On Stress Tests

Markus Brunnermeier
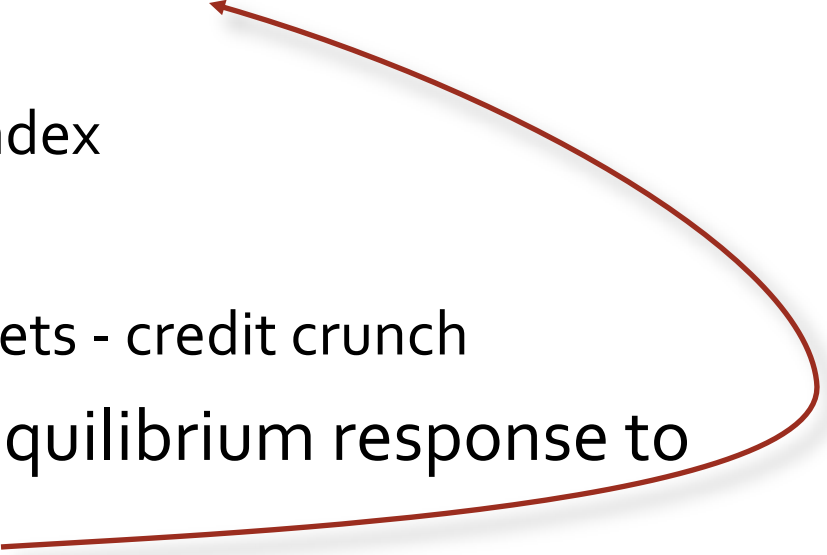
Princeton University

1. Stress Scenario

- **How bad?**
  - Is historical worst case a good guidance? (the world changes)
    - Loss rates can reach new heights
  - Data from other countries

- **What's exogenous? What's endogenous?**
  - Endogenous response
    leads to amplification mechanism/feedback loops/spirals
  - Second/third … round effects
  - Endogenous mechanism is very model dependent
    - Non-linear effects are key
    - General Equilibrium effects
  - Is macro-scenario (unemployment rate) really exogenous?

2. Endogenous Response → Loops

- **Risk Topography** – *General Equilibrium perspective*
- Direct responses to 5%, 10%, 15%,… drop in factor to
  - ΔValue
  - ΔLiquidity Mismatch Index
- Predict response
  - hold out - "fire sell" assets - credit crunch
- Derive likely indirect equilibrium response to
  - this stress factor
  - other factors

Non-linearities, externalities, multiple equilibria, amplification, mutually inconsistent planes, Fat tails, …

2. Liquidity is all about endog. responses

A   L

Market liquidity

  fire-sale price impact

(Technological liquidity)

  irreversibility

Funding liquidity

  maturity, haircut/margin spike

Liquidity Maturity mismatch

- *Leverage* and *maturity mismatch* not ideal measures

- LMI = Response indicator!
  - Counterparty/bank run
  - Collateral run

2. Further endogenous responses

- **Predatory Trading**
  - JP Morgan $2bn trading loss will become $6bn
  - Why not discovered during stress test????

- **Uncertainty/risk**
  - Single scenario might hide that agents don't know true scenario ⟶ precautionary behavior

- **Regulation: leverage ratio is counterproductive**
  - Leverage constraint has two effects
    - Normal times: payouts are delayed to build up cushion — Small stabilizing effect
    - Crisis times: fire-sales — Large destabilizing effect
  - Payout restriction in good times!

3. Micro-prudent vs. macro-prudent

- Fallacy of the Composition:

Balance sheet	action	micro-prudent	macro-prudent
Asset side	(fire) sell assets	Yes	Not feasible in the aggregate
	no new loans/assets	Yes	Forces others to fire-sell + credit crunch
Liability side	raise long-term debt		
	raise equity	Yes	Yes

- Macro: also include amplification in macro variables

3. Macro- vs. Micro-prudence

- Capitalization of whole financial sector matters!
  - Strong bank should not be allowed to pay out dividends if other financial institutions are weak (see e.g. BruSan10)

- Flight to safety capital flows
  - Dexia – ignored in EBA's European stress test
  - Adverse scenario might vary from bank to bank a lot!

4. How to implement?

- **Transparency**
  - Stress test results can trigger a bank/collateral run
    - Bad stress test news can serve as coordination/synchronization device
  - Reveal bank specific or macro/aggregate data?
    - Commit ex-ante to transparency strategy
  - Snapshots vs. average?

- **Ex-ante back-up recapitalization plan** for the case that the stress test results are negative

Main messages, again

1. What should be part of exogenous scenario – what endogenously modeled?

2. Endogenous responses ⟶ loops ⟶ liquidity
   - How well can they be modeled?
   - Depends on regulation
   - Importance of "predatory trading"
   - Uncertainty changes behavior – can single scenario capture it

3. Macro vs. Micro
   - Amplification is part of real economy! (endogenous)

4. Implementation
   - Transparency + recap back-up plan