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Introductory Microeconomics ECO/1A1Y

Monopoly

Outline

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- Topics
  - Market power revisited
  - Rational monopolies
  - Monopoly vs. Perfect competition: quantities & prices
  - Monopoly vs. Perfect competition: welfare

Market Structures

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- Structure ⇒ Behaviour⇒ Performance

- Market structures
  - Perfect competition (last lecture)
  - Monopoly (this lecture)
  - Imperfect competition

There Is Something About M…

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- KPN collaborates with Dutch antitrust probe
- http://online.wsj.com/article/BT-CO-20111206-703896.html

- Concerns over merger in Pharmacy
- http://www.nytimes.com/2011/12/06/business/tough-questions-for-express-scripts-medco-merger.html

- The EC to slam Google with 400+ page statement of objections
- http://www.ft.com/cms/s/2/a6065478-1c6e-11e1-9b41-00144feabdc0.html#axzz1fl8fS6Fz

- Google chairman meets EC's antitrust chief
- http://www.guardian.co.uk/technology/2011/dec/05/google-antitrust-inquiry-eric-schmidt?newsfeed=true

- Apple, E-book publishers probed by EU regulator
- http://www.businessweek.com/news/2011-12-06/apple-e-book-publishers-probed-by-european-union-regulator.html

Monopoly

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- Barriers to entry
  - Economies of scale
  - Product differentiation and brand loyalty
  - Lower costs for an established firm
  - Ownership or control over key factors/outlets
  - Legal restrictions
  - Mergers and takeovers
  - Aggressive tactics
  - Intimidation

Monopoly In A Nutshell

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- ***Monopoly:*** a market structure in which a single seller of a product with no close substitutes serves the entire market.
  - A monopoly has significant control over the price it charges

- One seller captures the whole market
  - Example: Microsoft/Google, National Lottery
- Generally price is high and output is less (relative to competitive markets)
- Perfect competition is the best type of the market, monopoly is the worst
  - There are some exception to this rule…

Five Sources Of Monopoly

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1) Exclusive Control over Important Inputs
2) Economies of Scale
3) Patents
4) Network Economies
5) Government Licenses or Franchises

Rational Firms and Perfect Competition

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- Firms are price takers and rational: they maximize profits
- Revenue will change only if the output is changed
- Change in revenue = Price x Change in output $(\Delta TR = p\Delta Q)$.
- Optimal stopping point: $p = MR = MC$
- Price is the average and marginal revenue (AR, MR)

Monopoly: Rational Thinking

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- The monopolist's goal is to maximize economic profit.
  - In the short run this means to choose the level of output for which the difference between total revenue and short-run total cost is greatest

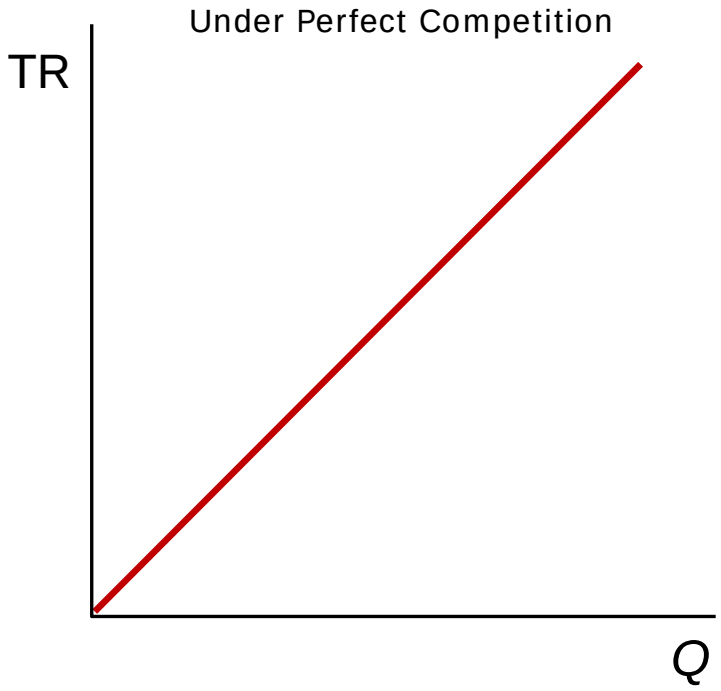
- Monopolist is the only seller and a rational firm
  - Not a price taker, but a price setter

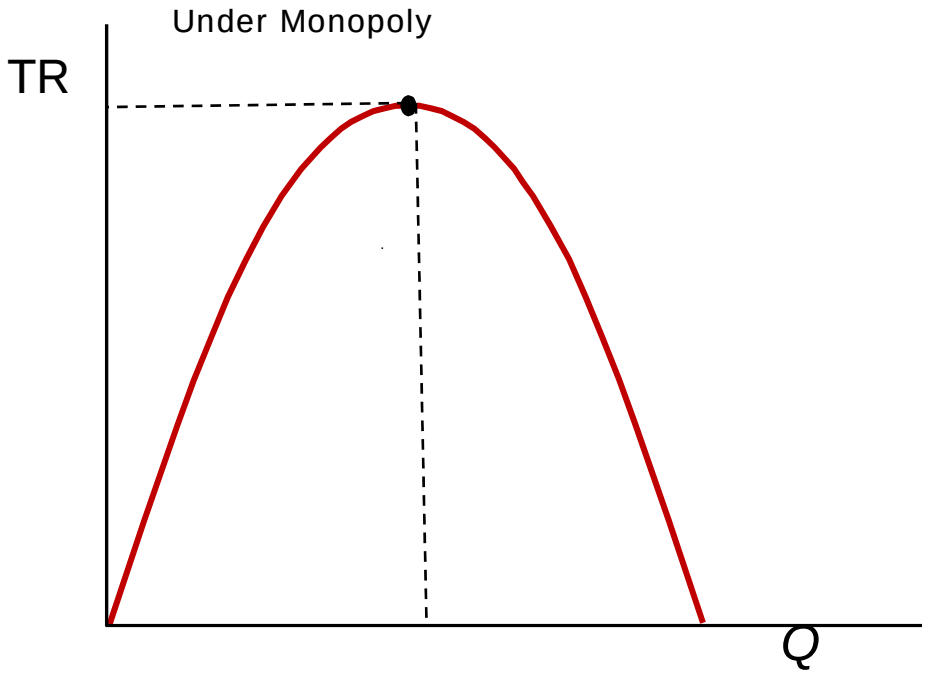
- The monopoly can change his revenue by changing the output and by changing the price
  - Change in Revenue = (Price x Change in output) + (Change in price x Output) ; $\Delta \mathrm{TR} = \mathrm{p}\,\Delta Q + \Delta p\; Q$
-

