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Topic 3. Market structure

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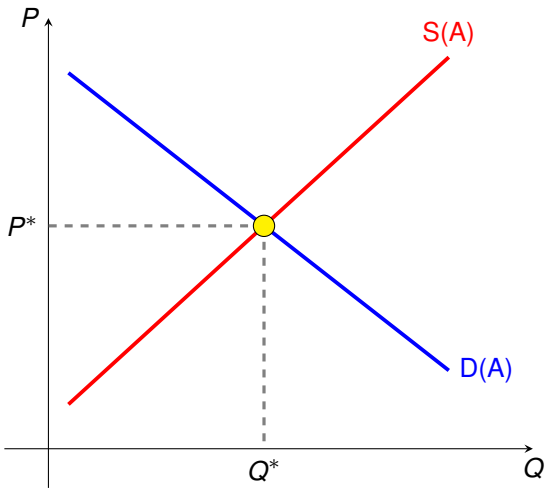
Outline

1. Perfect competition
2. Theory of production under perfect competition
3. Monopoly and monopolistic competition
4. Monopsony and monopsonistic competition

Introduction



- In Topic 2 we analyzed the equilibrium of the market for a good with a single supply and demand curve.
- We did this as if there were one single seller and one single buyer.

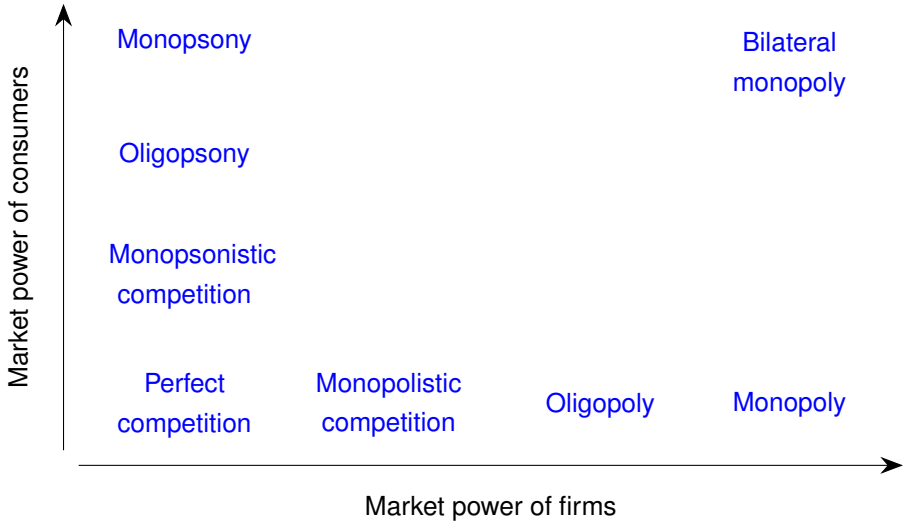
Introduction

- Behind these curves, there are typically (not always) many buyers and sellers:
  - How do we get allocate the Q^* units among all buyers?
  - How do we split the production of Q^* among all producers?
- The allocation of Q^* among buyers and sellers depends on the structure of the market, which varies according to the market power of market participants.

  $\rightarrow$ Market power: capacity to influence the equilibrium price.
- The "ideal" situation is one in which nobody in the market has any market power.

  $\rightarrow$ Perfectly competitive market.

Introduction



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Perfect competition

- A perfectly competitive market is one in which no single buyer nor seller can directly influence the market price with their individual decisions: nobody has any market power.
- This is the "ideal" situation because it delivers efficient outcomes:
  - Efficiency = it's impossible to make someone better off without hurting someone else.
  - In this context: it is impossible to produce more without increasing the price.
  - If you were a "god" with full knowledge of everything and everyone, and you were to decide how much is consumed and produced by each consumer and producer, you would do exactly what comes out from a perfectly competitive market.
- When is a market perfectly competitive? When it meets 5 conditions:

Conditions for a market to be perfectly competitive

1. Large number of seller and buyers.

   Each buyer/seller represents a sufficiently small share of the market so that their individual decisions do not affect the good's price.

   → Producers and consumers are price-takers; they behave as if the price was given.

   → They know the price and they know they can do nothing to change it.

