Bargaining and Reputation with Ultimatums

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Monday, November 19, 2018

Southern Economic Association

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Bargaining and Reputation (Abreu and Gul, 2000)

- Two players bargain to divide a unit pie.
- Each player is either rational (wants as a big share of the pie as possible) or persistent (demands a fixed amount).
- Players quit or persist.

Bargaining and Reputation with Ultimatums

- Two players bargain to divide a unit pie.
- Each player is either rational (wants as a big share of the pie as possible) or persistent/irrational (demands a fixed amount).
- Players quit, persist, or **may send an ultimatum**.

Application: Bargaining with Final-Offer Arbitration

- Two parties (e.g. a union and a firm, or partners of a bankrupt company) bargain to resolve a conflict.
- Each party is
  - justified/persistent (evidence supporting a claim)
  - unjustified/rational (no evidence supporting a claim)
- Two parties can settle the conflict on their own.
- Or they can let the court resolve their conflict when they get the chance.
  - A justified party goes to the court whenever there is a chance.
  - An unjustified party chooses strategically.

Results

1. How likely a player sends an ultimatum depends on own reputation and opponent's reputation, and is not necessarily monotonic in time (vs never in Abreu and Gul (2000)).
2. Players' reputations do not necessarily build up when both sides can send ultimatums (vs reputations always build up in Abreu and Gul (2000)).
3. Players' limit payoffs can depend on discount rates (as in Abreu and Gul (2000)) as well as the arrival rates of challenges.

Continuous-Time Bargaining of Abreu and Gul (2000)

- Player 1 and player 2 bargain to divide a unit pie.
- With probability z_1 player 1 persistently/irrationally demands a_1, and with probability z_2 player 2 persistently/irrationally demands a_2. Assume $d \equiv a_1 + a_2 - 1 > 0$.
- Time is continuous.
- At each instant, each player decides between conceding and persisting.
- Player i's discount rate is r_i.

Equilibrium Strategies and Reputations

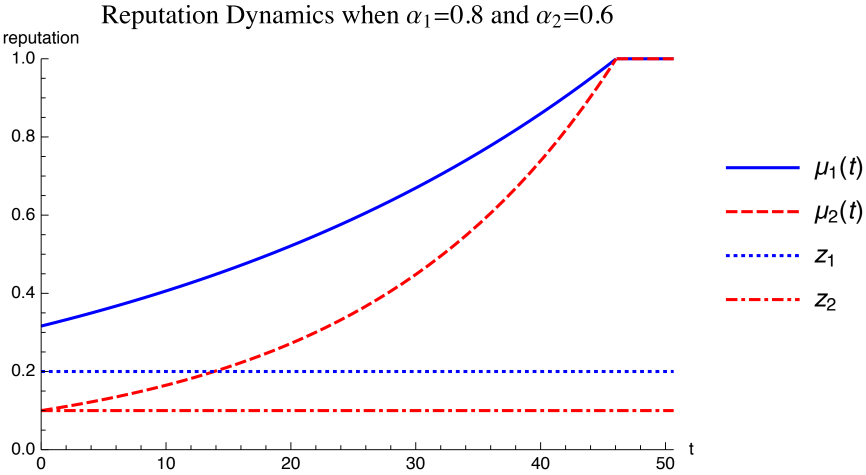
A player's strategy crucially depends on opponent's strategy and *reputation*, i.e., probability of persistence.

1. Players' reputations reach 1 at the same time.
2. Each player mixes between quitting and persisting at a constant rate to make opponent indifferent between quitting and persisting.