  Constraint: The monopoly cannot choose any [P, Q]
  - Charge more [↑P] ➔ Sell less [↓Q]
  - Sell more [↑Q] ➔ Charge less [↓P]

Revenue for the Monopolist

- As price falls, total revenue for the monopolist does not rise linearly with output (as it would in perfect competition).
  - Instead, it reaches a maximum value at the quantity corresponding to the midpoint of the demand curve after which it again begins to fall.
  - Total revenue reaches its maximum value when the price elasticity of demand is unity.





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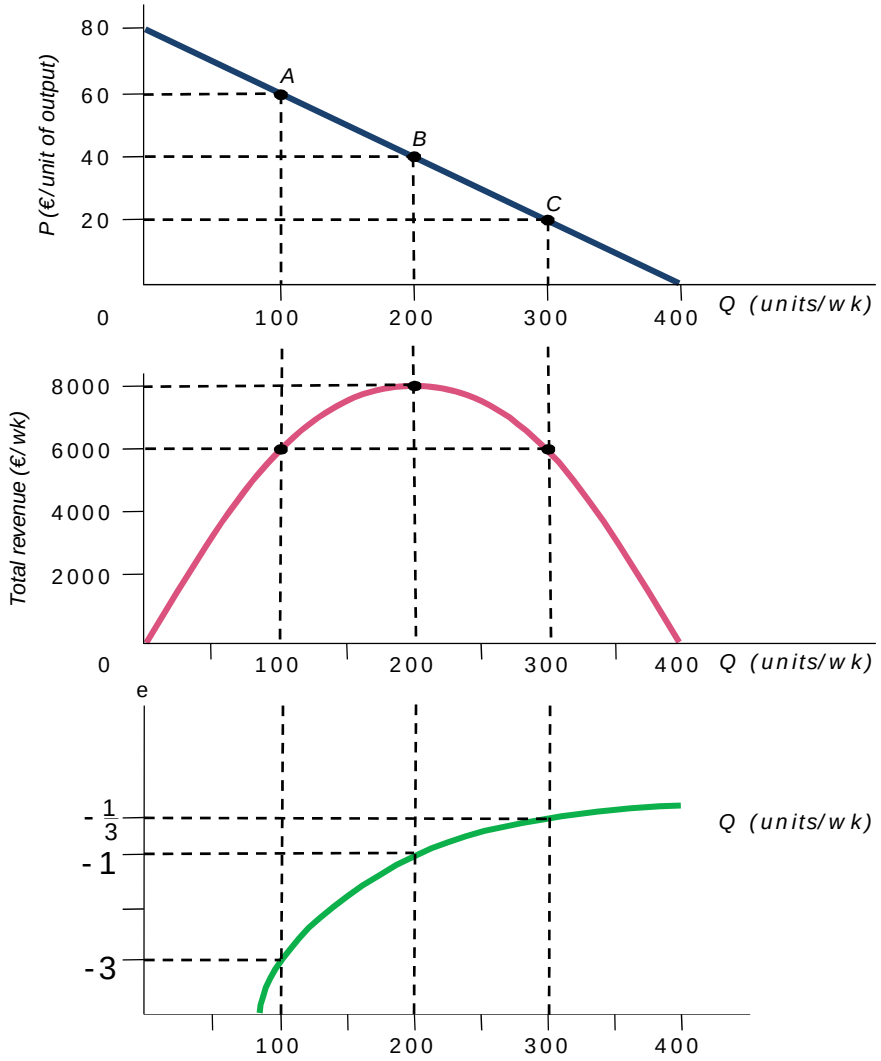
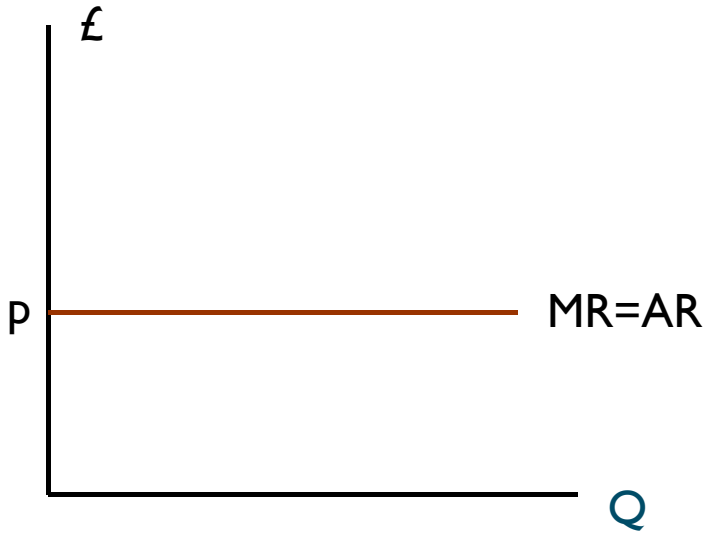
  - Total revenue reaches its maximum value when the price elasticity of demand is unity.
  - What about MR and AR curves?

