Transaction Capture, Execution and Maintenance</td>
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<td>Monitoring &amp; Reporting</td>
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<td></td>
<td>Customer/client intake and Documentation</td>
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<td>Customer/client Account Management</td>
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<td>Trade Counterparties</td>
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<td></td>
<td>Vendors &amp; Suppliers</td>
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<tr>
<td>Clients, Products and business Practices</td>
<td>Suitability, Disclosure and Fiduciary</td>
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<tr>
<td></td>
<td>Improper Business or Market Practices</td>
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<td></td>
<td>Product Flaws</td>
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<td>Client Selection, Sponsorship and Exposure</td>
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<td>Advisory Activities</td>
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</table>
Agenda

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  - Portfolio Review Metrics
Scenario Analysis (QRA) – Advantages & Challenges

**Advantages**

- **Granularity**
  - improves relevance to the business
  - provides structured thinking

- **Engagement**
  - A business discussion as much as a risk discussion
  - uses the language the business understands
  - Impact and frequency assessment playback

- **Completeness**
  - all relevant risk information used
  - Understanding risk drivers and refresh triggers

**Challenges**

- **Data availability**
  - availability and relevance of ILD & ELD

- **Consistency & Relativities**
  - Consistency in workshop delivery
  - Relativities in assessments
  - Write-up consistency

- **Keeping it simple**
  - Getting the right business representative
  - Keeping modelling discussions simple
QRA Process - Overview

1. preparation
- Review ILD & ELD content at BuRT level
- Prepare other risk info for reference cards
- Remap risks for Org Structure changes & Include any known new risks for QRA as appropriate

2. pre-workshop
- Pre-population of reference cards
- Scheduling of workshops

3. workshop
- Develop risk measurements for selected exposures
- Validate workshop measurements

4. confirmation
- SMEs confirmation of assessments provided
- Finalise QRA documentation

5. Validation
- GOR perform qualitative validation of results
- B/Units address issues raised under Validation
- Lockdown worksheets for use in Capital Model
- Document management

6. Quantitative Validation
- Portfolio Metrics applied
**Preparation: Collecting Risk Information**

### Previous QRA + Current Divisional Risk Profile + External Loss Data + New Pre-reading Material

#### Review existing risk information contained in current risk profile. Is the profile ‘current’ or does it need to be updated (incrementally) for new risk data (i.e. ILD, Control Weaknesses from KRIs, Audit Issues, Compliance Issues, CSA/CAP or SOX testing etc)?

#### Review any ELD from last QRA. Review for any new ELD data points that are relevant to this BuRT?
Preparation: Risk Information Sources

- Previous QRA assessment documentation
- Divisional Risk Profile

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### Key Risk Indicators
- CSA/CAP
- ILD
- SOX
- Compliance Incidents
- Audit Issues

### CSA/CAP
- Unauthorized Activity
  - Level: Low
  - Rating: Ok

### ILD
- Theft & Fraud
  - Level: Low
  - Rating: Ok

### SOX
- Theft & Fraud
  - Level: Low
  - Rating: Ok

### Compliance Incidents
- Theft & Fraud
  - Level: Low
  - Rating: Ok

### Audit Issues
- Theft & Fraud
  - Level: Low
  - Rating: Ok

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### Risk Type – Level 1
- Internal Losses (ILD)
- More / less incidents
- Control Weaknesses from Internal Losses, Audit, Controls Assurance, SOX, KRIs etc.

### Risk Type – Level 2
- External Fraud
- More / less incidents
- Control Weaknesses from Internal Losses, Audit, Controls Assurance, SOX, KRIs etc.

