Intermediate Microeconomics

Shan Gui

Shanghai University of Finance and Economics

Feb 2025

Welcome to the course!

Instructor: Shan Gui (桂姗)

- ▶ Email: guishan@shufe.edu.cn
- ▶ Website: gui-shan@github.io
- ▶ Research Fields: microeconomic theory, experimental economics, and behavioral economics

- ▶ Office: Room 320, School of Economics
- ▶ Office Hour: Tues. 3-4 pm or by appointment

What is Economics?

Dismal Science!

► Basic topics: <u>production</u>, <u>distribution</u>, and <u>consumption</u> of goods and services

► Studies how society manages its <u>scarce</u> resources.(Mankiw, Principle of Economics (1998))

Microeconomics (foundation!)

► Studies how **individuals** make decisions in the world of <u>scarcity</u>.

    Firm – Production – Maximizing profit (<u>rationality</u>)
    Consumer – Consumption – Maximizing <u>utility</u>
    Laissez-faire <u>Market</u> and Government Regulation

Macroeconomics

► Studies Economic Growth and Economic Cycles (inflation, unemployment, interest rate)

One Sentence to Represent Microeconomics

"The Invisible Hand." (Incentive matters)

Figure 1: Halloween Costumes

*It is not from the benevolence of the **butcher**, the **brewer**, or the **baker** that we expect our dinner, but from their regard to their own interest.*

<u>Adam Smith</u>, The Wealth of Nations (1776)

One Graph to Represent Microeconomics

Economics in about exchange. (Adam Smith, 1776)

- ▶ The division of labor increases mutual dependency.
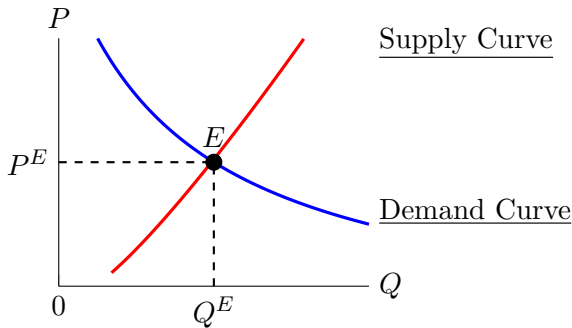- ▶ Competition of buyers/sellers drives price down/up when price is not P^E.

Figure 2: Equilibrium in the Competitive Market

How do we learn Microeconomics?

Learn microeconomics as a game system designer!

*In defining a microeconomic system two distinct component elements will be identified: an **environment** and an **institution**. ... A microeconomy is closed by the **choices of agents** in the intuition. (<u>Vernon Smith</u>, 1982)*

Environment

▶ Resources, technologies, agents' preference

Institution

▶ Decides rules of interaction, collects messages, delivers messages, and governs

Agents' Strategy

▶ Receive messages and make decisions

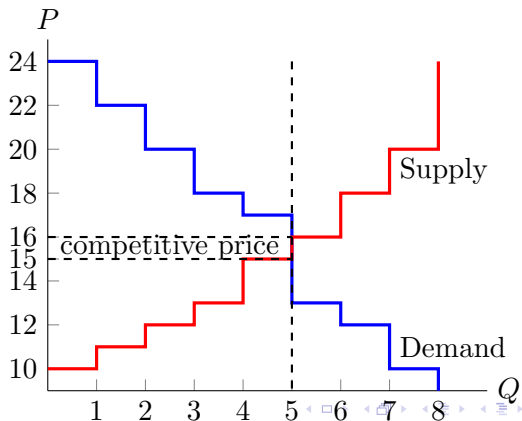Environment + Institution + Strategies ⇒ Economic Outcome

Example of an Exchange System

Consider the simplest setting

- ▶ Each buyer/seller can buy/sell at most one unit of a homogeneous good.

Environment of Exchange System: <u>Reservation Prices</u>

Buyer	Value	Seller	Cost
1	24	1	10
2	22	2	11
3	20	3	12
4	18	4	13
5	17	5	15
6	14	6	16
7	12	7	18
8	10	8	20

Desirable Outcome of Exchange System

The greatest number of transactions?

| #	Buyer	Seller	Surplus
1	1 (24)	8 (20)	(24-p)+(p-20)=4
2	2 (22)	7 (18)	(22-p)+(p-18)=4
3	3 (20)	6 (16)	4
4	4 (18)	5 (15)	3
5	5 (17)	4 (13)	4
6	6 (14)	3 (12)	2
7	7 (12)	2 (11)	1
8	8 (10)	1 (10)	0
	Total surplus:		22
	Maximum surplus:		40
	Efficiency:		22/40=55%
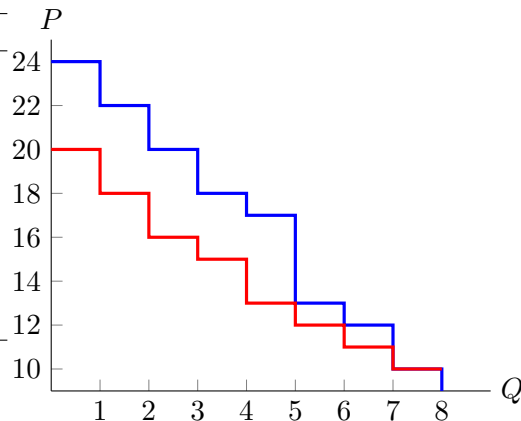
Multi-prices and deadweight loss (18=40-22).

(Pareto) Efficient Allocation as the Desirable Outcome

Competitive price leads to the greatest social surplus.