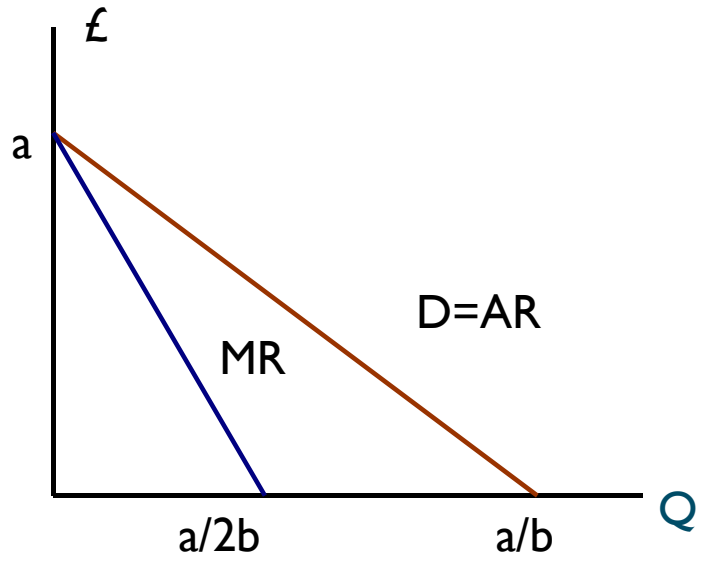


Revenue for the Monopolist
MR and AR Curves

- Perfect Competition

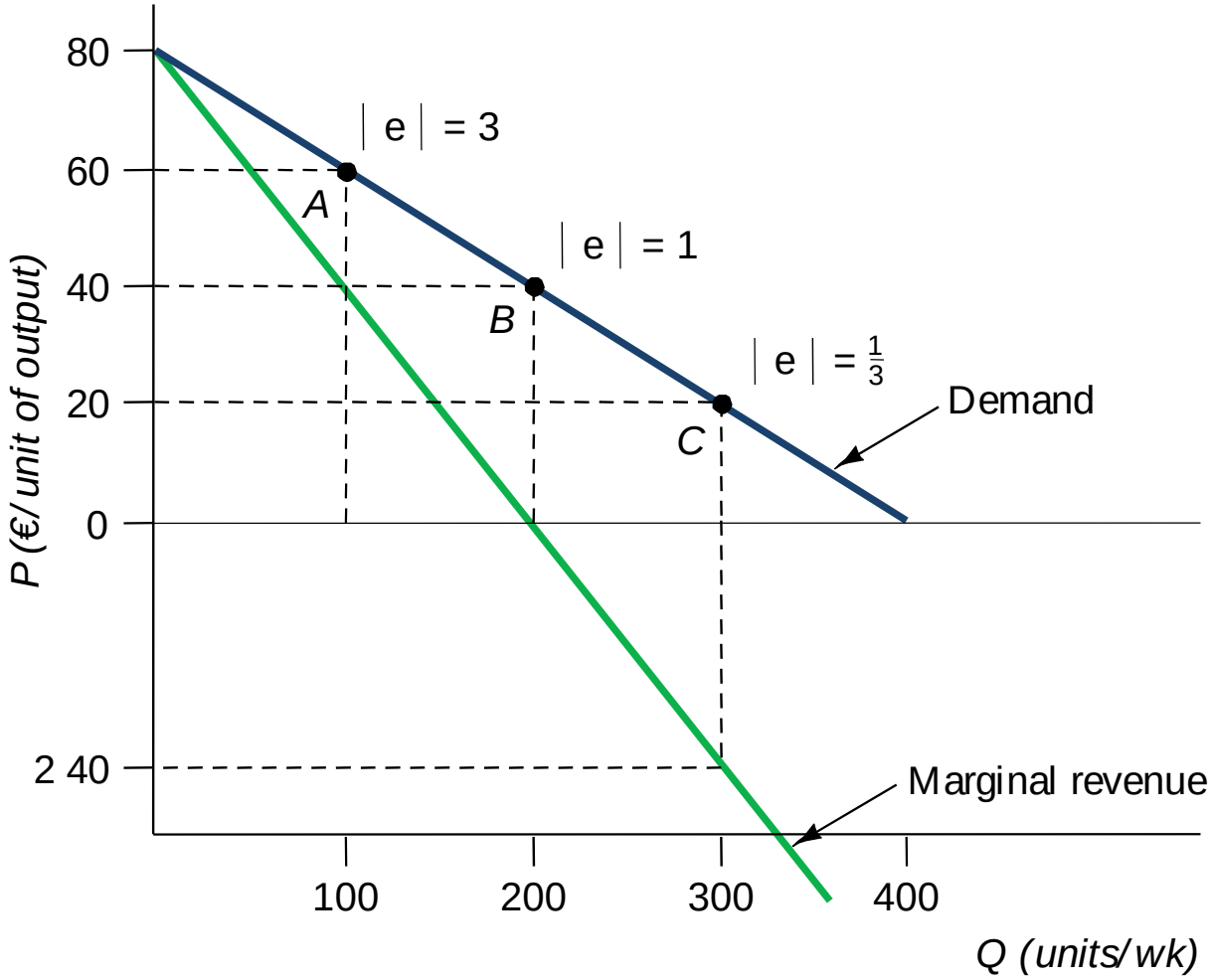


- Monopoly



$$p = a - bQ$$
$$TR = pQ = aQ - bQ^2$$
$$MR = \frac{d(TR)}{dQ} = a - 2bQ$$

Marginal Revenue and Elasticity



- Recall elasticity of demand is $\frac{\Delta Q}{\Delta P}\frac{P}{Q}$
- Then MR can be written as $MR = P(1 - \frac{1}{|\epsilon|})$
- The less elastic demand is wrt price, the more price will exceed MR
- In the limiting case of infinitely elastic demand (as in PC), MR = P