2. Producers produce a good that is homogeneous.

   Consumers do not differentiate between goods produced by different firms so they are completely indifferent between buying the good to firm A or to firm B.

   If products were not homogeneous (Android vs. iPhone) we would care who we buy the good from, giving some power to our preferred producer.

Conditions for a market to be perfectly competitive

3. There is perfect mobility of factors of production.

   Labor, capital, materials, etc. can move from one firm to another without restriction so that no firm is "forced" to produced with too many/few workers.

   If production factors were not perfectly mobile, some firms that should not produce (because they are not efficient enough) would produce, making the price higher than it *should*.

4. There is free entry of producers.

   There are no special costs that make it difficult for a firm to enter (or exit) an industry so that inefficient firms can be replaced by efficient ones.

   In the absence of free entry, inefficient firms could survive, pushing the price up.

Conditions for a market to be perfectly competitive

5. Perfect knowledge about market conditions.

   Everyone in the market knows the availability of the good and have full information about the future prices of the good and market conditions.

   If we were to wrongly think that tomorrow's price will be higher, we would increase our demand today pushing prices up inefficiently (because out beliefs about prices are wrong).

   This is not to say we all know everything, but that we all share the same information.

6. No government interference.

   There are no taxes nor subsidies that affect prices or consumer/producer behavior.

   This does not imply the absence of taxes or subsidies, but rather that, if they exist, they do not distort the decisions of consumers or buyers.

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Theory of production under perfect competition

- Assume we are in a perfectly competitive market: firms take the price P as given (they cannot change it) and decide how much they want to produce/sell.
- How many units of the good should firms produce?

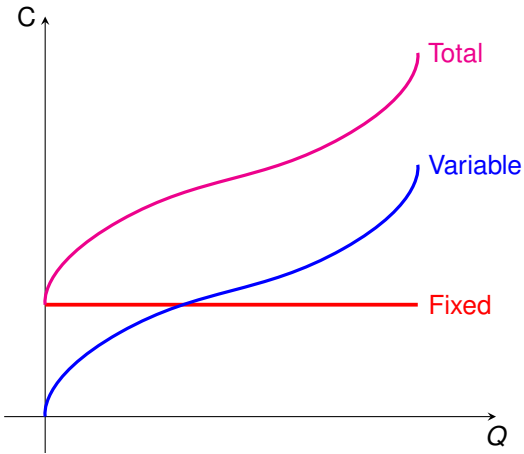
  Firms choose how much they produce, Q, so as to maximize profits (or minimize losses):

$$\text{Profits}\,(Q) \;=\; -\,\text{Fixed costs} \;+\; \text{Revenues}\,(Q) \;-\; \text{Variable costs}\,(Q)$$

  Revenues are the income they make from selling Q units ($P \times Q$), and costs...

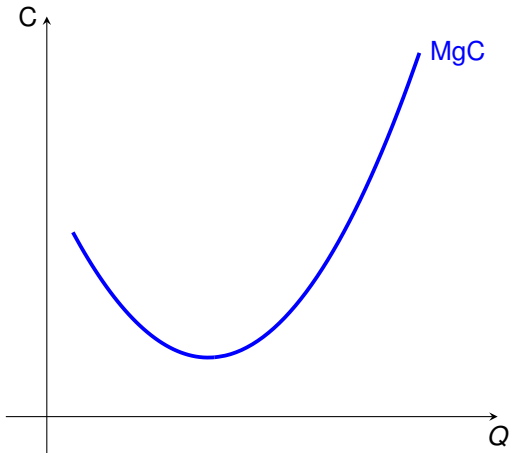
  - Fixed costs: the costs from fixed inputs (that do not depend on the level of production).
  - Revenues: the total income they make from selling Q units ($P \times Q$).
  - Marginal cost: the cost of producing one extra unit of the good.

Theory of production under perfect competition



- The fixed cost is independent of the number of units produced: straight line.
- The variable cost has a S-shape:
  - At the beginning, it increases slowly because inputs are underutilized
  - Then it starts growing rapidly, as inputs are more intensively used.
- The total cost is the combination of the variable and the fixed costs.

Theory of production under perfect competition



- The marginal cost begins decreasing
  - At the beginning, increasing the number of goods produced allows the firm to make use of the full capacity of their inputs.