Buyer	Surplus	Seller	Surplus
1	$24 - p$	1	$p - 10$
2	$22 - p$	2	$p - 11$
3	$20 - p$	3	$p - 12$
4	$18 - p$	4	$p - 13$
5	$17 - p$	5	$p - 15$
6	0	6	0
7	0	7	0
8	0	8	0
	Total Surplus:		40
	Maximum surplus:		40
	Efficiency :		100%
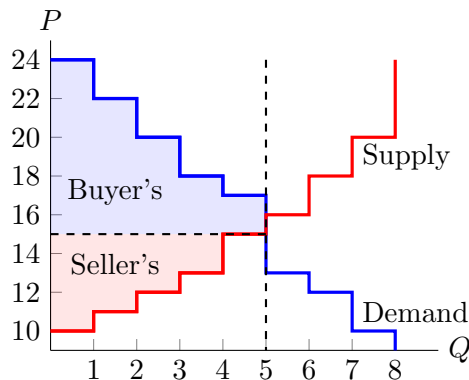
Decentralized Institution and Random Strategy

Decentralized Institution

- ▶ Players are located in different grids.
- ▶ Players start bargaining when at least one buyer and one seller meet.

Zero-Intelligent-Affinity (ZIA)(Gode and Sunder, 1993; McKabe, 2021)

- ▶ Buyer bids randomly between a lower bound and their value.
- ▶ Seller asks randomly between their cost and an upper bound.
- ▶ Both like to stay in the current location than to move a step further.

Computational results (Gui and Mckabe, 2021)

- ▶ transaction prices with variance; efficiency $\approx 58\%$ (50 buyers and 50 sellers)

Decentralized Institution and Rational Strategy

Chamberlin's (1948) classroom experiment

- ▶ Students were given buyer or seller roles and corresponding cards with private dollar values or costs.
- ▶ Walk among desks in the classroom to make deals.
- ▶ Transactions quantities higher than Q^E, prices not converge to P^E.

  Perhaps it is the perfect market which is "strange"; at any rate, the nature of the discrepancies between it and reality deserve study.

  (Chamberlin, 1948, JPE, p.108)

Centralized Institution and Rational Strategy

Double Auction (DA) (Smith, 1962)

▶ Buyers and sellers submit bids and offers in any order to a centralized platform that display quotes and transaction prices.

Bid/Ask Sequence

Bid	Ask
Bid	**Ask**
5.00	
4.00	
	7.00

Highest Bid = **$5.00**, Lowest Ask = **$7.00**

unit	value	bid	price	earnings
1	$7.00			$0.00
	Total Earnings:			**$0.00**

Round 1 Price Sequence
$6.00

Buyer

Highest Bid = **$5.00**, Lowest Ask = **$7.00**
Please enter or revise ask prices.

unit	cost	ask	price	earnings
1	$2.00	**$7.00**		$0.00
	Total Earnings:			**$0.00**

Round 1 Price Sequence:
$6.00

Seller

Figure 3: Screenshots from VEconLab

The Miracle of the Market

Results: Prices converge to P^E quickly, efficiency $> 85\%$

- ▶ Smith (1962): 6 buyers and 6 sellers, Efficiency $\approx 98.2\%$
- ▶ Martinelli et al (2023): 2 buyers and 2 sellers, Efficiency $\approx 89.1\%$

Why great results? – DA offers a price discovery process

- ▶ Price taker: The standing bid and ask to keep updating current prices.

Thoughts: Do traders play Nash (Friedman and Ostroy, 1995)?

- ▶ Nash equilibrium: given all other active traders bid/ask P^E, no better off from deviation.
- ▶ But in order to play Nash, players need to know P^E to begin with.

Can an Institution Reveal Demand and Supply? (beyond this course)

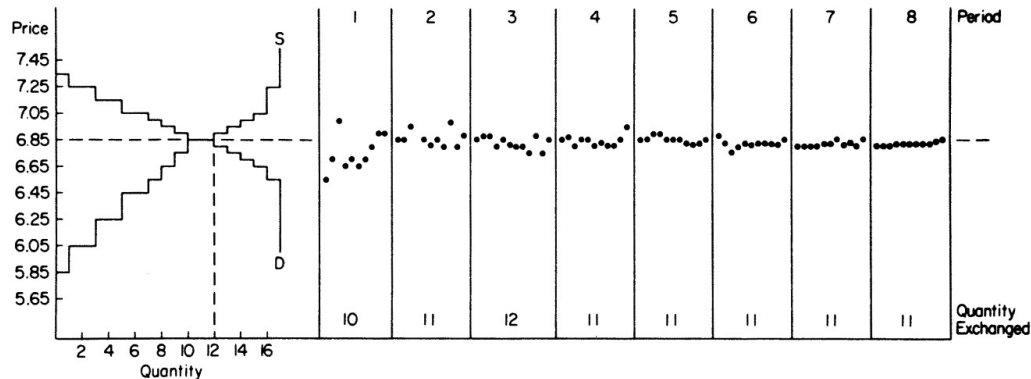Demand and Supply is not revealed in DA

Figure 4: Effciency= 98.2% (Smith et al., 1982)

Take Aways

Microeconomics is Fun!

▶ Economics is linked to everyday life.
▶ See the invisible hand, understand your world, make it a better place.

Microeconomics is Intuitive.

▶ Always use real-world examples to understand concepts.
▶ Always approach every example as if developing a game system.
  ▶ What is the given environment?
  ▶ How to design rules of interaction (institution)?
  ▶ How would (rational) people make decisions?
  ▶ What would be the economic outcome? Is the outcome desirable?