Benchmarking Operational Risk

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2018 Stress Testing Model Symposium
October 10\textsuperscript{th}, 2018

The views expressed in this presentation are solely my own, and do not necessarily represent polices or positions of the Federal Reserve Bank of Richmond or the Federal Reserve System.
Use of benchmark models

- Assess performance of primary model
- Provide a complementary independent view
- Calibrate firm's final estimates
- Validation as additional check on primary model and its results

See SR 15-18: Use of Benchmark Models in the Capital Planning Process
Overview of Benchmark Model

• Main idea: Bank activity generates operational risk

• Two-step model:
  • Step 1: Estimate industry losses at the activity level:
    o Banking
    o Corporate Finance
    o Sales & Trading
    o Other
  • Step 2: Redistribute industry losses according to banks’ exposures to each activity

➤ Example: A bank involved in retail lending will be exposed to the operational risk associated with banking activity as captured by its share of banking activity.
Benchmark Model

BHC Exposure to Activity \( \times \) Aggregated Activity Loss

Forecasts of firm exposure to each activity

Forecasts of industry-aggregated op losses (per activity and scenario)

Operational loss forecast by activity

Total Operational Forecast
Supervisory Model

- Two-step model:
  - Step 1: Industry aggregate operational losses conditional on macroeconomic factors
  - Step 2: Redistribution by firm size

- Results
  - Bank-level forecast
  - Percentiles of aggregate 9Q loss distribution as proxy of scenarios
  - Tail frequencies and severities are informed by industry history
  - Body frequencies and severities are informed by each firm history
## Production vs Benchmark

<table>
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<th><strong>Benchmark Model</strong></th>
<th><strong>Production Model</strong></th>
<th><strong>Regression Model</strong></th>
<th><strong>Historical Simulation</strong></th>
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<td><strong>Data Structure</strong></td>
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<tr>
<td>Business line</td>
<td>• Business line</td>
<td>• Observation level (all losses pooled together)</td>
<td>• Event type</td>
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<tr>
<td><strong>Bank Loss Forecast</strong></td>
<td>• Industry-level forecast</td>
<td>• Industry-level forecast</td>
<td>• Bank-level forecast</td>
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<td></td>
<td>• Redistribute using activity proxies</td>
<td>• Redistribute using size</td>
<td>• Own history driven</td>
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<td><strong>Scenario Forecast</strong></td>
<td>• Empirical distribution</td>
<td>• Macro-based scenario forecasts</td>
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<td>• Percentile-based scenario forecasts</td>
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<td><strong>Main Driver</strong></td>
<td><strong>Activities</strong></td>
<td><strong>Size</strong></td>
<td><strong>History</strong></td>
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Lessons learned

- Very high correlation at the bank level in $ values and as % of RWAs or assets
- Bank-level differences between supervisory and benchmark model are explained by:
  - Impact of modeling assumptions
  - Impact of data structure
- Performance testing results of benchmark model are similar to those of supervisory model