. . . but the becomes increasing

  - With so many units, inputs are over-utilized, creating congestion and increasing the cost.

Theory of production under perfect competition

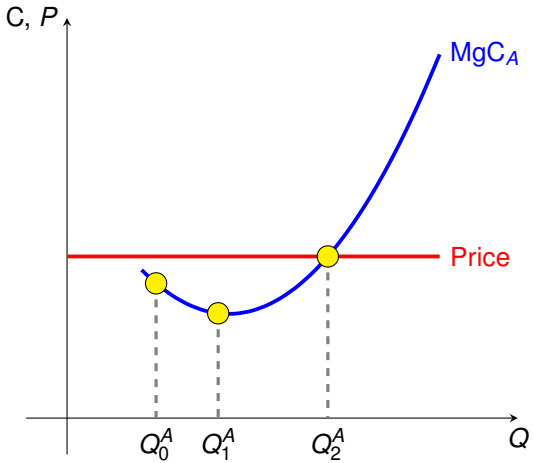
$$\text{Profits}\,(Q) \;=\; -\,\text{Fixed costs} \;+\; \text{Revenues}\,(Q) \;-\; \text{Variable costs}\,(Q)$$

- Firms maximize profits (or minimize losses). At which Q? Two possibilities:
  - They produce 0 units (stay inactive) or...
  - They produce, 1, 2, 3 units, ... and keep increasing production until the extra revenue they get (marginal revenue; the price) is equal to the extra cost they incur (marginal cost).

Revenues from 1 extra unit	$=$	Cost from 1 extra unit
(MARGINAL REVENUE (PRICE))		(MARGINAL COST)

This level of production maximizes Revenues (Q) $-$ Variable costs (Q).

Theory of production under perfect competition



- Should firm A produce more than Q_0^A?

  If production is Q_0^A the extra revenue for one additional unit (the price) of production is greater that the extra cost of producing this unit.

- What if production is Q_1^A?

  The same as before...

- And if production is Q_2^A?

  If production increases by 1 more unit, the extra cost would be higher than the marginal revenue (price).

Example

	Revenue		Costs				
Units	Marg.	Total	Fixed	Variable	Total	Marg.	Produce?
3	5	15	9	4	13	1	Yes! $5 > 1$
4	5	20	9	4	13	0	Yes! $5 > 0$
5	5	25	9	6	15	2	Yes! $5 > 2$
6	5	30	9	9	18	3	Yes! $5 > 3$
7	5	35	9	14	23	5	Yes! $5 = 5$
8	5	40	9	22	31	8	No! $5 < 8$
9	5	45	9	32	41	10	No! $5 < 10$

- For any production below 7, an additional extra unit generates more revenues than costs.
- For a production of 7 units, the price (marginal revenue) the firm gets for one extra unit is equal to the extra cost of producing this extra unit.

Theory of production under perfect competition

$$\text{Profits}\,(Q) \;=\; -\,\text{Fixed costs} \;+\; \text{Revenues}\,(Q) \;-\; \text{Variable costs}\,(Q)$$

- Firms maximize profits (or minimize losses):
  - If firm A decides to produce, it will produce Q_*^A: $\text{Price} = \text{Marginal cost}\,(Q_*^A)$
  - The alternative is to produce 0. When will firm A find it optimal not to produce?

    When revenues are below variable cost producing any unit increases firm losses.
    - Better to produce 0 and "just" pay the fixed cost.

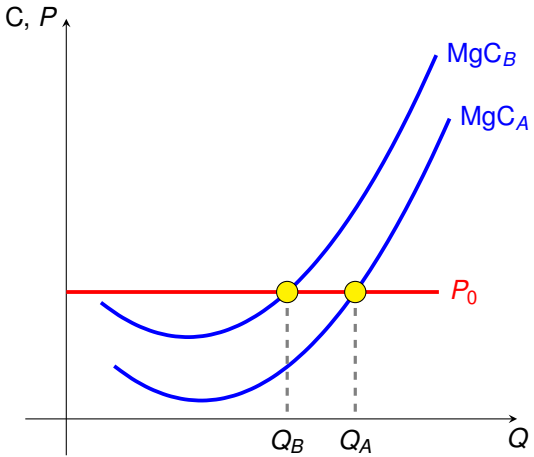
From individual to market supply

- We know how much each firm produces
  - Either they produce Q_*^A, such that the marginal cost equals the price
  - Or they produce 0 units if revenues from Q_*^A are below variable costs.
- How does this relate to market supply (Q^*)?