### Rating / Trend (June 2006)
- Potential Loss
- System Security
  - Not Applicable

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#### How are we performing?
- System Security: Not Applicable

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**Commonwealth Bank**
Preparation: Risk Information Sources

- Internal Loss Data (ILD)
  - SONAR
  - Business Objects Report
- External Loss data (ELD)
  - FIRST DB
**QRA – Assessment Workshop**

**Who’s typically in a workshop**

- Subject Matter / Business Experts (SMEs) with an appropriate level of experience in the business area and understanding of the risk type/ exposures

- Subject Matter / Business Experts from relevant Group Support function (e.g. from Technology Services in the case of Systems/IT Infrastructure Failure workshop)

- Business Unit Facilitator – cover all businesses within that Business Unit

- Independent Co-facilitator from Group Operational Risk

**The key focus of the Workshop is based on:**

**Assessment of ‘Frequency’**
- How often do loss events occur

**Assessment of ‘Impact’**
- How big are the losses when they do occur
  - what is the most likely impact (after controls and pre-insurance)
  - what would be the impact of the worst out of 10 loss incidents
Q2  Do you expect one or more loss events for this exposure each year?
Yes

Assessment should reflect the current risk and control environment. Anticipated changes should be captured via indicators, or via a refreshed QRA once the impact of the changes has been determined.

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**FREQUENCY - HOW OFTEN DO LOSS EVENTS OCCUR**

Q3  What is the most likely number of loss events in a year?

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**IMPACT - HOW BIG ARE THE LOSSES WHEN THEY DO OCCUR (in $’000s)**

Loss includes all direct losses and also identifiable impacts on margin business volumes, but excludes cost of control improvements, ongoing recurring margin business volume impacts beyond one year, and generalised reputational impacts on the bank as a whole.

**Q4**  The following is a table and graph of predicted loss event frequencies based on your above judgement. Click on the buttons below or adjust your judgement above to best reflect your judgement.

<table>
<thead>
<tr>
<th>Periods of 1 year</th>
<th>Events per period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td>3</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>45</td>
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<td>5</td>
<td>44</td>
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<td>6</td>
<td>43</td>
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<td>7</td>
<td>42</td>
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<tr>
<td>8</td>
<td>41</td>
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<tr>
<td>9</td>
<td>40</td>
</tr>
<tr>
<td>10</td>
<td>39</td>
</tr>
</tbody>
</table>

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**Q5**  When a loss incident does occur, what is the most likely impact (after controls, pre insurance)?

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**Q6**  What would you judge to be the impact of the worst out of 10 loss incidents?

(This does not represent the maximum loss that can occur for this exposure).

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**Q7**  The following is a table and graph of predicted loss impacts based on your above judgements. Click on the buttons below or adjust your judgements above to best reflect your judgement.

<table>
<thead>
<tr>
<th>Impact per Incident</th>
<th>12</th>
<th>20</th>
<th>28</th>
<th>36</th>
<th>44</th>
<th>52</th>
<th>60</th>
<th>68</th>
<th>76</th>
<th>84</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller Loss</td>
<td>74%</td>
<td>44%</td>
<td>44%</td>
<td>44%</td>
<td>44%</td>
<td>44%</td>
<td>44%</td>
<td>44%</td>
<td>44%</td>
<td>44%</td>
</tr>
<tr>
<td>Larger Loss</td>
<td>26%</td>
<td>56%</td>
<td>56%</td>
<td>56%</td>
<td>56%</td>
<td>56%</td>
<td>56%</td>
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</table>

Based on these judgments, there is a likelihood of losing more than $40

There is a likelihood of losing more than $80

The calculated average loss impact is $36

Commonwealth Bank
QRA – Approach to Validation

How is the validation performed

- Independent role performed by Group Operational Risk function ahead of assessment data being cleared for use by Capital Model Team

- Group Operational Risk also play a co-facilitation role in the Workshops and provide a weekly delivery forum meeting to share & discuss ideas/issues/concerns and program progress

What do we look for in validation

The basic principles established to support the effective validation process are:

- Appropriate pre-reading material was provided to stakeholder (SME) participants
- Confirm appropriate stakeholder participation and involvement
- Validate use of available information
- Document all judgements and discussions
- Confirmation of Assessments by SMEs
- Follow a consistent process
- Support periodic review of the measurement processes
QRA – Approach to Validation

Key Areas of Validation focus:

- Application of the Risk Information provided in the pre-reading material
- Workshop Write-up document provides sufficient insight and description of the rationale for the assessments to satisfy a removed party and to facilitate future use
- Reasonableness of assessments for Frequency and Impact based on the Risk Information provided in the pre-reading materials
- Accuracy and completeness of information provided

The Validation process is qualitative – and based on reviewing the individual exposures within a given BuRT. In this regard it is a forerunner to a more quantitative review based on a series of portfolio metrics (refer later discussion on this point).

