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Macroprudential Stress Testing: Data and Design Choices

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Overview

- How are stress tests used in supervision of U.S. banks?
- What makes a stress test “macroprudential”?
- What’s missing?
- Key take-aways



How are stress tests used in the U.S.?

Stress tests as part of U.S. banking supervision

- Supervisory stress tests are part of the Fed's supervisory assessment of large banking companies
 - First performed in 2009 SCAP
- Stress tests results are a key element of the annual Comprehensive Capital Analysis and Review (CCAR)
 - “Bottom up” estimates made by the firms
 - “Top down” estimates made by the Fed
 - Supervisory review of capital management and capital planning
- The Fed discloses its stress test calculations for individual firms
 - CCAR results
 - Dodd-Frank Act (DFAST) results
 - Same basic calculations; differ by dividend and repurchase assumptions
- Proposed changes would integrate stress test results into Basel-based capital requirements
 - Stress Capital Buffer



Key elements of the CCAR/DFAST stress tests

- Macro scenario that gets more stringent as economy improves
 - Unemployment rate must increase by at least 3-4% AND hit at least 10%
 - More severe decline in housing prices as prices run above trend
- Banks with large trading or counterparty positions also face global market shock on these positions
- Results based on Fed's models using industry-provided data
- Same models for everyone
- Same macro scenario for everyone
- Results differ because of differences in bank input data



What makes stress tests macroprudential?

Two distinct aspects of a macroprudential perspective

- Structural: a view of the system rather than just individual institutions
 - Identifying important “nodes” – institutions where negative externalities of failure are the most severe and pervasive
 - Understanding feedback loops among firms and markets
 - Policy implications: strengthen prudential requirements and supervision of systemically important “nodes” (firms, clearinghouses, FMUs, etc.)
- Cyclical: a view of how risks to financial stability are changing over time
 - Understanding cycles in credit, asset prices, leverage, liquidity...
 - Understanding feedback loops between the financial system and the economy
 - Policy implications: lessen the probability and/or consequences of the turning of the cycle



The What and How of U.S. stress testing

- What U.S. supervisory stress tests measure:
 - Regulatory capital ratios for individual banks
 - Project net income over 9-quarter forward horizon
 - Quarter-by-quarter “walk through time”
 - Income and loan losses over time; instantaneous global market shock
 - Translation to capital via accounting and regulatory capital rules
- How the stress impact on capital ratios is measured:
 - Bank-by-bank “stand-alone” approach
 - Individual pieces of net income (revenues, non-credit expenses, credit losses for different types of loans) calculated separately and added up for total impact at a bank
 - What happens at Bank A does not affect Bank B



Structural macroprudential elements

- U.S. supervisory stress tests are calculated individually for each bank, on a bank-by-bank basis – Why?
- Important to remember how the results are used:
 - In both SCAP and CCAR, embedded in a broader supervisory program with firm-specific consequences
 - In SCAP, firms had to raise capital to fill in any “gaps”
 - In CCAR, key element of assessment of capital planning and capital adequacy
- Microprudential use of results
 - Use in microprudential supervision has shaped the direction of modeling towards “accuracy” and “precision” at the firm level
 - Firm-specific implications result in push towards firm-specific precision
 - Arguably addresses structural macroprudential concerns



Cyclical macroprudential elements

- The primary cyclical element of the U.S. stress tests is the scenario
 - As noted, designed to be more severe when times are good
 - Assumed increases in unemployment, asset price declines and other “salient risks”
- But these countercyclical elements compete against improvements in asset quality in determining severity of losses
 - Starting conditions matter – better asset quality at the start leads to lower losses overall
- Recent work by Liang and Kohn (2019) suggest that this horse race is at best a tie and perhaps that improved asset quality is winning
 - They find that primary countercyclical elements are dividends and share repurchases, which have increased steadily during the expansion

What's missing?

Limits on macroprudential insights

- The tests are capital stress tests and don't directly capture liquidity, runs or fire-sale risks
 - Large U.S. banks are subject to separate liquidity stress tests as part of CLAR program
 - But the two sets of tests aren't integrated
 - "Probability" and "severity" assessed separately
- The stand-alone approach means that the results for the banking industry are the sum of the results for individual banks
 - Little additional insight into interactions and contagion among the banks
 - Little insight about possible shift of activity to the non-bank or shadow bank sector
 - Little insight about feedback to the broader macro economy
- Complex models using detailed data mean generating supervisory projections is time- and resource-intensive
 - Only a small number of scenarios can be evaluated during each cycle
 - Will the full range of risks to the banking sector be captured?
 - Will vulnerabilities at all banks be identified?



Design choices for macroprudential stress tests

- Where should the complexity be?
 - Less complex at the firm level: Simplified and streamlined as compared to microprudential models
 - More complex at the system level to capture cross-firm and cross-sector linkages – the whole differs from the sum of the parts
- Data on linkages between institutions
 - Not just loans but higher frequency/intraday transactions that capture funding links
 - Counterparty and derivatives exposures
- Data from non-banks and the unregulated sector
 - How complete a picture can a banking-oriented stress test provide?
- Ability to do many scenarios, not just a handful



Key take-aways

Key take-aways

- There are many design choices in supervisory stress testing, especially regarding where complexity should be built in.
- Design choices have consequences for what is and is not well-captured in the stress testing program.
- Different design choices are likely needed for stress tests to fully capture macroprudential vulnerabilities.