  In a perfectly competitive market, the more productive a firm is, the more it produces.
  - Better production technology allows firms to decrease their marginal cost.
  - The level of production at which marginal cost equals the price is higher!
- Imagine we have a market where the equilibrium quantity is Q^* and where (for simplicity) there are only two firms, A and B, and assume that firm A is more productive than firm B.

  We assume both A and B always find it optimal to produce.

From individual to market supply



- Imagine we have two firms, A and B, and that A is more productive than B.

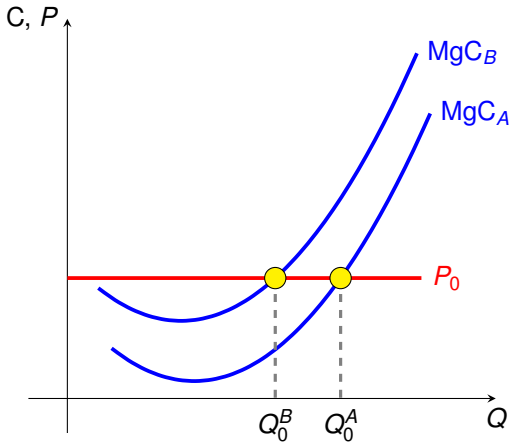
  We assume both A and B always find it optimal to produce.

- Firm A is more productive than firm B.

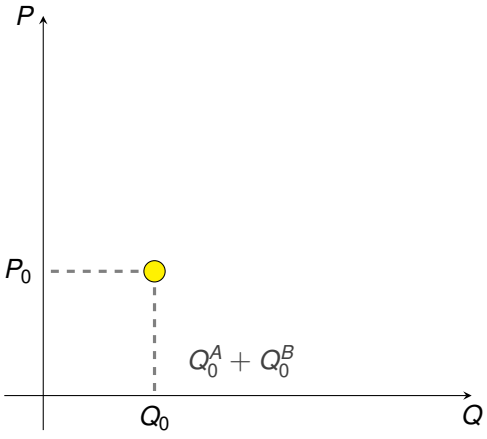
  The marginal cost is lower the more productive the firm is.

- If the equilibrium price is P_0...
  - Firm A produces Q_A
  - Firm B produces $Q_B < Q_A$