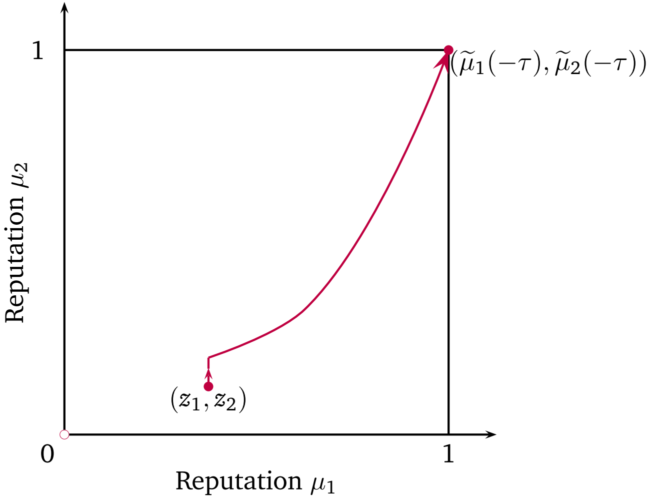
$$\lambda_j = \frac{r_i(1 - a_j)}{d}.$$

3. One player may quit with a positive probability at time 0.

Reputation Dynamics



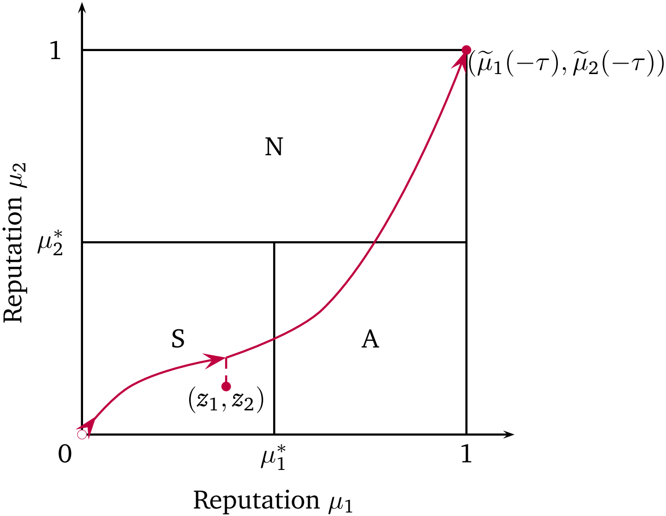
Reputation Diagram



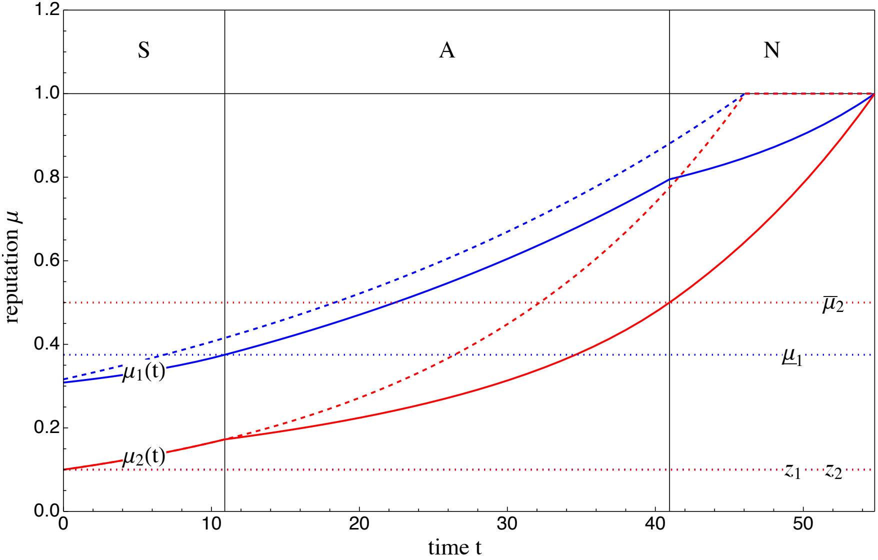
Bargaining with One-Sided Challenges

- Player 1 and player 2 bargain to divide a unit pie.
- With probability z_1 player 1 persistently/irrationally demands a_1, and with probability z_2 player 2 persistently/irrationally demands a_2. Assume $d \equiv a_1 + a_2 - 1 > 0$.
- Time is continuous.
- **A challenge opportunity arrives to player 1 with Poisson rate g_1.**
  - If player 1 does not challenge, the chance may arrive again.
  - If player 1 pays cost c_1 to challenge, player 2 has to respond.
    - If player 2 yields to the challenge, player 1 gets a_1 and player 2 gets $1 - a_1$.
    - If player 2 pays cost c_2 to see the challenge, then player 1 loses if he's unjustified (rational) and wins if he's justified (irrational).
- At each instant, each player decides between conceding and persisting.
- Whenever necessary, player 1 decides whether or not to challenge, and player 2 decides whether or not to yield to the challenge.
- Player i's discount rate is r_i.