Monopoly: Optimal Rule

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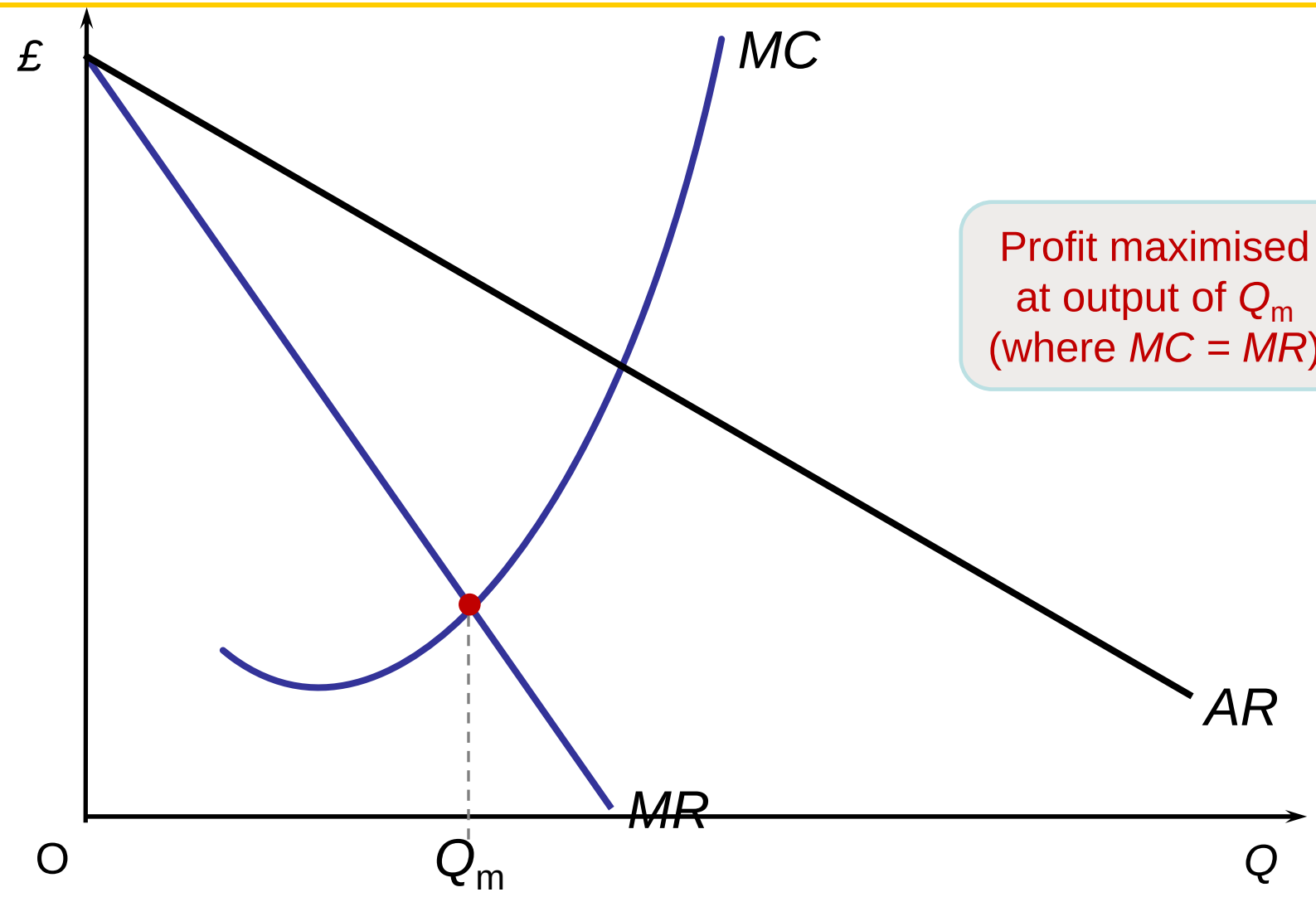
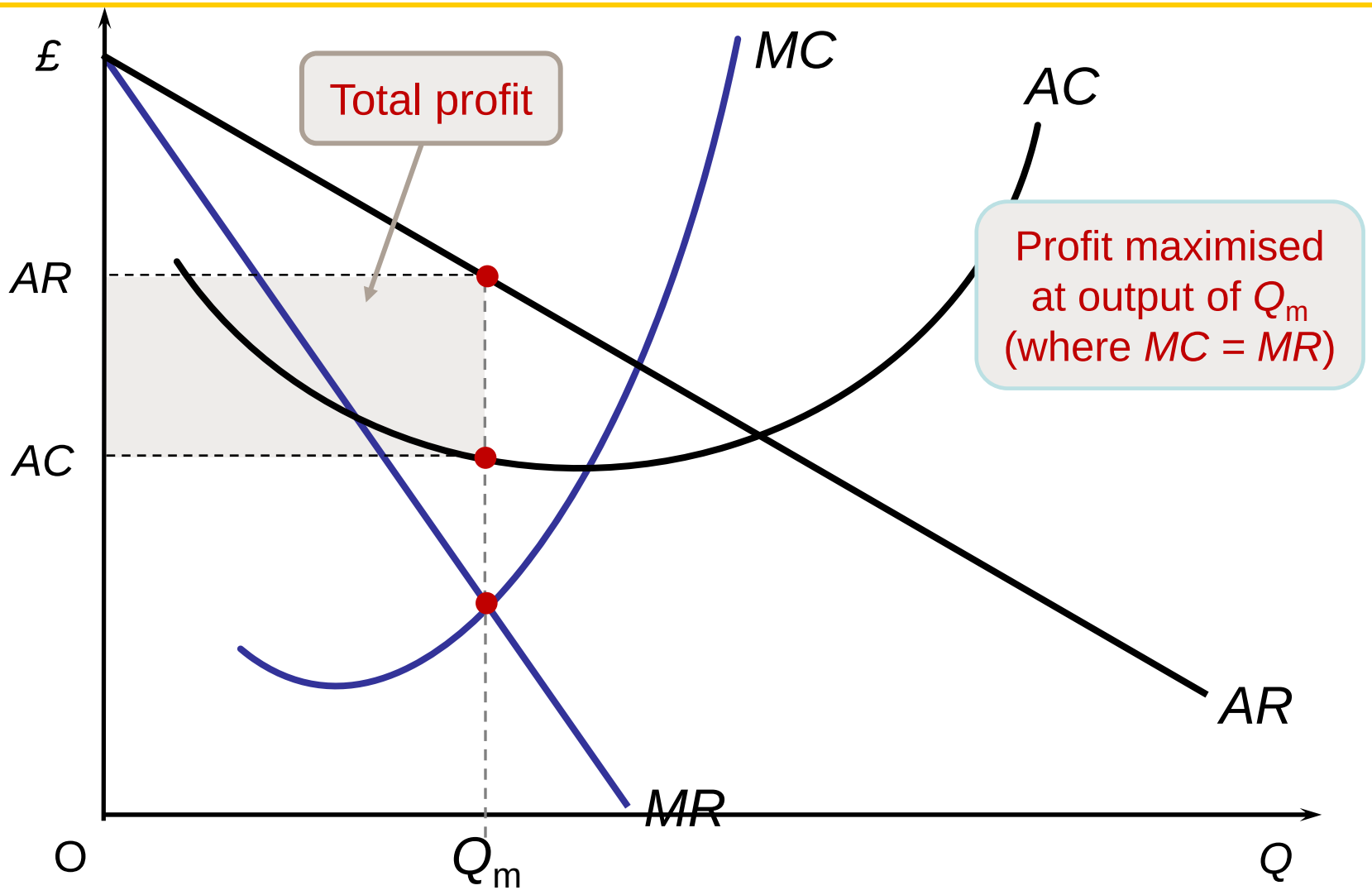
- ***Optimality condition for a monopolist***: a monopolist maximizes profit by choosing the level of output where marginal revenue equals marginal cost.
  - Optimal stopping point for monopolist: $\boldsymbol{MR = MC}$
  - MR is not constant: selling more at a lower price
  - Price > Marginal Revenue [recall $MR = P(1 - \frac{1}{|\epsilon|})$]
  - Monopolist produces at a level where $\boldsymbol{P > MR = MC}$