From individual to market supply

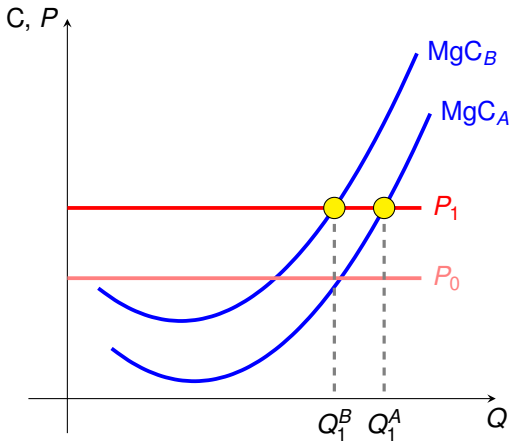


Individual supply

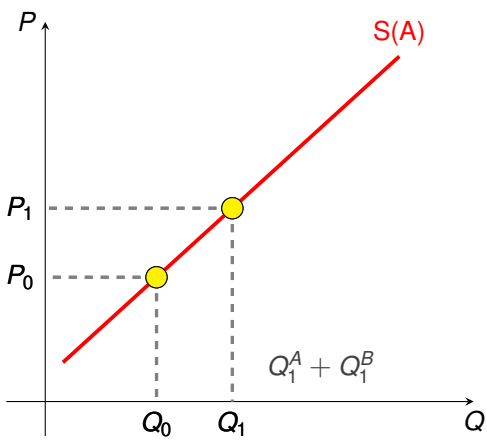


Market supply

From individual to market supply



Individual supply



Market supply

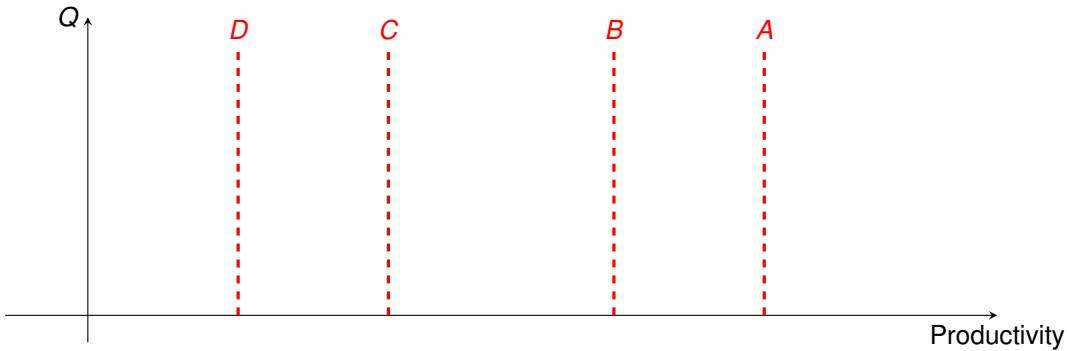
From individual to market supply

- As the price increases, the overall supply in the market grows.

  Why? Two sources: If the price increases...

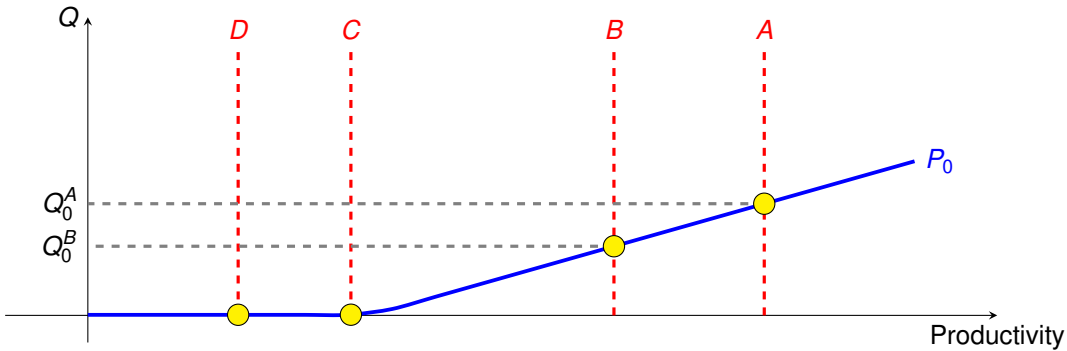
  - The production that makes marginal cost equal to the price increases for all (active) firms.
  - More firms find it optimal to produce.
    - More firms will have revenues above the variable cost
    - Firms will keep entering the market until there is one firm for which revenues equal variable costs. Firms les productive than this one will not enter.

From individual to market supply



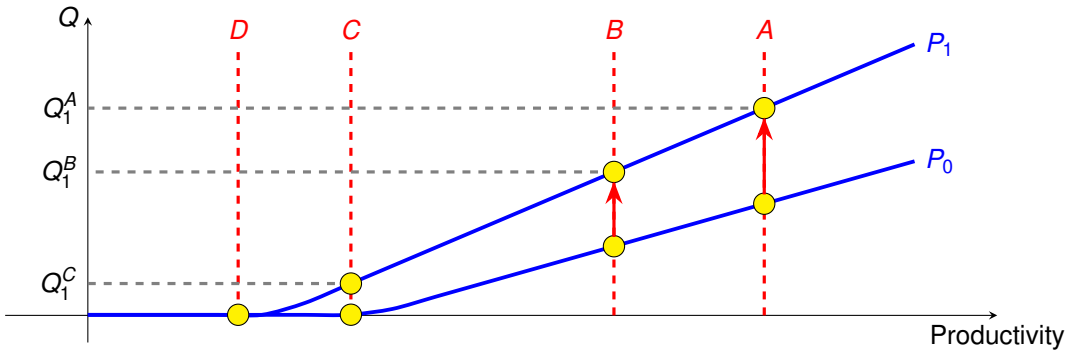
- To illustrate this point, imagine we rank all firms in the market according to their productivity.
- The most productive firm is *A*, followed by *B*, *C* and *D*.

