

# Benchmarking Operational Risk

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

# Use of benchmark models

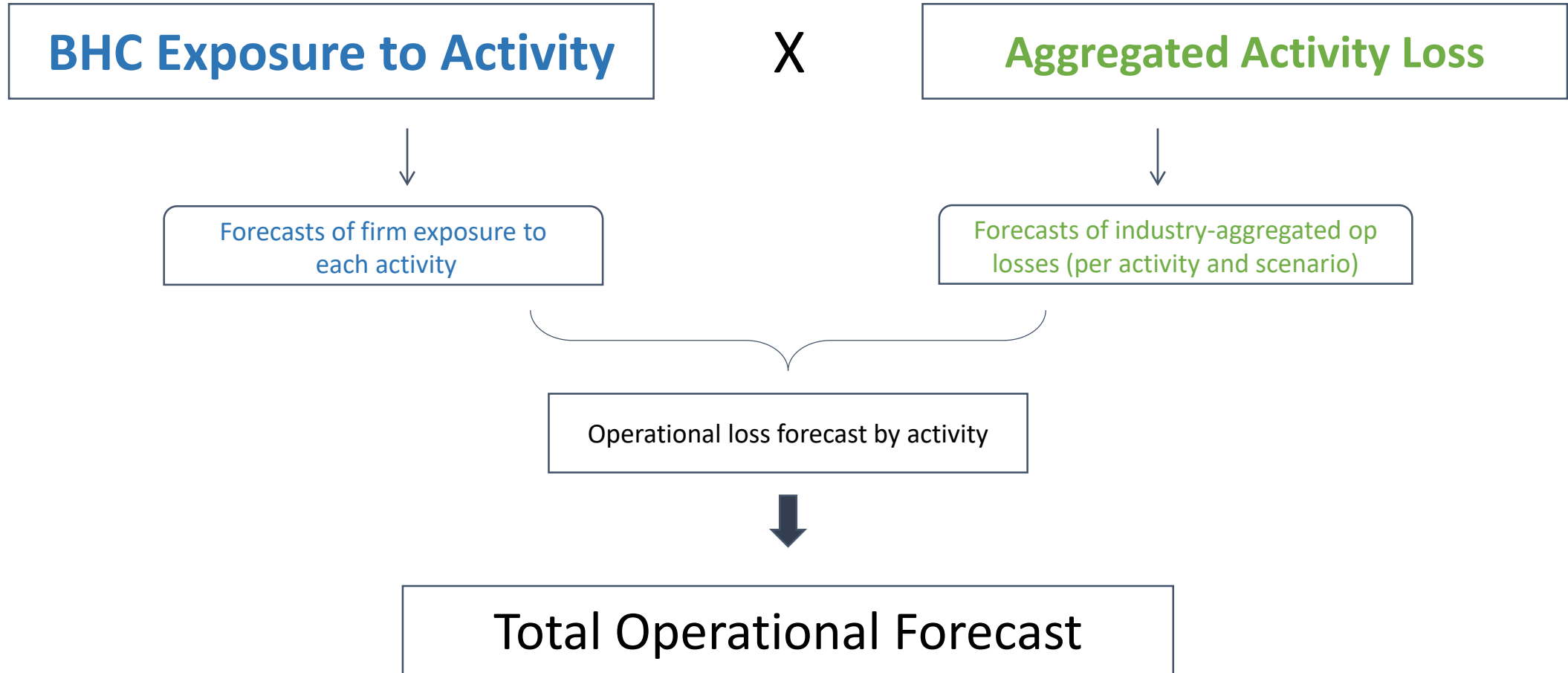
- Assess performance of primary model
- Provide a complementary independent view
- Calibrate firm's final estimates
- Validation as additional check on primary model and its results

