Syllabus

- **Instructor:** Corinne Langinier, Heady Hall 383, phone: 294-5830, e-mail: langinie@iastate.edu
- **Time and Location:** T-Th 12:40-2:00, Curtiss 306
- **Office Hours:** M-W 2-3 PM and by appointment
- **Main Textbook:** *The Theory of Industrial Organization (tenth Edition)*, by Jean Tirole, the MIT Press, 1998 (required).

- **Work to be done:**
  - 5 assignments
  - a term paper
  - two midterm exams
  - a final.
Outline of the Course

**Introduction** Industrial Organization.
What is the firm? The theory of the firm

**Part 1:** The exercise of monopoly power

Chapter 1 Monopoly
Chapter 2 Product Selection
Chapter 3 Price Discrimination

**Part 2:** Strategic Interaction

Chapter 11 Introduction to Game Theory
Chapter 5 Short-Run Competition
Chapter 7 Product Differentiation
Chapter 8 Entry, Accommodation and Exit
Chapter 9 Information and Strategic behavior
Chapter 10 Research and Development and the Adoption of new Technology
Internet and e-commerce
Introduction to IO

• Study the functioning of markets.

1 Historical development of IO

2 waves:
1. “Harvard Tradition” (J. Bain (1956, 1959) and E. Mason (1939, 1949)) is more empirical.
   – Structure - Conduct - Performance paradigm.
   – BUT causal relationship or correlation?
   – Descriptive analysis: Case studies, Regressions.
   – BUT limits of empirical analysis.
   – “Chicago Tradition”: need for rigorous theoretical analysis.
2. In 70s, theoretical wave due to different factors
   – Economists were not satisfied with the empirical analysis;
   – New interest for IO.
   – Non cooperative game theory (Nash in 50s).
   – Dynamics and asymmetric information.
2 Definition of IO

- Structure and behavior of firms in imperfectly competitive markets.
- But IO is also concerned with market inefficiency. Imperfect competitive markets are unlikely to maximize social welfare.
- Government intervention: antitrust action, market regulation....
- New theoretical IO relies on old tradition (case studies and stylized facts).

There exists two new waves:
1. A new empirical IO wave (econometric) with structural models (theoretical model + data and empirical analysis to test the model with completely new tools).
2. Experiments in laboratories (new wave in micro and game theory as well).
3 Market definition, Partial equilibrium and Welfare criteria

3.1 Competitive-equilibrium

Sketch of the model (Arrow Debreu):

• economic goods,
• no asymmetric information,
• consumers have preferences over bundles of goods,
• producers (owned by consumers) have to respect a production set,
• all agents are price-takers.

• Consumers maximize their welfare under their budget constraint → the demand function.
• Producers maximize their profit subject to the technological constraint → the supply function.

• A Competitive equilibrium is a set of prices, with associated demands and supplies such that the markets for each good clear (total demand=total
supply).
Two fundamental welfare theorems:
1. A competitive equilibrium is Pareto Optimal.
2. Under convexity assumptions, any Pareto Optimal allocation can be decentralized by a choice of the right prices and an appropriate redistribution of income among consumers.

⇒ Each good is sold at its marginal cost.

This model does not take into account
- externalities may exist between agents,
- goods can be public in nature,
- consumers can have imperfect information.

Key assumption of this model: agents are price-taker.
- But most markets are served by a small number of firms with non negligible market power.

Our assumptions
A1. Partial equilibrium;
A2. Downward-sloping demand curves;
A3. Consumer surplus.
3.2 Consumers’ Surplus

• What is the demand for a single good?

• Quasi-linear utility function

\[ U(q_0, q_1, \ldots, q_m) = q_0 + \sum_{h=1}^{m} V_h(q_h) \]

where \( q_0 \) is the numeraire. \( V'_h(q_h) > 0 \) and \( V''_h(q_h) < 0 \).

• The program of the consumer is

\[
\begin{align*}
\text{Max} & \quad U(q_0, q_1, \ldots, q_m) \\
\text{s.t.} & \quad q_0 + \sum_{h=1}^{m} p_h q_h \leq I
\end{align*}
\]

where \( I \) is the income.

• FOC

\[ V'_h(q_h) = p_h \forall h = 1, \ldots, m \]

– Demand decreases with price,

– demand is independent of the other prices and income.

• Consider homogeneous good.
• What is the **consumer’s surplus**?

• In discrete:
  – many heterogenous consumers
  – each buys 0 or 1 unit
  – consumer $i$’s willingness to pay is $v_i$
  – marginal consumer $v_n$
  – $v_1 \geq v_2 \geq \ldots \geq v_n$
  – Consumer’s surplus
    \[ CS = (v_1 - p^o) + (v_2 - p^o) + \ldots + (v_{n-1} - p^o) \]

• In continuous:
  – net consumer’s surplus
    \[ S^n = \int_{p^o}^{\bar{p}} D(p)dp \]
    where $\bar{p}$ is the lowest price at which there is no demand. In discrete case ($\bar{p} = v_1$).

• What happens if the price changes from $p^o$ to $p_1$?
  \[ \Delta S^n = - \int_{p^o}^{p_1} D(p)dp \]
  \[ \Delta S^g = - \int_{p^o}^{p_1} D(p)dp + [p_1 D(p_1) - p^o D(p^o)] \]
• What is the **producer surplus**? \( PS \) is the profit

\[
\Pi = p^o q^o - C(q^o)
\]

where \( C(q^o) = \int_0^{q^o} MC(q) dq \).

• What is the **total surplus**?
  – Aggregate welfare \( TS = CS + PS \).
  – The TS is maximum when \( p = p^o \).

• If the price increases, what is the measure of welfare loss?
  – **Deadweight loss**:
    \[
    DWL = TS(\text{after}) - TS(\text{before}).
    \]
  – A unit tax \( t \) for each unit sold
    \[
    DWL = \frac{1}{2} t \left| q^1 - q^0 \right| = \frac{1}{2} t^2 \left| D'(p^1) \right|
    \]

• There exist other measures of the surplus (if more than one good).
  • Compensating variation;
  • Equivalent variation.
3.3 What is a market?

- It involves either a homogeneous good or group of differentiated products that are fairly good substitutes (or complements) for at least one good in the group and have limited interaction with the rest of the economy.

- Examples: market for cars, for luxurious cars, for used cars....... Market for soft drink (Ginger Ale, Lemonade....), market for Cola (Coke and Pepsi).

3.4 Major observations

Why competitive market does not explain everything?

1. Concentration
2. Product characteristics
3. Costly activities
4. Research and development