

MICROECONOMICS AND POLICY ANALYSIS - U8213
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 Class Notes - Spring 2001

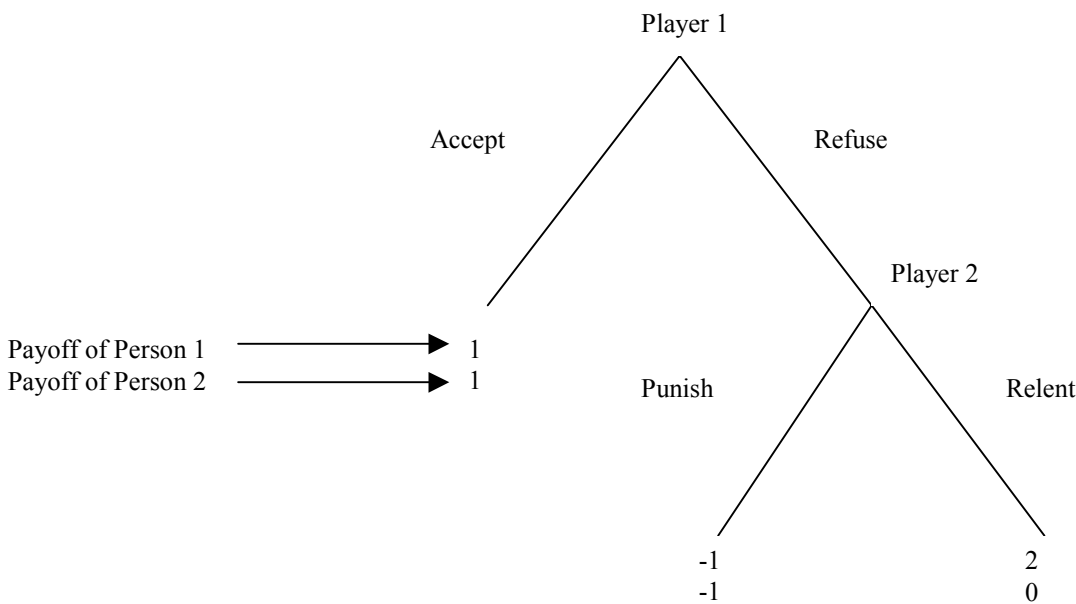
Time Consistency

Monday, March 26th

Reading: Dixit and Nalebuff

Example Game: Visiting a Relative

Extensive Form Representation:



Normal Form:

		Player 2	
		Punish	Relent
Player 1	Accept	1,1	1,1
	Refuse	-1,-1	2,0

What are the Nash Equilibria?

(1,1) and (2,0)

Is this reasonable? Remember that there are games where every equilibria is a Nash equilibria. Are the two equilibria equally reasonable in terms of timing?

(1,1) is improbable. It is sustained by a threat that isn't credible. You can't see this in the Normal form because you are viewing simultaneous choices but in the extensive form you can view the temporal dimension of the game.

Implications of non-credible threats: If one is to make a threat it must be credible. Only credible threats have meaning.

Two important aspects of the Extensive Form representation:

1) Extensive Form uses **backward induction**. You solve the game by solving first all the terminal nodes (end of decision tree - final decisions faced) and working backward. You make decisions today with the assumption that you will behave optimally in the future. Rule of Dynamic Optimization.

2) The solution that arises from backward induction is the **sub-game perfect equilibrium**. There are no non-credible threats used in the solution therefore (1,1) in the game above is not sub-game perfect.

Time Consistency vs Time Inconsistency

The visit example is **time inconsistent**. What you are promising at time zero is inconsistent with what you will do at a later time. In the visit example, the parents threatened to punish the kid if he/she did not visit the relative. But, the parents would not punish the child later if he/she did not go to the visit the relatives.

The example of Ulysses and the Sirens is **time consistent**. At time zero Ulysses says the Sirens will not affect him. Ulysses created a situation in which he was forced to remain time consistent by tying himself up so he couldn't leave the boat.

Layaway Plans are an example of forcing someone to be time consistent.

Hijacking: Many governments have positions that they will not negotiate with terrorists. Is this time consistent? Not really because once hostages are taken there is great pressure to get them released therefore it ceases to be a credible commitment. To be completely credible you could **never** negotiate with terrorists.

Famine/International Aid: If the International community rescues individuals in distress then it diminishes the incentives of domestic governments and localities to remedy the situation. The International community could stop giving and intervening but this probably would not be time consistent.

Credible Commitments - Doing something to force you to commit **Dixit and Nalebuff - Chapter 6**

Credible Commitments -- how to achieve the goals promised at time zero. How do you ensure that your goal is reached although the payoff is in the future (enforcing a Nash Equilibrium that relies on non-credible threats)?

Eight Fold Path to Credibility:

1) Establish and use a Reputation:

Concept of reputation relies on repeated games/actions. You take certain actions so that in the future people will deal with you in a certain way. There must be a future circumstance. You may accept a lower payoff in one period to receive a higher payoff in future periods. You may do it today even if it isn't optimal because it may be beneficial in the future when the situation arises.

Bargaining and attributes influence reputation.

Examples:

- Tax amnesties
- Negotiating with Terrorists
- Parental punishment and children
- Charity
- Tourism

2) Write contracts

Device that imposes penalties (litigation, etc.) for not following through on a contract.

Example: Mr. Russo who told the public he would pay \$25,000 to a person's favorite charity if they caught him eating in a restaurant. This would help him stick to his diet.

3) Cut off communication

Eliminates the possibility for renegotiations. Commits you to a course of action.
Good bargaining strategy.

Example: Relationships

4) Burn bridges behind you

You can't retreat and must move forward.

Example: Army

Cortes burning his ships upon his arrival in Cempoalla, Mexico

5) Leaving the outcome beyond your control / brinkmanship

Examples: Dr. Strangelove

Automation

6) Move in small steps

Reduces the size or threat or promise and the scale of commitment

Example: Thieves who work together

- 7) Develop credibility through teamwork
Others can help us achieve a credible commitment
Example: Soldiers

- 8) Employ mandated negotiating agents
Have someone else negotiate for you.
Example: Negotiating a raise
Vending machine