Chapter 17

Backward induction: Ultimatums And Bargaining

We develop a simple model of bargaining, starting from an ultimatum game (one person makes the other a take it or leave it offer), and building up to alternating offer bargaining (where players can make counter-offers). On the way, we introduce discounting: a dollar tomorrow is worth less than a dollar today. We learn that, if players are equally patient, if offers can be in rapid succession, and if each side knows how much the game is worth to the other side, then the first offer is for an equal split of the pie and this offer is accepted. But this result depends on those assumptions; for example, bargaining power may depend on wealth.

Ultimatums and Bargaining

2 Players (1 and 2)

1 makes 2 a take it or leave it offer (s and 1 - s).

2 accepts the offer then payoffs are (s, 1 - s) or 2 can reject then payoffs are (0 , 0).

Backward induction predicts the payoffs should be (0.99, 0.01).

2 Period Bargaining

Player 1 makes offer to 2 (s1, 1 - s1).

If player 2 accepts then payoffs are (s1, 1 - s1).

If 2 rejects the offer then player 2 makes offer to 1 (s2, 1 - s2) but the total payoffs decreases by delta.

If player 1 accepts then payoffs are (s2, 1 - s2).

If player 1 offers 2 > delta * 1 then 2 will accept and if player 1 offers less then 2 will reject.

3 Period Bargaining

Player 1 makes offer to 2 (s1, 1 - s1).

If player 2 accepts then payoffs are (s1, 1 - s1).

If 2 rejects the offer then player 2 makes offer to 1 (s2, 1 - s2) but the total payoffs decreases by delta.

If player 1 accepts then payoffs are (s2, 1 - s2).

Player 1 makes offer to 2 (s1, 1 - s1) but the total payoffs decreases by delta.

If player 2 accepts then payoffs are (s1, 1 - s1) else both get (0, 0).

Equilibrium is at (1 - delta * (1 - delta), delta * (1 - delta)).

For n stage game the equilibrium is at ((1 - delta)/(1 + delta), (delta + (delta)^n)/(1 + delta)). At infinite stage, payoff are (1/(1 + delta), delta/(1 + delta)). If we take delta = 1, payoffs are (½, ½).

Conclusions

Alternating offer bargaining.

1. Even split if potentially can bargain forever, delta = 1, no discounting and rapid offers and same discount factor delta1 = delta2.

2. The very first offer is accepted. No haggling. Value of the pie and value of time is assumed to be known.