Profit Maximising Under Monopoly

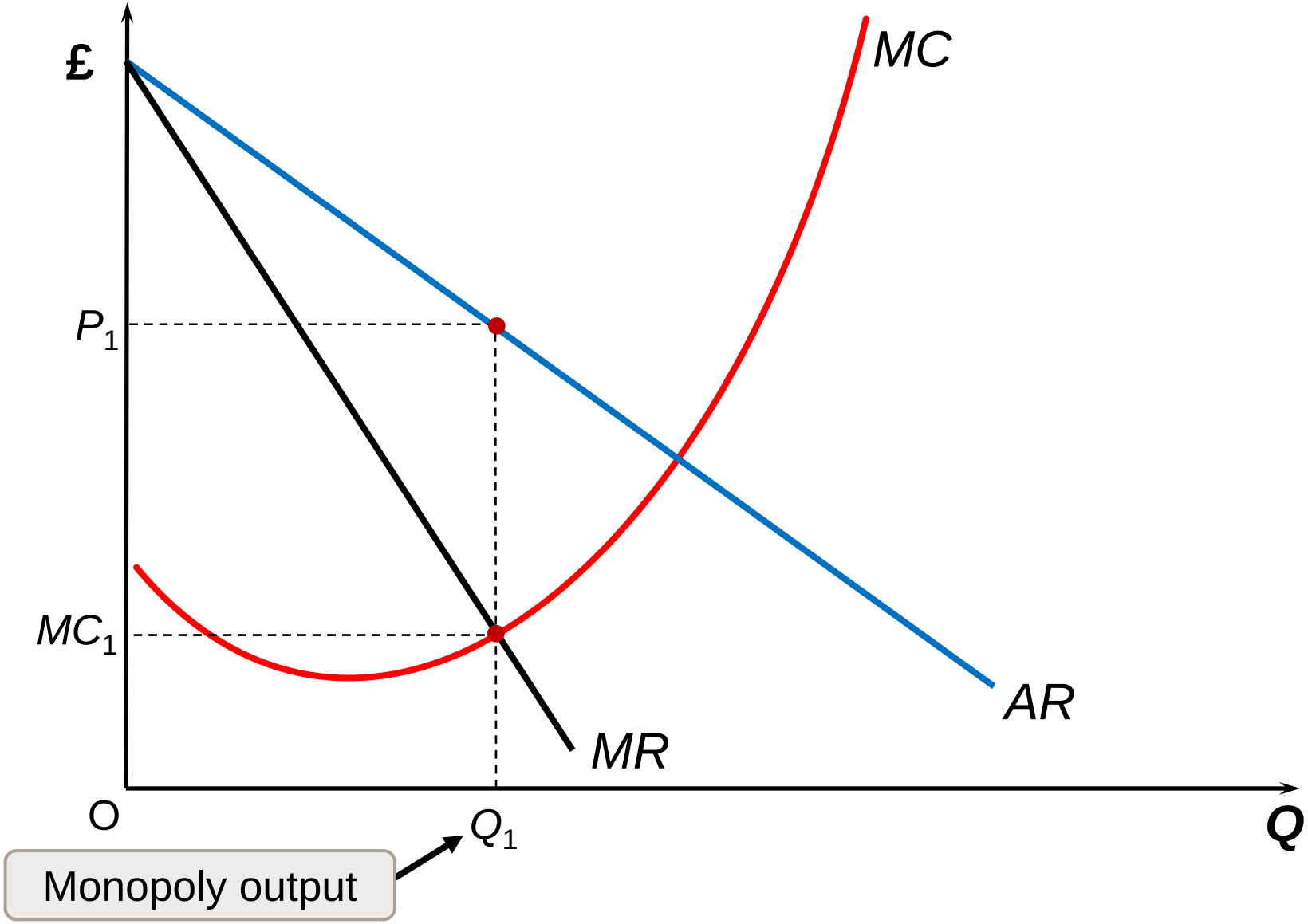


Profit maximised at output of Q_m (where *MC* = *MR*)