From individual to market supply



- When the market price if P_0, firm A produces Q_0^A, more than firm B (Q_0^B)
- Firms C and D find it optimal not to produce.

From individual to market supply



- If the market price increases to P_1, both firms A and B produce more.
- Firm C now finds it optimal to produce, while D remains inactive.

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Monopoly and monopolistic competition

- In a perfectly competitive market, no consumer nor firm has market power: the market price and quantity is determined by supply and demand and are efficient.
  - The market price is the lowest price possible to serve all the market.
    - There is no way the price could fall without damaging somebody: supply would fall and some consumer would not get what they demand.
  - More productive firms produce more of the good
    - Less productive firms either produce less or stay inactive.
- How does this change if firms were to have some ability to modify the market price?

  Extreme case: there is only one firm in the market $\rightarrow$ Monopoly

  We'll then study the intermediate case.

Monopoly

A monopoly is a market where there is only one producer/seller.

- This single firm has a significant control over the market price. Why?

  In a competitive market, if a firm tries to sell its product at a higher price consumers switch to their competitors. In a monopoly, this is not the case...

- Can the monopolist set any price? Not really...

  If the monopolist increases the price for its product, some consumers will stop buy the good and other consumers will decrease their demand.

- The price in a monopoly is always higher than it would be under perfect competition.

  One could reallocate production among firms so that the quantity supplied remains equal while the price falls: inefficient price.

Monopoly

Why do monopolies arise? Three main reasons...

1. Legal restriction:

   Some monopolies are created by law in public interest, typically as public firms. Other (more) usual case are the monopolies created by patent rights.

2. Control over key raw materials:

   When a firm is able to acquire all producers of a key material required to produce the good, no other competitor can enter the market.

3. Efficiency:

   A firm is so productive, that it can serve all the demand at lower price that any competitor. These are called natural monopolies.

Monopolistic competition

- Monopolies are bad for social welfare and are typically persecuted by the government.
  - Consumers are “forced” to pay higher prices
  - Quality of goods is typically lower
- Perfectly competitive markets assume unrealistic conditions...
  - Are goods homogeneous? Is CocaCola *identical* to Pepsi?
  - Is entry in a market *completely* free?
  - Do all firms have *identical* access to production inputs?
- Most industries lay in between the two extremes (perfect competition *vs.* monopoly).

Monopolistic competition

- When the market is populated by a (sufficiently) large number of producers but some (or all) conditions of perfect competition are not met...

  The market operates under monopolistic competition.

  - The most common case is a market in which the good is not homogeneous:
    - If a firm increase its price, it will not lose all its consumers $\rightarrow$ Market power
    - Differentiation: quality, location, social status, etc.
  - Firms have some degree of market power but not as much as in a monopoly.

    The price in a monopolistic competitive market is higher than in a perfectly competitive one, but lower than in a monopoly.

Monopolistic competition

- Monopolistic competition is in between perfect competition and monopoly...
  - The fewer producers there are, the closer it gets to a monopoly:
    - If there are few producers, we call it oligopoly.
    - If there are only two producers, we call it duopoly.
  - The more homogeneous goods are, the closer it gets to perfect competition:
    - The market for cloths is more competitive that that for cars.
  - The more difficult it is to enter the market, the closer it gets to a monopoly:
    - The market for car renting is more competitive that that for taxis.

Summary

Conditions	Perfect Competition	Monopolistic competition	Perfect Monopoly
Number of firms	Large	Many/Few	One
Type of product	Homogeneous	Differentiated	Unique
Condition of entry	Very easy	Relatively easy	Blocked
Control over prices	None	Some	Significant
Example	Fruits	Cloth	Running water

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Monopsony and monopsonistic competition

- So far we have depart from the perfect competition framework by “giving” market power to firms. But, what about consumers?
- When there are few, or even one, consumer, they have significant market power.
  - When there is only one consumer, we say we are in a monopsony.
    - A big factory being the only employer in a small village.
  - When there are few consumers, we say we are in a monopsonistic competition.
    - Big supermarket chains are very few compare to the number of food suppliers.
    - Labor market in Silicon Valley’s tech companies.
- As opposed to monopoly or monopolistic competition, in a monopsony or monopsonistic competition market, the market price is lower than in a competitive market.

Questions?