Supervisory Stress Test Modeling of Operational Risk

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Outline

- Modeling Challenges
- Current Approaches
- Policies and Principles We Focus On
- Refining the Panel Model
- Historical Simulation Model
- Conclusion

Modeling Challenges

- No structural model to explain ops risk
  - Risk of building a complicated "black box"
  - Need for more intuitive and simpler approaches
- The relationship with macro is hard to capture
  - There's evidence of the relationship, but it is hard to model
- Data quality
  - Challenges in timely reporting of tail losses
  - Differences in reporting of loss dates
  - Short time series sample
- Capturing risk that a bank may not have experienced
  - Need for integrating the industry experience

Current Approach

Ref: DFAST 2016 Supervisory Stress Test Methodology and Results

- Average of results from two models:
    1. Panel regression model
    2. Historical simulation model
- Plus results from legal reserve increase model
- Panel regression model:
    - Loss frequency is a function of macro and firm-specific variables
    - Loss severity is a firm-specific historical average loss
- Historical simulation model – modified in CCAR2016
    - Simulated loss distribution
- Modeling by loss event types.

Policies&Principles for Modeling Choices

- Policies and Principles – 2015 Stress Testing Symposium
- Stress focused
  - Project outcomes in stressed environments
- Simpler and more transparent
  - Simulation model: Avoid adding a parametric structure
  - Panel model: Avoid adding variables with weak intuition and impacts on results
- Comparability
  - Scaling the industry loss experience rather than relying only on firm's individual loss history
- Robustness and Stability
  - Simulation model: The industry loss data improves stability
  - Panel model: The relationship between industry losses and the macro is more robust than for individual banks

Changes to the Panel Model Considered for CCAR2017

- Model the aggregate loss amount rather than separately loss frequency and severity.
- Two steps: (i) model the relationship of industry losses with macro; (ii) scale industry forecasts to a bank
  - Step 1: Time series regression - the relationship between the industry losses and the macro
  - Step 2: Panel regression - scale industry loss forecasts to a bank. The scaling factor is total assets.

Examples of considered alternatives:
- One-step panel regression. Cons: results unstable
- Quantile regression. Cons: results depend on the choice of quantile
- Modeling statistically transformed loss data. Cons: may lead to instability of results for banks with short data sample

Simulation Model- in CCAR2016

Modeling Concept

- Simulated 9Q loss distribution

- Stress results: percentiles linked to the frequency of severe recessions

- The industry tail losses are relevant to all banks

Modeling the loss tail

- Tail Frequency: a combination of individual tail frequency and industry frequency scaled using asset size

- Tail severity: one industry tail scaled using asset size

Conclusion

In modeling choices we focused on:

- Simplification – new panel model
- Stability – less reliance on volatile individual firm data
- Stress focused – sensitivity to macro and accounting for the industry experience
- Comparability - scaled industry data