On the Stability & Efficiency of Network Bargaining with Search Friction

Should One Buy Free Trade Coffee at Starbucks^{TM}?

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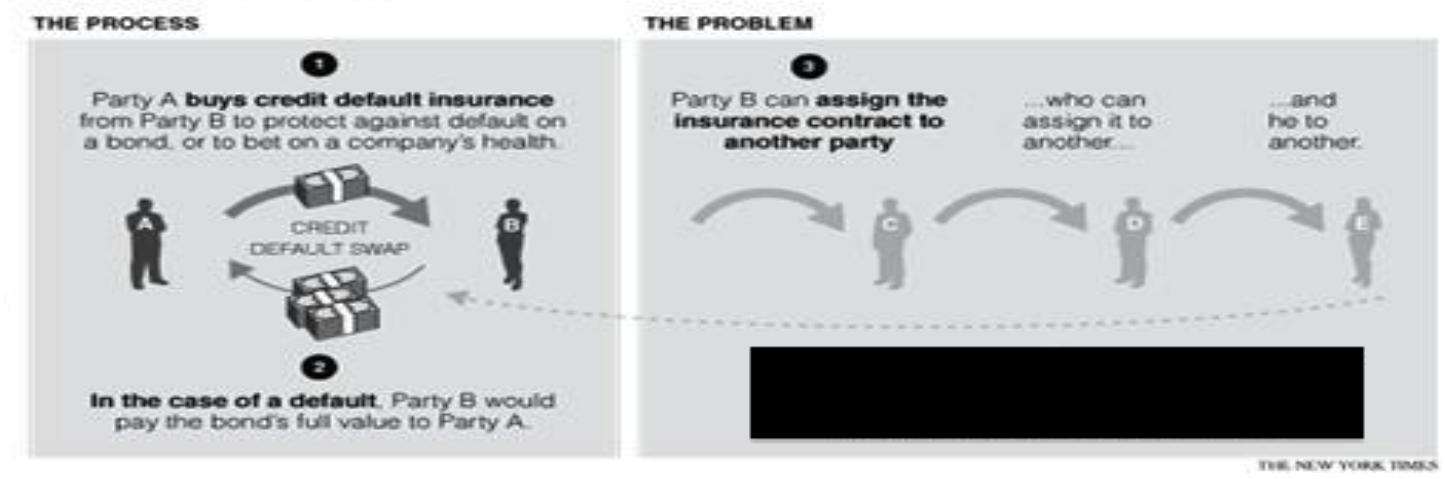
Motivation

Coffee supply chains



Credit default swaps

Trading in supply-chain & banking/financial networks

Characteristics:

- Middlemen involved in such trade networks
- Bilateral trading limited by connectivity
- Faster trades: electronic platforms & high-frequency trading
- Few models exists to analyze the impact

Issues:

- Stability: Do stable trading strategies exist or does state fluctuate?
- Efficiency: When profitable, does trade actually happen?

Goals:

- *Understand bilateral trading with network constraints*
- *Understand impact of speed of trading on stability*

Methodology

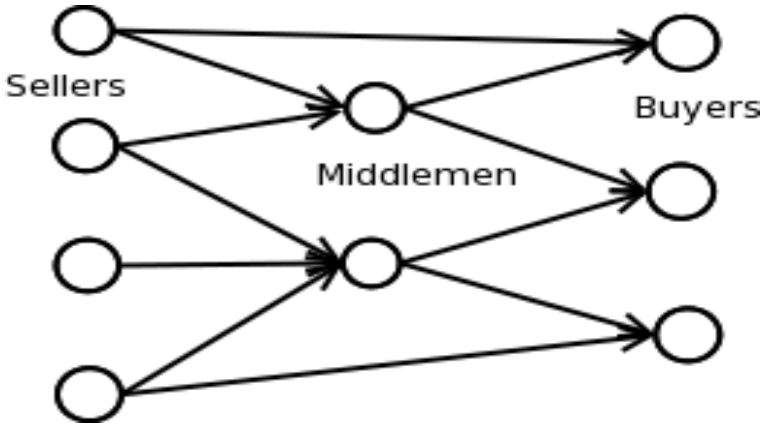
Approach:

- Dynamic non-cooperative bargaining as a micro-market mechanism
- Scale to increase size of economy
- Analyze limiting dynamics

Challenges:

- Network Structure: Incorporating local constraints on trade
- Bargaining Procedures: Modeling inter-party bargaining
- Large Market: Model market power as number of agents increase
- Frictions: Impact speed of trading

Model



- Trading network: sellers, middlemen & buyers (≤ 2 hops)
- Each node (agent type) has $m \geq 1$ agents
- Each seller has one indivisible good
- Each agent can have at most one good
- Trade only along directed edges, transaction cost C_{ij} for edge (i, j)
- Only buyers consume item, value V_k for type k
- Middlemen make money by flipping good
- Network, transaction costs are common knowledge

Contributions

1. Define a local bargaining process, incorporates search friction
2. Prove as system scales limiting "stationary" equilibria exist
   Uses fluid limit of Markov process + incentive constraints
3. Use this solution concept to study how network structure impacts trade
   - **Asymptotic efficiency**:
     With patient agents, only cheapest routes will be taken
   - **Endogenous delays**: Network introduces distortions
     Even when profitable, trade may get delayed
     With delays, sellers surplus[2] is 0

Details: http://arxiv.org/abs/1302.2869

[2] Many gallons of coffee were consumed in the writing, most from local roasters

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Where is the coffee?

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