Profit Maximising Under Monopoly



Monopoly Versus Perfect Competition
Prices And Quantities



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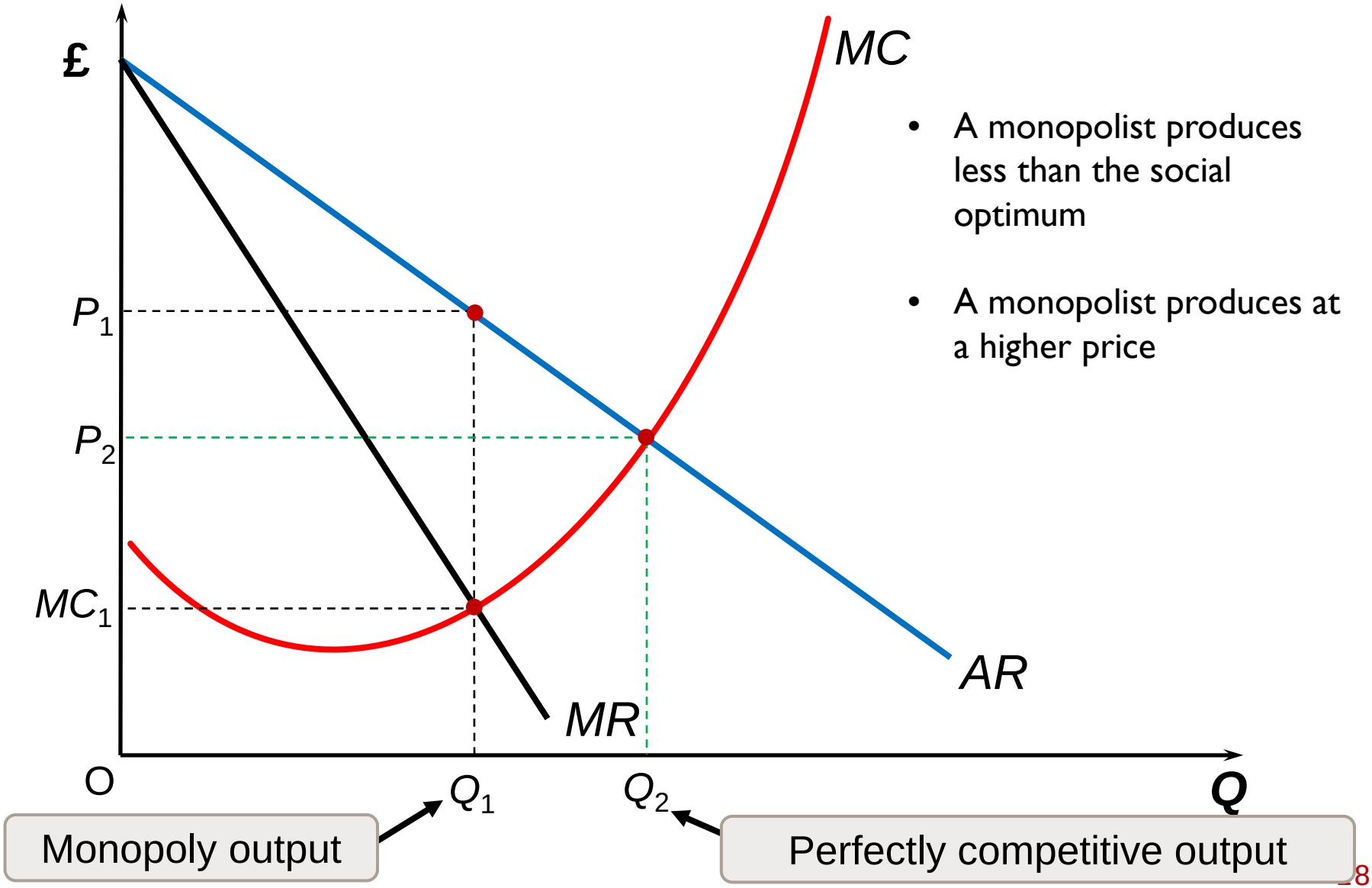

- A monopolist produces less than the social optimum
- A monopolist produces at a higher price

Profit-Maximizing Mark-up

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- If a monopolist's goal is to maximize profits, she will never produce an output level on the inelastic portion of her demand curve.
- The profit-maximizing level of output must lie on the elastic portion of the demand curve.
- The profit-maximizing mark-up for a monopolist is

$$\frac{P - MC}{P} = \frac{1}{|\epsilon|}$$

  - where $|\epsilon|$ is the absolute value of elasticity of demand
  - the larger the value the smaller the mark-up
  - in the extreme case of infinitely elastic demand, the mark-up is zero → which implies that $P = MC$ which is the same as in the perfectly competitive case

Profit-Maximizing Mark-up

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- The profit-maximizing mark-up for a monopolist is

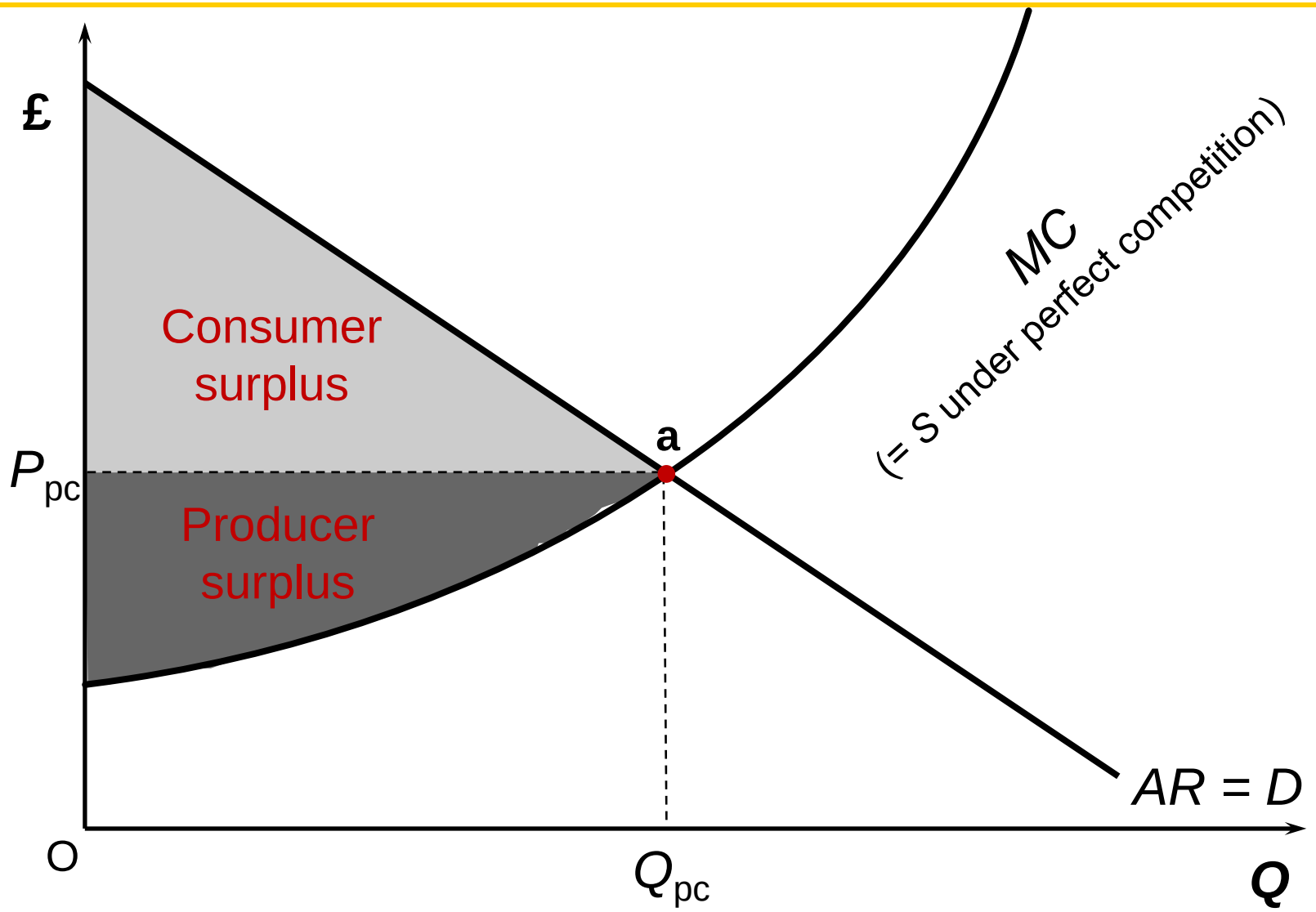
$$\frac{P - MC}{P} = \frac{1}{|\epsilon|}$$

