

Lecture 2

Perfectly competitive markets



microeconomics II
first module

Important notes

1. **Homework 1** will be due on Monday
2. **Practice problem set 2** is online ^^

Basic assumptions of PC

A market is perfectly competitive when

1. Firms are *many*
2. Product is *homogeneous*
3. Entry and exit are *free* ^^

Assumptions

1. Large number of firms

- * Firms are so many that cannot *meaningfully interact*
- * This assumption leads to *price-taking*
 - ◆ Each *firm* holds a tiny market share and its actions *do not affect* other firms
 - ◆ Price is set at the *market level* - the firm *cannot* affect it
 - ◆ That is, for the firm, price is considered *given*
- * What happens if the firm *deviates*?
- * Also, every *consumer* buys too small a share of industry output to have any impact on market price ^^

Assumptions

2. Product homogeneity

- * All products *have differences*
- * It matters how the consumer *perceives* the good
- * Heterogeneous products, such as brand names, can charge *higher prices* because they may be perceived as better ^^

Assumptions

3. Free entry and exit

- * Suppliers can easily *enter or exit* the market
 - ◆ There are no *special costs* that make it difficult for a firm to enter (or exit) an industry
 - ◆ There are *no prohibitions* in entering a market
- * Buyers can easily *switch* from one supplier to another ^^

Profit maximization in general

- ★ Lets see the math first:

$$\Pi = R - C$$

- ★ The FOC for this expression is

$$\frac{d\Pi}{dq} = \frac{d(R - C)}{dq} = \frac{dR}{dq} - \frac{dC}{dq} = MR - MC = 0$$

- ★ This yields the **generalized** profit maximization **condition**
 $MR = MC$

under any market structure, profit is maximized when the cost for producing an extra unit equals the revenue from this unit.

Profit maximization in PC

- ★ Under perfect competition the price is **constant**
- ★ So, the **revenue** is

$$R = \bar{p} \cdot q$$

- ★ Thus, marginal revenue (MR) is

$$\frac{dR}{dq} = \frac{d(\bar{p} \cdot q)}{dq} = \bar{p} \frac{dq}{dq} = \bar{p}$$

- ★ So, under **PC** the profit maximizing condition becomes
 $p = MC$

under PC, profit is maximized when the cost for producing an extra unit equals the (given) price.

Demand for a PC firm

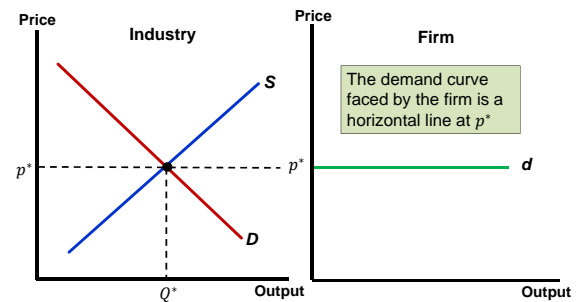
- ★ **Demand curve** faced by an individual firm is a horizontal line

firm's sales have **no effect** on market price

- ★ **Demand curve** faced by the whole market is downward sloping

shows quantities *consumers* will purchase at different prices.

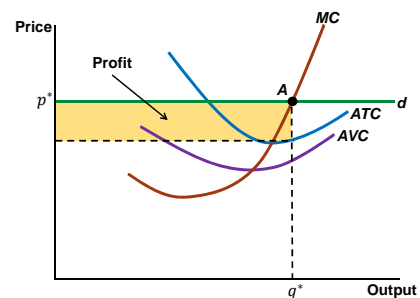
Demand for a PC firm (graphs)



Choosing output: Short-Run

- ★ We will need to **combine** the **demand** with the **cost** structure of the firm in the same graph in order to investigate the **decision about q^***
- ★ In the **Short-Run**, **capital is fixed** and firm must choose levels of **variable inputs** to maximize profits
- ★ We can look at the **graph** of MR, MC, ATC and AVC to determine profits.

A competitive firm in the S-R



Stability of the S-R equilibrium

- ★ Assume that $MR=MC$ when the PC firm produces q^*
- ★ This means that q^* **maximizes** the firm's profit
- ★ If the firm produces any $q < q^*$

$$MR > MC$$

more profit could be gained by **increasing output**

- ★ If the firm produces any $q > q^*$

$$MR < MC$$

decreasing output will increase profits

When should the firm shut down?

- ★ A firm is producing **chairs**
 - ◆ 1 worker for \$80 / day with 1-year contract
 - ◆ \$10 worth of materials per chair (wood, etc.)



