Minimal-Intelligence Agents for Bargaining Behaviors in Market-Based Enviroments

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The problem

- Market-Based Control in distributed computer systems
  - Not working in every case without a centralized control or human supervision, that knows everything about the system
  - We need a distributed system, that is working with self-controlled nodes
    - Agents
- The beginning: Human based tests for modeling continuous double auction in real minimally simple market
  - Do we need humans, or intelligence at all?
- Zero-Intelligence trading models(ZI-U, ZI-C)
  - No memory, no learning, random bids, random offers, limits
  - Just in special cases converge to the equilibrium price
    - They need some „brain”

Solving the problem

- Zero-Intelligence-Plus trading models:
  - Variable profit margin based on the last shout
    - For sellers:
      - If (the last shout was accepted at a price):
        - Any seller for which (shout price <= price) should raise its profit margin
        - If (the last shout was a bid)
          - Any active seller for which (shout price >= price) should lower its margin
      - Else
        - If(the las shout was an offer)
          - Any active seller for which (shout price >= price) should lower its margin
  - Adaptation for raising/lowering profit margin
    - $\mu_i(t+1) = \frac{(p_i(t)+\Gamma_i(t))}{\lambda_{i,j}-1}$

Results

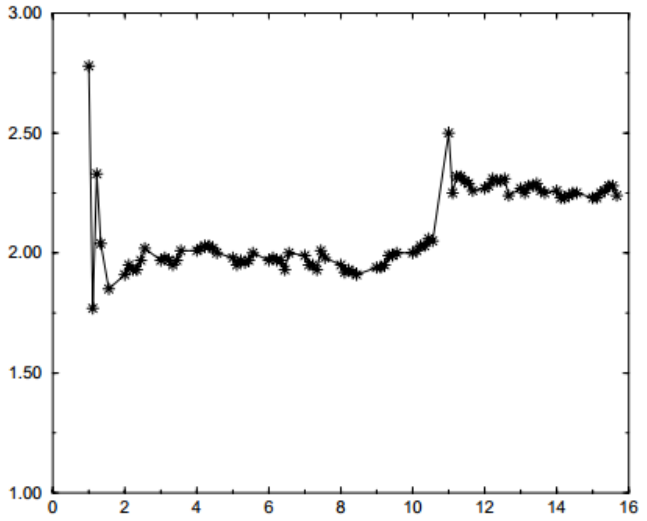

Figure 46: Transaction-price time series for one experiment with a sudden increase in demand. Initial market is illustrated in Figure 24 (P_0 = \$2.00). After 10 trading days, demand is increased (P_0 = \$2.25) and the experiment continues for another 5 days. See text for discussion.

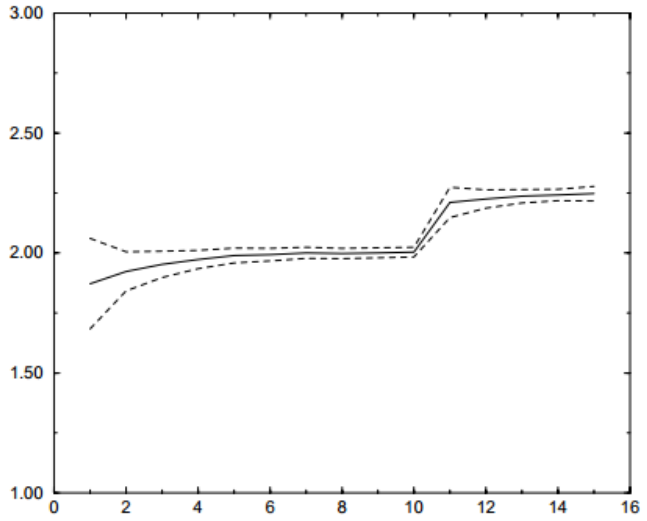

Figure 47: Mean ZIP transaction prices, averaged over 50 increased-demand experiments.

Opinion

Good

- I've learned something new, that never heard before: Market-Based Control, what is quite interesting
- Comparing model efficiency across time:
  - Humans (1962) vs.
  - ZI models (1993) vs.
  - ZIP models (1997)
- Possibilities
- C code

Bad

- Sometimes maths not explained in details