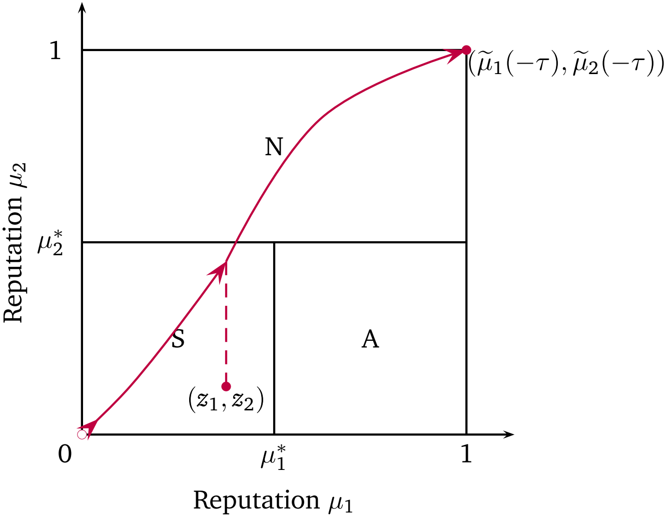
Non-Monotonic Challenge Rate



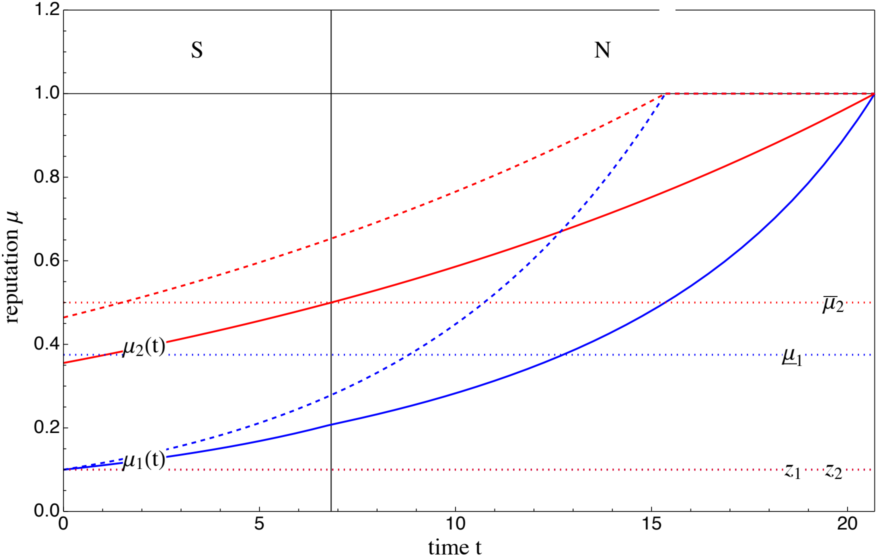
Non-Monotonic Challenge Rate



Monotonic Challenge Rate



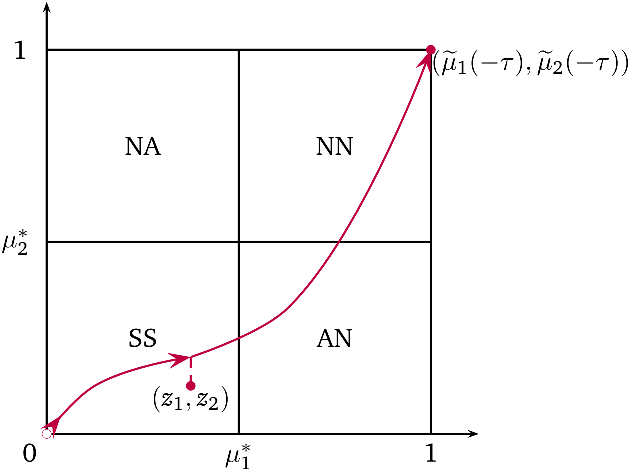
Monotonic Challenge Rate



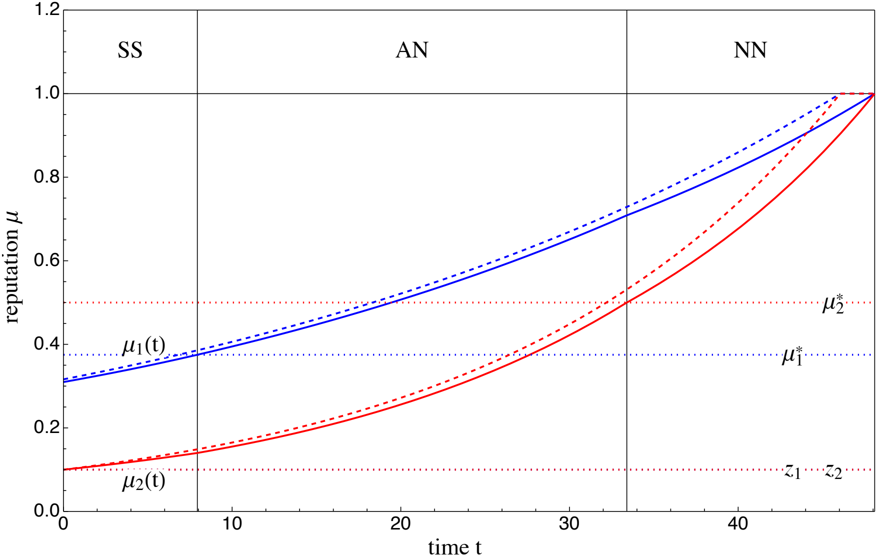
Bargaining with Two-Sided Challenges

- Player 1 and player 2 bargain to divide a unit pie.
- With probability z_1 player 1 persistently/irrationally demands a_1, and with probability z_2 player 2 persistently/irrationally demands a_2. Assume $d \equiv a_1 + a_2 - 1 > 0$.
- Time is continuous.
- **A challenge opportunity arrives to player i with Poisson rate g_i.**
  - If player i does not challenge, the chance may arrive again.
  - If player i pays cost c_i to challenge, player j has to respond.
    - If player j yields to the challenge, player i gets a_i and player j gets $1 - a_i$
    - If player j pays cost c_j to see the challenge, then player i loses if he's unjustified (rational) and wins if he's justified (irrational).
- At each instant, each player decides between conceding and persisting.
- Player i decides whether or not to challenge, and player j decides whether or not to yield to the challenge.
- Player i's discount rate is r_i.