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

# Overview of Benchmark Model

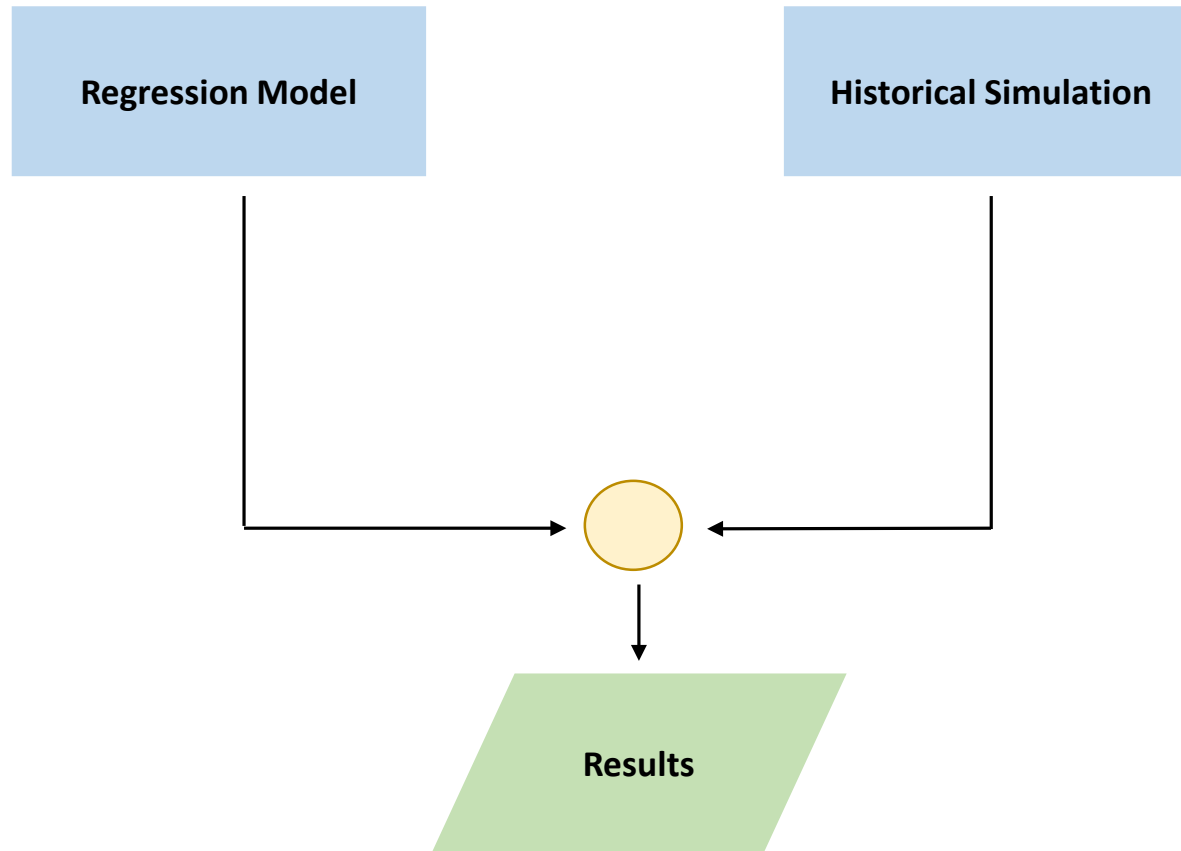
- Main idea: Bank activity generates operational risk
- Two-step model:
  - Step 1: Estimate industry losses at the activity level:
    - Banking
    - Corporate Finance
    - Sales & Trading
    - Other
  - Step 2: Redistribute industry losses according to banks' exposures to each activity
- Example: 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



# Supervisory Model

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

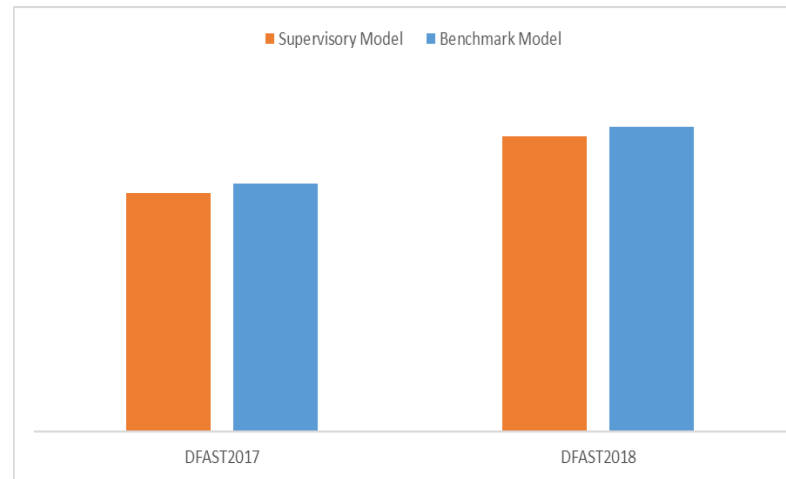


- Bank-level forecast
- Percentiles of aggregate 9Q loss distribution as proxy of scenarios
- Tail frequencies and severities are informed by industry history
- Body frequencies and severities are informed by each firm history

# Production vs Benchmark

	BENCHMARK MODEL	PRODUCTION MODEL	
		REGRESSION MODEL	HISTORICAL SIMULATION
DATA STRUCTURE	<ul style="list-style-type: none"> <li>• Business line</li> </ul>	<ul style="list-style-type: none"> <li>• Observation level (all losses pooled together)</li> </ul>	<ul style="list-style-type: none"> <li>• Event type</li> </ul>
BANK LOSS FORECAST	<ul style="list-style-type: none"> <li>• Industry-level forecast</li> <li>• <b>Redistribute using activity proxies</b></li> </ul>	<ul style="list-style-type: none"> <li>• Industry-level forecast</li> <li>• <b>Redistribute using size</b></li> </ul>	<ul style="list-style-type: none"> <li>• Bank-level forecast</li> <li>• <b>Own history driven</b></li> </ul>
SCENARIO FORECAST	<ul style="list-style-type: none"> <li>• Empirical distribution</li> <li>• Percentile-based scenario forecasts</li> </ul>	<ul style="list-style-type: none"> <li>• Macro-based scenario forecasts</li> </ul>	<ul style="list-style-type: none"> <li>• Simulated distribution</li> <li>• Percentile-based scenario forecasts</li> </ul>
<b>MAIN DRIVER</b>	<b>Activities</b>	<b>Size</b>	<b>History</b>

# 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