- ★ The worker makes 10 chairs per day

$$AC = \frac{80}{10} + 10 = \$18$$

- ◆ For $p > 18$ the firm has **profit**
- ◆ For $p < 18$ the firm has **losses** – Should it **shut down**?
- ★ For $10 < p < 18$ the firm **covers** its AVC and parts of FC
 - ◆ If it shuts down it will have to pay the FC **from its pocket**
 - ◆ Keep operating till the **contract** with the worker expires

Losses and shut down

- ★ It is not rare that at a given market price, a firm will incur **losses**

that is, when $p < AC$
- ★ If $AVC < p < AC$, the firm should **continue** producing in the short-run

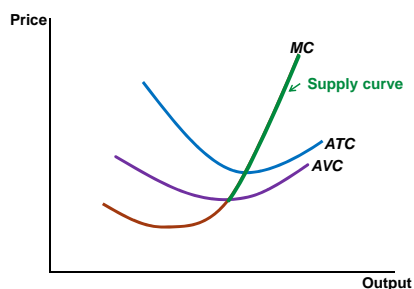
covers **all** of variable costs and **part** of fixed costs
- ★ If $p < AVC < AC$, the firm should **shut down**

operation makes the situation **worst** – cannot even cover variable costs

S-R supply

- ★ Supply curve tells **how much output** the firm will produce at different prices
- ★ Competitive firms **produce the quantity** where $p = MC$
- ★ Also, **shut down** when $p < AVC$
- ★ The competitive firm's **supply curve** is the portion of the MC curve above the AVC curve

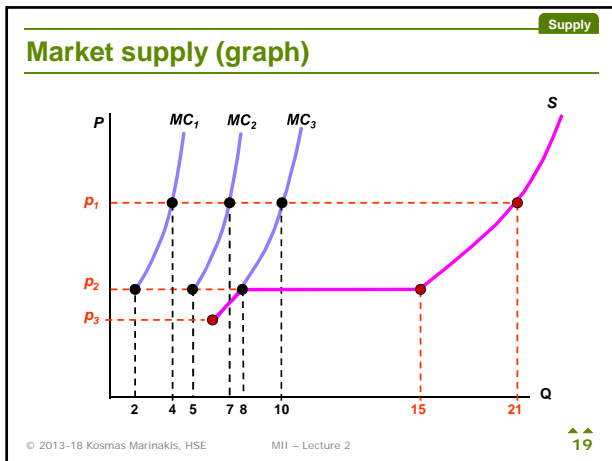
S-R supply curve



Market supply for the S-R

- ★ Shows the amount of output the **whole market** will produce at given prices
- ★ Is the **horizontal sum** of all the individual firms' supply curves in the market

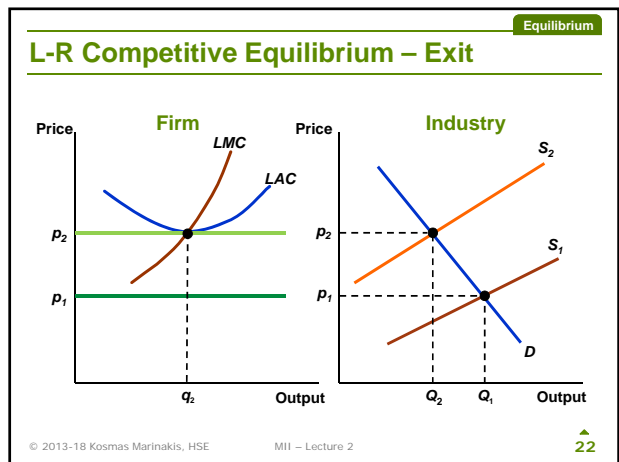
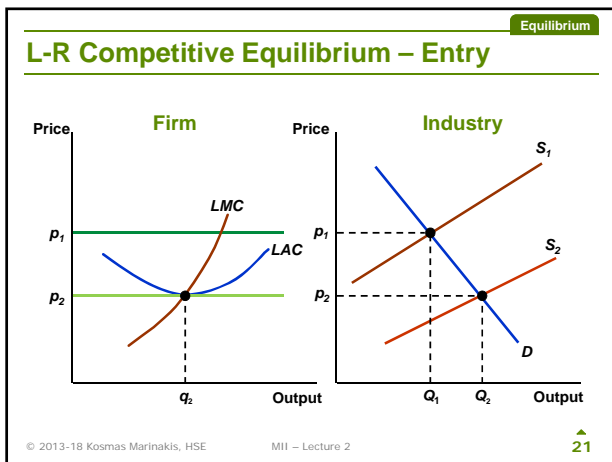
adding quantities for each price
- ★ The **market** supply is **more elastic** than the **firm** supply curves



Long-Run Competitive Equilibrium

- ★ For the long-run equilibrium, firms must have **no desire** to enter or leave the industry
- ★ Mobility in and out this industry will be eliminated when **economic profit vanishes**
- ★ When $\Pi = 0$, the owner of the firm is earning a **normal return** on his/her investment
 - normal return is firm's **opportunity cost** of using money to buy capital instead of investing elsewhere.

