Discussion: Minimization of Systemic Risk as an Optimal Network Reorganization Problem - The Case of Overlapping Portfolio Networks in the European Government Bond Market

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Modeling strategy

- Multilayer network
  - Captures connectedness via common exposures
  - Salient feature of real world financial networks
- Specializes DebtRank (Battiston et al, 2012)
  - from direct exposure to common exposures
- Endogenizes impact of fire-sale of assets
  - Kyle (1985) price impact model
- Shows systemic risk minimization is feasible
  - Rebalances banks' sovereign bond portfolios
    - Minimize impact of default
    - Banks' original risk profile unchanged

Systemic risk minimization in the model

- Achieved by reducing the system total DebtRank
- Intuition
  - Increase homogeneity in the system
  - Reduce DR of banks with high DR
  - Increase DR of banks with low DR
- Constraints faced by banks in minimization problem
  - Value new allocation = Value old allocation
  - Returns at least equal to original allocation return
  - Variance at most equal to original allocation variance
- Would results hold when faced with other constraints?

Real world constraints: Capital

- Banks need to hold capital against risky assets
- Let
  - K_i be original total capital of bank
  - x_{ki} the new sovereign bond allocation
  - RW_k the risk-weight associated with sovereign bond k
- We need a capital allocation constraint

$$\sum_k RW_k \times x_{ki} \leq K_i$$

Real world constraints: Concentration limits

- Banks need to meet concentration limits
- Let L_k be the concentration limit for bond k
- We need a concentration limit constraint

$$\frac{x_{ki}}{\sum_k x_{ki}} \leq L_k$$

Real world constraints: Liquidity

- Banks need to hold liquid assets
- Let
  - Liq_i be the required liquidity the bank holds
  - x_{ki} the new sovereign bond allocation
  - h_k the haircuts for asset k
- We need to ensure the bank has enough liquidity

$$\sum_k h_k \times x_{ki} \geq K_i$$

Thank You