  - where $|\epsilon|$ is the absolute value of elasticity of demand

- Economists often use this relation to figure out the mark-ups for a monopolist and/or the marginal costs of the monopolist without even having access to costs data

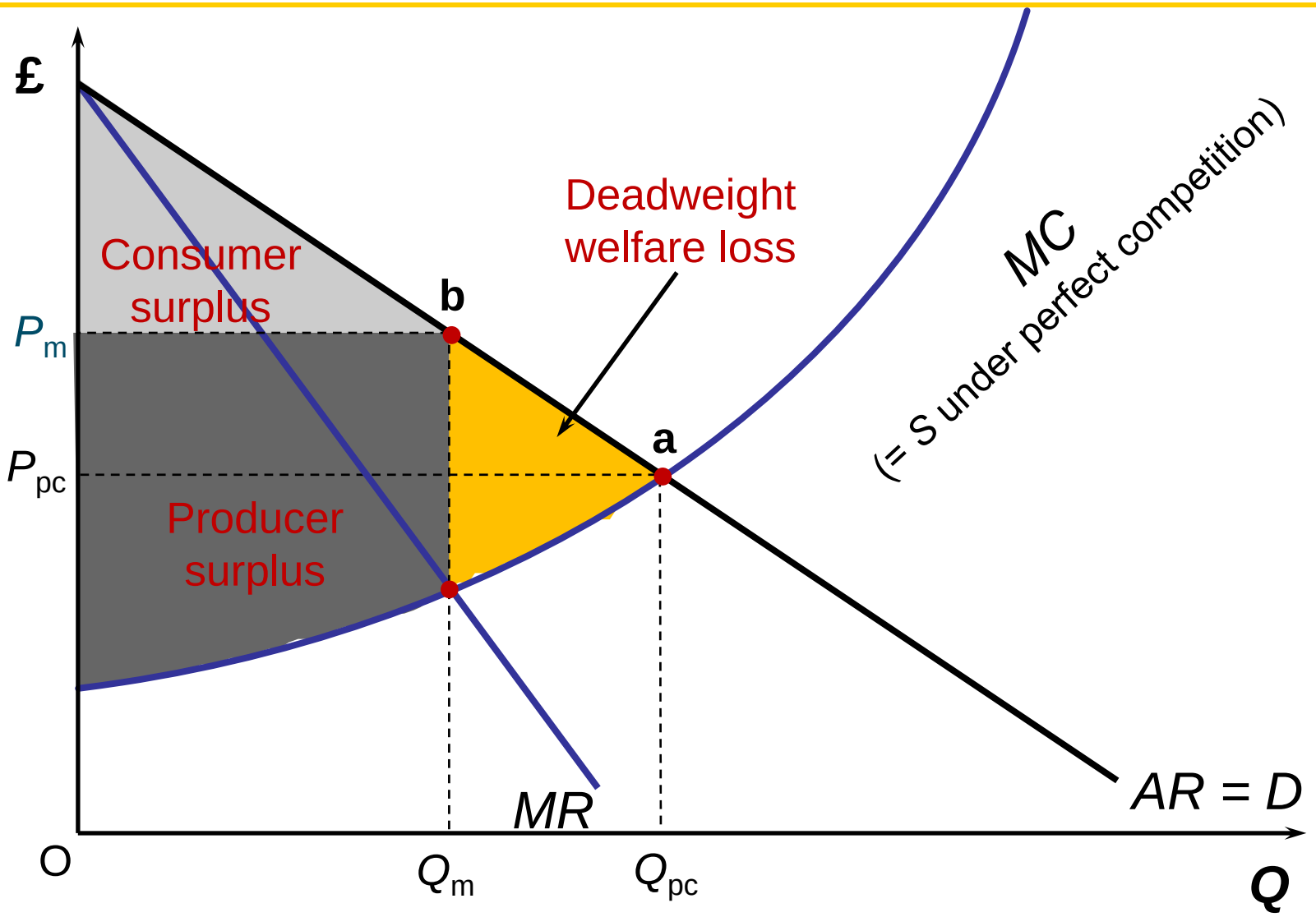
  - How? From quantity and price data, compute the slope of the demand curve and obtain elasticity of demand
  - A monopolist's price is £10. At this price the estimated absolute value of elasticity is 2. What is her mark-up? What is her MC?
  - Mark-up = ½ (50%);
  - $MC = P\left(1 - \frac{1}{|\epsilon|}\right)$ = 10(1 – ½) = £5

Social Welfare
Under Perfect Competition



(a) Industry equilibrium under perfect competition

Social Welfare Under Monopoly



(b) Industry equilibrium under monopoly

How To Reduce Deadweight Loss?

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- Moving away from monopoly to competition seems to be a good idea: it create greater social welfare and will lead to win-win situation for the society

- Market method: by encouraging competition, breaking monopolies that are engaged in unfair practices

- Regulatory method: by regulating the monopolist's output choice directly (e.g. via competition commission)

Price Discrimination

Senior Day

If you're at least 60 years old you've probably seen a lot of great movies in your lifetime. And if you haven't, get started now with discounted tickets on Senior Day every Tuesday for a limited time at select AMC theatres.

