Systemic Risk

- Risk build up.

  What [low frequency] data do we need?

- Systemic risk: Endogenous amplification of shocks through conditions in the financial system

  Destabilizing feedbacks, spirals, etc.

Assessing Conditions for Feedbacks

1. Stress data on:

   VALUE (i.e. capital, solvency) and LIQUIDITY.

   - Why? Most theoretical analyses of feedback mechanisms map value and/or liquidity into decisions.

2. Measurement should have consistency over time, to form a growing panel.

   - Why? To estimate firm response functions.

Two-Factor Example

- Date 0: measurement date
- Date 1: Possible crisis
- Focus on "risk factors" and "liquidity factors"
  - N possible date 1 real estate prices (risk factor)
  - M possible date 1 repo haircuts (liquidity factor)
  - States s = M X N matrix
- Elicit information on value and liquidity for orthogonal movements in each factor, for each state s:
  - VALUE(s) = Equity
  - LIQUIDITY(s) = Liquidity Mismatch Index

Liquidity Mismatch Index (LMI)

Assets	*Liabilities*
Asset "liquidity weight": λ - Treasuries/cash: $\lambda = 1$ - Overnight repo: $\lambda = 1$ (or close to one) - Agency MBS: $\lambda = 0.95$ - Private-label MBS: $\lambda = 0.90$	Liability "liquidity weight": λ - Overnight debt: $\lambda = 1$ - Long-term Debt: $\lambda = 0.5$ - Equity: $\lambda = 0.20$

LMI = liquidity of assets minus

liquidity promised through liabilities

Basel 3: Net Stable Funding Ratio, Liquidity Coverage Ratios implicitly assign some λ weights

Two pieces of information

1. Capital and liquidity in each future stress scenario
   - This gives capital/liquidity position if real estate falls by 20%
2. Measure of date 0 portfolio choice:
   - Δ(value) and Δ(liquidity) with respect to each factor
   - How much value-risk sensitivity is the firm taking?
   - How much liquidity sensitivity is the firm taking?

Modeling Response Function

- We want to know how a firm will respond to a shock that changes value and liquidity
  - Shed risk ⇒ Reduce Δ(value)
  - Hoard liquidity ⇒ Reduce Δ(liquidity)

- **Feedbacks** when placed in general equilibrium

Calibrating Response Function

- Data presents a history of "date 0"s in varying conditions
  - Each date is a portfolio choice, Δ, as a function of current firm value/liquidity and current state of economy
  - Panel data

- *Key feature of our approach: entire history is useful.*

General equilibrium modeling

- In each state we know direct responses to 5%, 10%, 15%,… drop in factor in terms
  - Value, Liquidity index
- Predict response function
  - Try to "fire" sell assets, hoard liquidity, credit crunch
- Derive likely indirect equilibrium response to
  - this stress factor
  - other factors

Externalities, multiple equilibria, amplification, mutually inconsistent plans,…

- *Competition among systemic risk models*

Choice of stress scenarios

- Issue 1: Need core data to form panel data set on which to calibrate response functions
  - Orthogonal stress scenarios on baseline set of factors
  - Repeated observations
- Issue 2: Much of the interest at any time t is on special cases
  - Correlated scenarios (cross-scenarios)
  - Tailored scenarios (e.g., Greek default)
- Need both …