Overview

Consumer Theory

Producer Theory

Exchange
Edgeworth Box

All Possible Exchange Points

Contract Curve
Overview

Consumer Theory

Producer Theory

Exchange (Multiplicity)

Walrasian Equilibrium
Walrasian Equilibrium

Requirements:
1) Full information
2) “Smooth Indifference Curves”
   (Convex, continuous, monotonic)
3) Interior Solution
4) No Externalities

Outcome: Welfare Theorems
1) If (x,p) is a Warasian equilibrium, then x is Pareto Efficient
2) Suppose x is a PE allocation in which each agent holds a positive amount of each good. If preferences are convex, continuous, and monotonic, there exists an initial endowment for which x is a Walrasian Equilibrium.
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Are the Requirements Satisfied?

Interior Solution? Information Externalities

Game Theory

Partial Equilibrium Games (Industrial Organization)

Modern Day Economics
Game Theory

A Careful model of how agents interact with one another.

Nash Equilibrium: A strategy profile in which no one has an incentive to change strategies.

Dominant Strategy Equilibrium: A strategy profile in which your optimal strategy does not change with any undominated strategy of a competitor.

Mixed Strategy Equilibrium: A strategy profile in which players are randomizing between actions. Note: Any action that we randomize between must have the same expected payment.

Nash Theorem: There exists at least one Nash equilibrium for any finite action space game.
# Industrial Organization

<table>
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<th>Simultaneous</th>
<th>Sequential</th>
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<tr>
<td><strong>Price</strong></td>
<td>Bertrand</td>
<td>Second Mover Adv</td>
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<tr>
<td><strong>Quantity</strong></td>
<td>Cournot</td>
<td>Stackleburg (1st Mover Advantage)</td>
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Reaction Curves

- **Upward Sloping Reaction Curves** (Compliments)
  - Prices driven down to \( MR = MC \)
  - Prices driven to zero with constant marginal cost

- **Downward Sloping Response Curves** (Substitutes)
  - Quantities between the CE and Monopoly levels
  - Profits are positive and decreasing with the number of players
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Information

Private Information:

Proposer
- Uniformed
- Informed

Screening
- Revelation Principal
  - Distortion of goods
    - At the low end to protect
    - Profits at the high end
  - Often No Equilibrium
    - In Pure Strategies

Signaling
- Bayesian Nash Equilibrium
  - Structure of Off Equilibrium
    - Beliefs influence Final
    - Outcome
  - Too many Equilibrium

Private Information: Moral hazard – I have an action that affects the outcome that you can’t see.
2nd Degree PD

2nd Degree PD: I know people have different utility functions
Two types: \( u_1(x_1), u_2(x) \). Can't tell the difference between them

Assume \( u_1(x) > u_2(x) \)

IR constraints:
\[
\begin{align*}
  u_1(x_1) - r(x_1) &\geq 0 \\
  u_2(x_2) - r(x_2) &\geq 0
\end{align*}
\]

IC Constraints:
\[
\begin{align*}
  u_1(x_1) - r(x_1) &\geq u_1(x_2) - r(x_2) \\
  u_2(x_2) - r(x_2) &\geq u_2(x_1) - r(x_1)
\end{align*}
\]
Step 3: Solve the simplified problem

Max \( r_1(x_1) + r_2(x_2) \)

Subject to:
\( u_2(x_2) - r(x_2) \geq 0 \) (IRL)
\( u_1(x_1) - r(x_1) \geq u_1(x_2) - r(x_2) \) (ICH)
Review: Single Price
1) Part b (ii).

2nd Degree Price Discrimination

\( P_L \neq P_H, \; K_L \neq K_H \)

* Inefficiency in low market
* Efficiency in high market
* IC constraint gives High market Positive Rents
1) Part b (iii).

**2rd Degree Price Discrimination**

\[ P_L \neq P_H, K_L \neq K_H, Q_L \text{ constrained} \]

* Inefficiency in low market
* Efficiency in high market
* IC constraint gives High market Positive Rents
* Quality constraints increases monopolists Rents

Deadweight Loss in Low Market
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My Actions Impact the Outcomes of Others

Example:
Suppose there are two firms. Producing 1 unit of firm ones output reduces the size of the market for the second firm:

\[ D_{q_1}(q_1, q_2) = 10 - q_1 \]
\[ D_{q_2}(q_1, q_2) = 10 - q_1 - q_2 \]

Firm 1 with zero MC will choose \( q_1 = 5 \). Firm 2 now will choose \( q_2 = p_2 = 2.5 \).
If firm 1 and 2 were the same and took into account externalities, he would charge different amounts.

Externalities are often called missing markets. If Firm two could contract on the externality, we would be back in the WE world.