It is anticipated that standardisation of some scenarios & parameters in the industry over the next 2-4 years will provide further benchmarking metrics which will further strengthen the overall validation process.
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The Bank’s modelling approach is very granular – with some 85 businesses each considered against the 20 Basel risk types. This is driven both to model risk and the tail event potential accurately and to link closely with where the business manages their risk.

To continue this and capture the best business judgments in the QRA process the Bank allows businesses to assess their key risks risk at the exposure level with separate frequency and severity judgements.

These exposure level judgements are simulated to provide an annual loss distribution for the exposure that is shown to the business subject matter experts to ensure we have captured their judgements appropriately. These exposure annual loss distributions are aggregated to the Business / Risk Type (“BuRT”) level, resulting in an annual loss distribution for the BuRT.

However separate frequency & severity distributions are required at the BuRT levels to:

- Combine with other information sources (eg. ILD)
- Model insurance mitigation
- Incorporate frequency or severity dependence modelling

Challenge: How to “convert” the BuRT annual loss distribution to “equivalent” frequency and severity distributions?
Technical Issues – Scenario Analysis

- **Approach:**
  - Calculate characteristics (e.g. variance) of BuRT annual loss distribution
  - Calculate parameters using the Method of Moments technique for all possible frequency (Poisson, Binomial and Negative Binomial) and severity distribution (Lognormal, Weibull and Gamma) pairs
  - For each distribution pair that returns valid parameters, simulate the annual loss distribution
  - Use a statistical based business rule to determine the best fit distribution pair
Technical Issues – Portfolio Review Metrics

- Assessment approach is bottom-up or granular
- We use tailored top-down checkpoints on the portfolio
- Four established Portfolio Review Metrics:
  1. Existence of Internal Loss Data vs Materiality Assessment judgment
  2. Bank Operational Risk Regulatory Capital vs Basel Standardised Measure
  3. Business Unit OR Regulatory Capital vs Basel Standardised Measure
  4. Modelled Expected Loss vs Budgeted Loss (for relevant businesses)
- There are defined processes for responding to issues raised by these comparisons
- The Bank is also working on three additional Portfolio Review Metrics for diagnostic purposes:
  5. Scenario Analysis Expected Loss vs Average Internal Loss Data
  6. Scenario Analysis Unexpected Loss % by Risk Type vs External Loss Data (Fitch)
  7. Tail Ratio (UL/EL) for particular risks vs same ratio for peer banks
- Also interested in other benchmarking initiatives
Questions & Contact Details

- Questions

- Contact Details
  - Denis Taylor, General Manager, Group Operational Risk, denis.taylor@cba.com.au
  - Mark Shelton, Executive Manager, Operational Risk Solutions, sheltoma@cba.com.au
  - David Farmer, Capital Modelling Team Leader, Basel II Operational Risk Project, david.farmer@cba.com.au
Abbreviations used in the presentation:

- QRA: Quantitative Risk Assessment – scenario analysis process used across the Bank
- ILD: Internal Loss Data
- ELD: External Loss Data
- CSA/CAP: Controls Assurance program (qualitative risk and control assessment looking at inherent and residual risk)
- SME: Subject Matter Expert or business expert
- BuRT: Business / Risk Type level,
- B/U: Business & Unit
- GOR: Group Operational Risk
- GRM: Group Risk Management
- SONAR: The Bank’s Loss Incident Management system of record (for capturing ILD)
- First Database: External loss event database records sourced from Fitch