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Equilibrium

L-R equilibrium properties

- ★ All firms in industry are **maximizing** profits

$$MR = MC$$
- ★ No firm has incentive to **enter** or **exit** industry

$$\Pi = 0$$
- ★ Market is in **equilibrium**

$$Q_D = Q_S$$

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Efficiency

- ★ A market is **efficient** when **nothing is lost** due to its function
 - if the function of the market creates **frictions**, the market is inefficient
- ★ All the **gains from trade** between the parties are **captured**
 - does it matter who captures them?

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Measuring market efficiency

- ★ How can we **quantify an index** of economic efficiency?
- ★ How do we measure **inefficiency** in a specific market?
such measure of efficiency would be necessary to **evaluate government intervention** or policy.

Surplus

- ★ Surplus is the **benefit** beyond the minimum benefit required for a transaction to occur
 - ◆ I was willing to teach 3 courses per year in order to accept an offer from HSE
 - ◆ They offered me to teach just two
 - ◆ So, I am enjoying a surplus of 1 course less teaching load.

Consumer Surplus

- ★ **Consumer surplus** is the value consumers receive beyond what they actually pay for the good

$$CS = \left(\begin{array}{l} \text{How much you} \\ \text{are willing to pay} \end{array} \right) - \left(\begin{array}{l} \text{How much you} \\ \text{actually pay} \end{array} \right)$$

- ◆ **Willingness** to pay is measured by...?
- ◆ **Actual payment** is given by...?
- ★ CS measures the net benefit to consumers by the **area** between the demand curve and the market price.

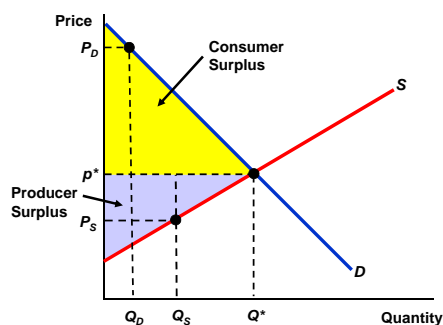
Producer Surplus

- ★ **Producer surplus** is the benefit producers receive beyond what it costs to produce a good

$$PS = \left(\begin{array}{l} \text{How much you} \\ \text{actually receive} \end{array} \right) - \left(\begin{array}{l} \text{How much you} \\ \text{are willing to sell} \end{array} \right)$$

- ◆ **Willingness** to sell is measured by...?
- ◆ **Actual payment** received is given by...?
- ★ Producer surplus measures the net benefit to producers by the **area** between the supply curve and the market price.

Consumer and Producer Surplus



Efficiency in a Competitive Market

- ★ From the previous figure it seems that **nothing is lost**
- ★ The total surplus is **gained by someone** in this market
- ★ Therefore, PC markets are **always 100% efficient**
- ★ Does this mean that **no failures** occur in PC?.

Market Failure

- ★ Sometimes, the **market system** may **fail**
 - ◆ **What is** a failure?
 - ◆ **How** can it occur if markets automatically **equilibrate**?
- ★ When the market fails:
 - ◆ Prices fail to **provide proper signals** to consumers and producers
 - ◆ The market is "**inefficient**" (in what sense?)
- ★ Government may **intervene** to fix the problem

Types of market failures

- ★ **Externalities**
 - costs or benefits that **do not show up** as part of the market (e.g. pollution, systemic risks, antibiotic resistance, education)
- ★ **Asymmetry of information**
 - imperfect information prevents **efficient transactions** from happening
- ★ **Mechanism design** can induce failure
- ★ Government intervention may be desirable in all cases

Example

	Georgi	Olga
Plan A	10	10
Plan B	1	11

- ★ Which plan is **best**?
- ★ What if Olga alone **is deciding** about the plan?
- ★ What can we say about **efficiency**?

Thank you!



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WARNING!

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