Global Games and Financial Fragility:

Foundations and a Recent Application

Itay Goldstein

Wharton School, University of Pennsylvania

Outline

Part I:

The introduction of global games into the analysis of financial fragility and crises

Part II:

A recent application, based on a paper "The Interdependence of Bank Capital and Liquidity" (with Elena Carletti and Agnese Leonello)

Financial Fragility and Coordination Failures

- What makes financial systems fragile? What causes crises and breakdowns in financial institutions and markets?
- A primary source for fragility is: c**oordination failures**
- A coordination failure arises when economic agents take a destabilizing action based on the expectation that other agents will do so as well. The result is a **self-fulfilling crisis**
- The key ingredient for this to arise is **strategic complementarities**: agents want to do what others do

Leading Example: Bank Runs

- Diamond and Dybvig (1983): Banks Create liquid claims on illiquid assets using demand-deposit contracts
- Arrangement leads to two equilibria:
  - **Good equilibrium:** only impatient agents demand early withdrawal
  - **Bad equilibrium:** all agents demand early withdrawal. **Bank Run** occurs
- Bank runs occur because of strategic complementarities:
  - When everyone runs on the bank, this depletes the bank's resources, and makes running optimal. As a result, runs are **panic-based**

Problems with Multiplicity

- The model provides no tools to determine when runs will occur. This is an obstacle for:
  - **Understanding bank choices:**
    - What will be the equilibrium choices of banks, e.g., liquidity provision, when they take into account the possibility of a run and how it is affected by their choices?
  - **Policy analysis:** which policy tools are desirable to overcome crises?

  - Deposit insurance is perceived as an efficient tool to prevent bank runs, but it might have costs, e.g., moral-hazard
  - Without knowing how likely bank runs are, it is hard to assess the desirability of deposit insurance

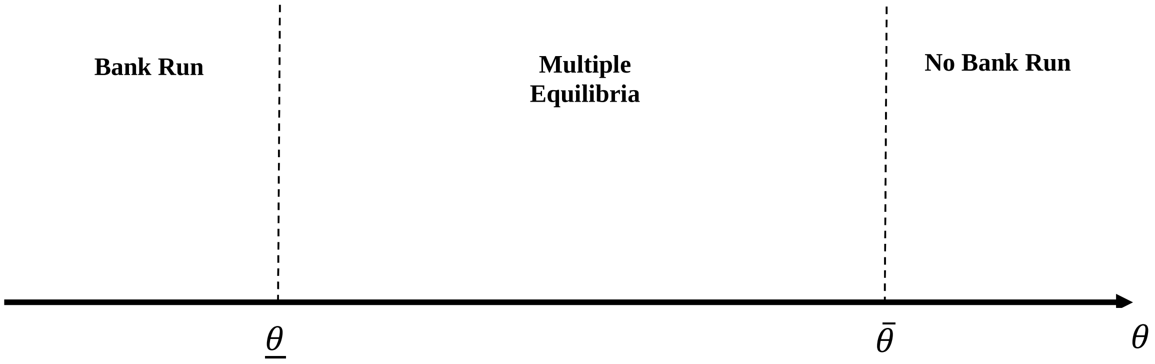
- **Empirical analysis:** what constitutes sufficient evidence for the relevance (or lack of) of strategic complementarities in fragility?
  - Large body of empirical research associates crises with weak fundamentals. Is this evidence against the panic-based approach?
  - How can we derive empirical implications?

The Global-Games Approach

- The global-games approach – based on Carlsson and van Damme (1993) – enables us to derive a unique equilibrium in a model with strategic complementarities and thus overcome the problems associated with multiplicity of equilibria
- The approach assumes that the fundamentals of the bank may be in extreme dominance regions and that agents observe slightly noisy signals of them
- A simple illustration is provided by Morris and Shin (1998)

Equilibrium with Global Games: Step I

- Assuming the existence of dominance regions:



Bank Run

Multiple Equilibria

No Bank Run

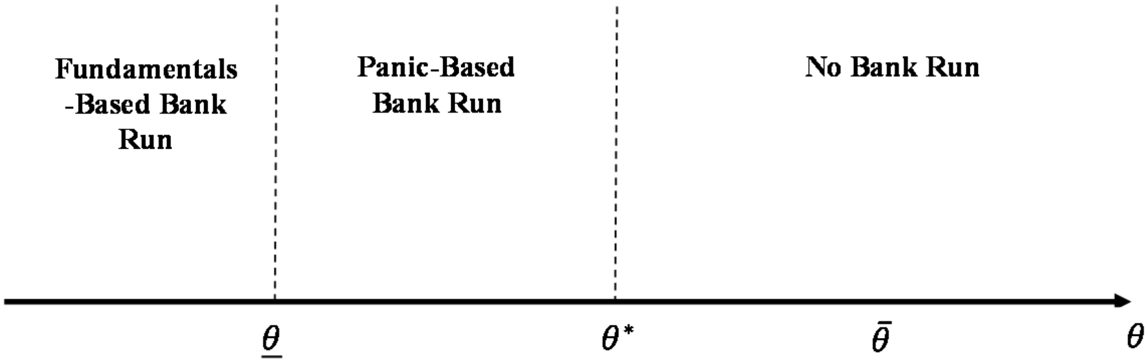
$\underline{\theta}$

$\bar{\theta}$

θ

Equilibrium with Global Games: Step II

- Assuming slightly noisy signals:



A run occurs if and only if the fundamentals are below a unique threshold

Working with Global-Games Equilibrium

- Run probability captured by threshold θ^*, which is characterized by indifference condition of marginal agent
- Analyzing this condition, one can:
  - Characterize banks' choices and their interaction with run probability (Goldstein and Pauzner, 2005)
  - Conduct policy analysis (Allen, Carletti, Goldstein, and Leonello, 2018)
  - Derive and test empirical predictions (Chen, Goldstein, and Jiang, 2010)