FINANCIAL STABILITY INSTITUTE
BANK FOR INTERNATIONAL SETTLEMENTS

Macro Stress Testing

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Outline

- Introduction
- Sources of systemic risk
- Stress testing failures
- Key decisions for and desirable features of macro stress tests

Introduction (1)

- Macro stress tests are executed by financial sector regulators (or supervisors), central banks and international financial organizations
  - In “good times” their main goal is to “measure” systemic risk
  - This is the risk that failure of part of the financial system can lead to wide-spread financial sector difficulties with large adverse effects on the real economy
  - They can also help restore confidence in financial systems

Introduction (2)

- Macro stress tests will always estimate the losses for key financial institutions under assumed future developments
  - Large banks are typically included in the set of institutions studied
  - Assumed future developments are usually adverse macroeconomic shocks

Sources of Systemic Risk (1)

- Self-reinforcing feedback loops
  - Economic activity ➔ financial institution (FI) profitability ➔ lending ➔ economic activity
  - Asset fire sales
  - FI losses ➔ government bailouts of FI ➔ declines in sovereign credit worthiness ➔ increases in FI funding costs

Sources of Systemic Risk (2)

- Contagion risk
  - Uncertainty about who is exposed to the bad credits or has similar exposures
    - Hoarding of liquidity by financial institutions
    - General reluctance to transact
  - Losses from counterparty defaults
    - Losses from interbank loans

Systemic Risk Monitor

- Systemic risk model developed by the Austrian Central Bank for macro stress testing purposes
  - Incorporates losses from defaults from interbank loans by banks who suffer sufficient losses in their trading and loan books
  - See *Systemic Risk Monitor: A Model for Systemic Risk Analysis and Stress Testing of Banking Systems*, Austrian National Bank, Financial Stability Report, June 2006

Sources of Systemic Risk (3)

- Large, common risk exposures across FIs
  - Interest rate risk
  - Real estate price risk
  - The risk of an economic downturn
  - “Short memories” could play a role in the build-up of large exposures

Sources of Systemic Risk (4)

- House price busts
  - Recessions accompanied by house price busts tend to be longer and deeper than other recessions
    - Banks are important providers of credit
    - Widespread homeownership
    - Overshooting of house prices

Sources of Systemic Risk (5)

- There are good reasons to suspect that banking systems are inherently unstable
  - Use significant leverage
  - Fund long-term, illiquid assets short term
    - Vulnerable to runs
    - Self-fulfilling crises through runs

Sources of Systemic Risk (6)

- Banking crises are associated with significant lost output
  - BCBS' median estimate is 63% of pre-crisis output
  - US GDP in 2006 was 13 trillion US dollars
    - The BCBS median estimate suggests that the recent crisis cost US taxpayers $ 8.2 trillion

Stress Testing Failures (1)

- The stress tests run by some financial institutions prior to the crisis were based on shocks that were too mild
  - "Short memories"
    - Loans granted in "good times" have a higher probability of default than loans granted in recessions
  - Wrong incentives arising from "too big to fail" considerations

Stress Testing Failures (2)

- Some banks with large trading portfolios assume diversification benefits across stress losses for their trading portfolio and loan book
  - Yet substantial diversification benefits might not arise during periods of severe economic and financial market stress

Stress Testing Failures (3)

- Enhanced macroprudential policies could include macro stress tests that:
  - require key financial institutions to examine the impact of large shocks
  - require large banks to simultaneously estimate losses for their trading portfolio and loan book

Which FIs to include in a macro stress test?

- All systemically important financial institutions
  - Historically, this has meant at least all large banks
  - Highly connected securities firms?
  - Large insurance companies?
  - Recent EU-wide macro stress test examined 90 banks

A macro stress test can be bottom up or top down

Top-down approach

- Completely designed and performed by official authorities

Bottom-up approach

- Based on results of individual stress tests conducted by financial institutions themselves
- All institutions employ the same stress event set by official authorities

Top-Down Choice

- Examine individual balance sheets
  - More likely to reveal a build-up of systemic risk
  - Allows for a determination of which financial institutions need more capital
  - Is necessary to assess reasonableness of assumed diversification benefits across stress losses for a bank’s trading portfolio and loan book
- Employ only aggregate data

Assumed Adverse Developments

- Single-variable shocks (sensitivity tests)
- Multi-variable shock scenarios are arguably better
  - More plausible
  - More likely to accurately predict losses
    - Almost surely if both trading portfolio and loan book losses are estimated
    - Probably true even if only loan book losses are estimated

Macro Stress Test (MST) Scenarios

- Multi-variable shock scenarios are plausible future developments
  - They are not forecasts
  - Should incorporate large shocks
  - MST scenarios usually envision an economic downturn (or slowdown)
    - This reflects the perceived importance of macroeconomic risk for banks’ credit exposures

The Time Horizon

- The estimation of credit losses argues for a relatively long time horizon for the MST and scenario
- Yet trading portfolios can change quickly
- In practice, the time horizon is usually between one and three years

Elements of the 2011 Irish MST Scenario

Variable	2011	2012	2013
GDP	-1.6%	0.3%	1.4%
Exports	2.0%	2.1%	2.5%
Unemployment Rate	14.9%	15.8%	15.6%
CPI Inflation	0.7%	0.9%	1.0%
House Prices	-17.4%	-18.8%	0.5%
Commercial RE	-22.0%	1.5%	1.5%

Ending Capital Requirements under the Adverse Scenario

- 2009 US SCAP MST
  - Tier 1 capital > 6% of RWA
  - Core Tier 1 capital > 4% of RWA
- Recent Irish top-down MST
  - Core Tier 1 capital > 6% of RWA
- EBA EU-wide bottom-up MST
  - Core Tier 1 capital > 5% of RWA

Thank you