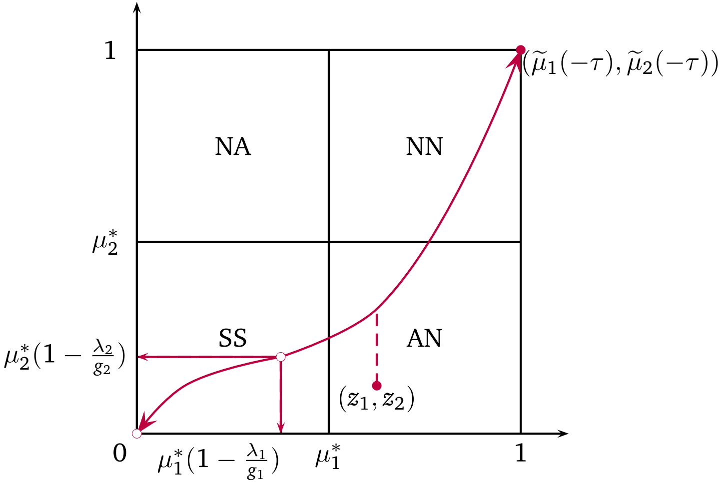
Reputation Building Up



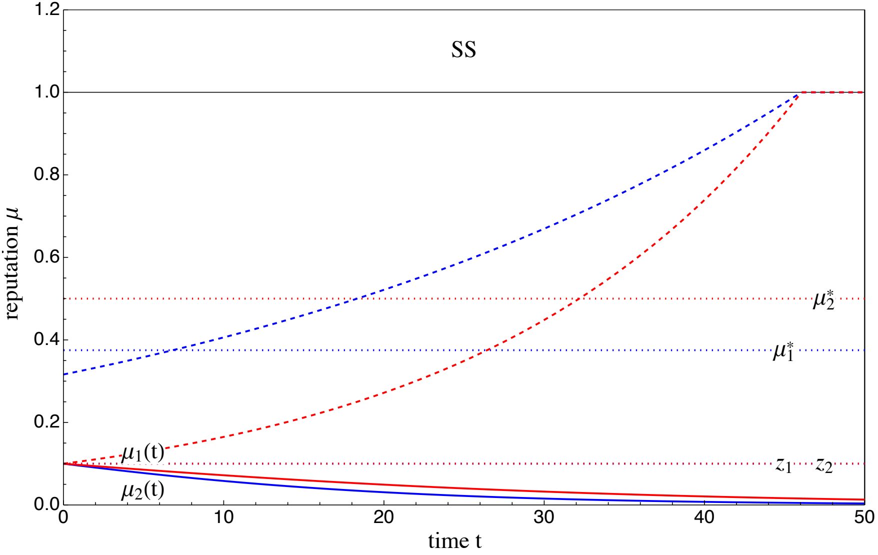
Reputation Building Up



Reputation Not Building Up



Reputation Not Building Up



Limit Payoffs

Suppose players can choose their initial demands a_i and a_j (multiple types).

- Player 1's limit payoff in Abreu and Gul (2000) is

$$\frac{r_2}{r_1 + r_2}.$$

- Player 1's limit payoff in bargaining with one-sided challenge is

$$\frac{r_2}{\max\{r_1, g_1\} + r_2}.$$

- Player 1's limit payoff in bargaining with two-sided challenge is

$$\frac{\max\{r_2, g_2\}}{\max\{r_1, g_1\} + \max\{r_2, g_2\}}.$$

Conclusion

- The paper builds a model of reputational bargaining with an opportunity to challenge the opponent.
- A player initially is indifferent between challenging and waiting when the opportunity is present; then strictly prefers to challenge; finally strictly prefers not to challenge.
- Neither player's reputation may build up when the opportunity to go to court is abundant (e.g., it is easy for a justified player to collect supporting evidence).
- The paper gives an economic interpretation and application of "irrationality" in Abreu and Gul (2000).

THANK YOU!

References I

Abreu, Dilip and Faruk Gul, "Bargaining and Reputation," *Econometrica*, 2000, *68* (1), 85–117.