Student Day

If you're a student, you can't go wrong on Thursdays at select AMC theatres because you get a lower ticket price when you show a current high school or college ID. Make the smart choice and choose AMC every Thursday for Student Day and broaden your entertainment mind.

AMC KidsPack

Includes a kid-sized popcorn & drink and a package of AMC Frooti Tootis!

Free Refill on Large Soda and Popcorn

Day of purchase only. "Large Drink" offer limited to large fountain drinks. One refill per popcorn or large drink purchased.

Price Discrimination

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- A monopolist charges a **uniform price** if it sets the same price for every unit of output sold.

- While the monopolist captures profits due to an optimal uniform pricing policy, it does not receive the consumer surplus or dead-weight loss associated with this policy.

- The monopolist can overcome this by charging more than one price for its product.

- A monopolist **price discriminates** if it charges more than one price for the same good or service.

Price Discrimination

- Price discrimination: a practice where the monopolist charge different prices to different buyers.

- *Third-degree price discrimination*: charging different prices to buyers in completely separate markets, e.g. student discounts.

- *Second-degree price discrimination:* charging different prices for different units of a good, e.g. quantity discounts.

- *First-degree price discrimination*: consumers are charged individual prices where each unit is sold at the consumer's maximum willingness to pay thereby extracting all consumer.

Conditions for Price Discrimination

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- In terms of demand elasticities, if elasticities associated with market segments are the same
  - No incentive on part of a firm to price discriminate
  - Because profit-maximizing output and price are identical in both markets

- Two necessary conditions for price discrimination are
  - Ability to segment market
    - Exists if re-sales become so difficult that it becomes impossible to purchase a commodity in one market and sell it in another market
    - When resale is possible, **arbitrage** will eliminate any price discrepancies and Law of One Price will hold
  - Existence of different demand elasticities for each market segment

Price Discrimination
Willingness to Pay

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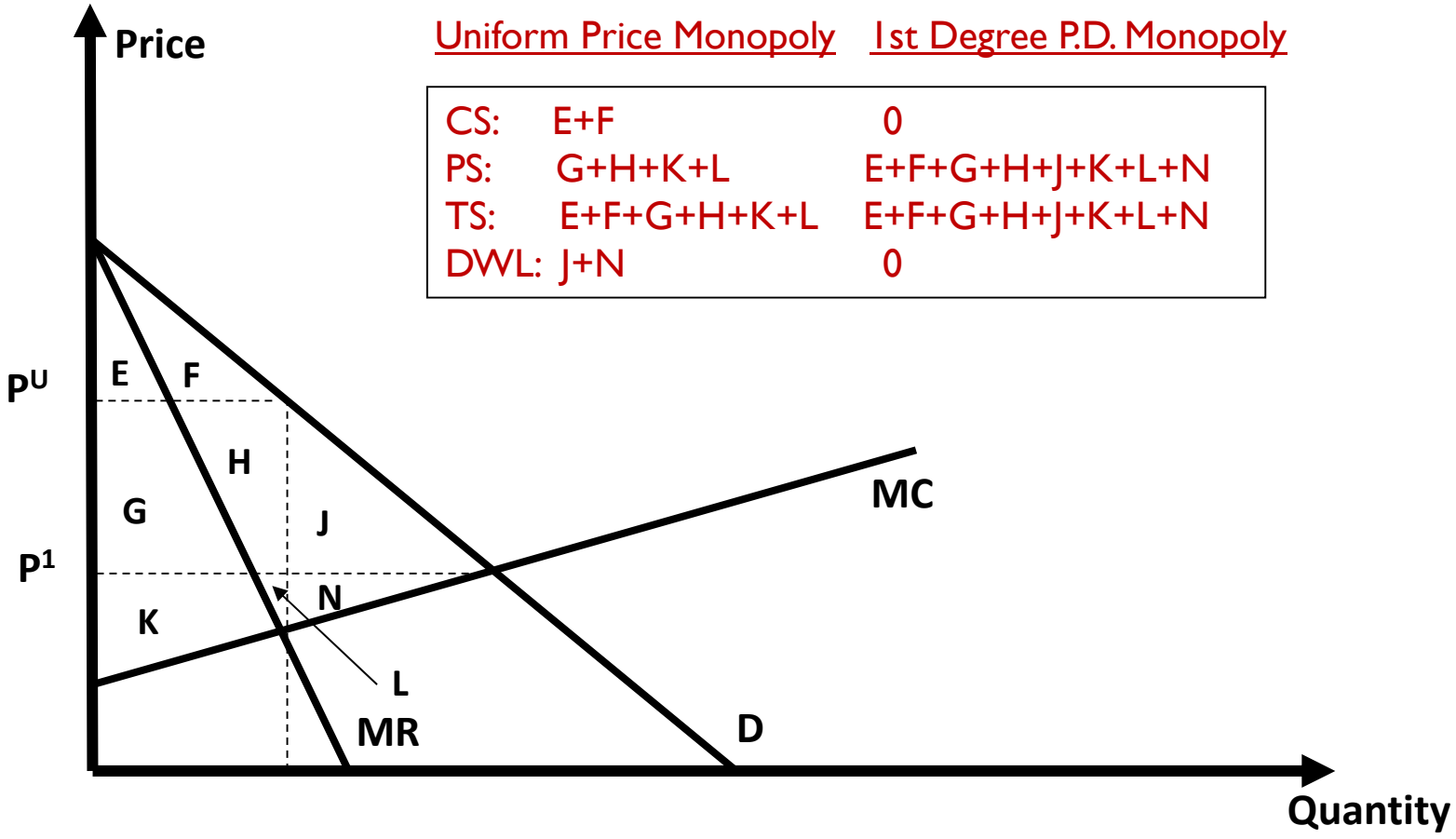
- The consumer's maximum willingness to pay is called the consumer's **reservation price**.
- Think of the demand curve as a "willingness to pay" curve.
- If the monopolist can observe the willingness to pay of each customer (based on, for example, residence, education, "look", etc.), then the monopolist can observe demand perfectly and can "perfectly" price discriminate.
  - Price is in the eye of the beholder

Price Discrimination
1st degree Price Discrimination

- Make consumers pay the amount that they are willing to pay
- Consumer surplus is taken by the supplier



Price Discrimination
1st degree Price Discrimination

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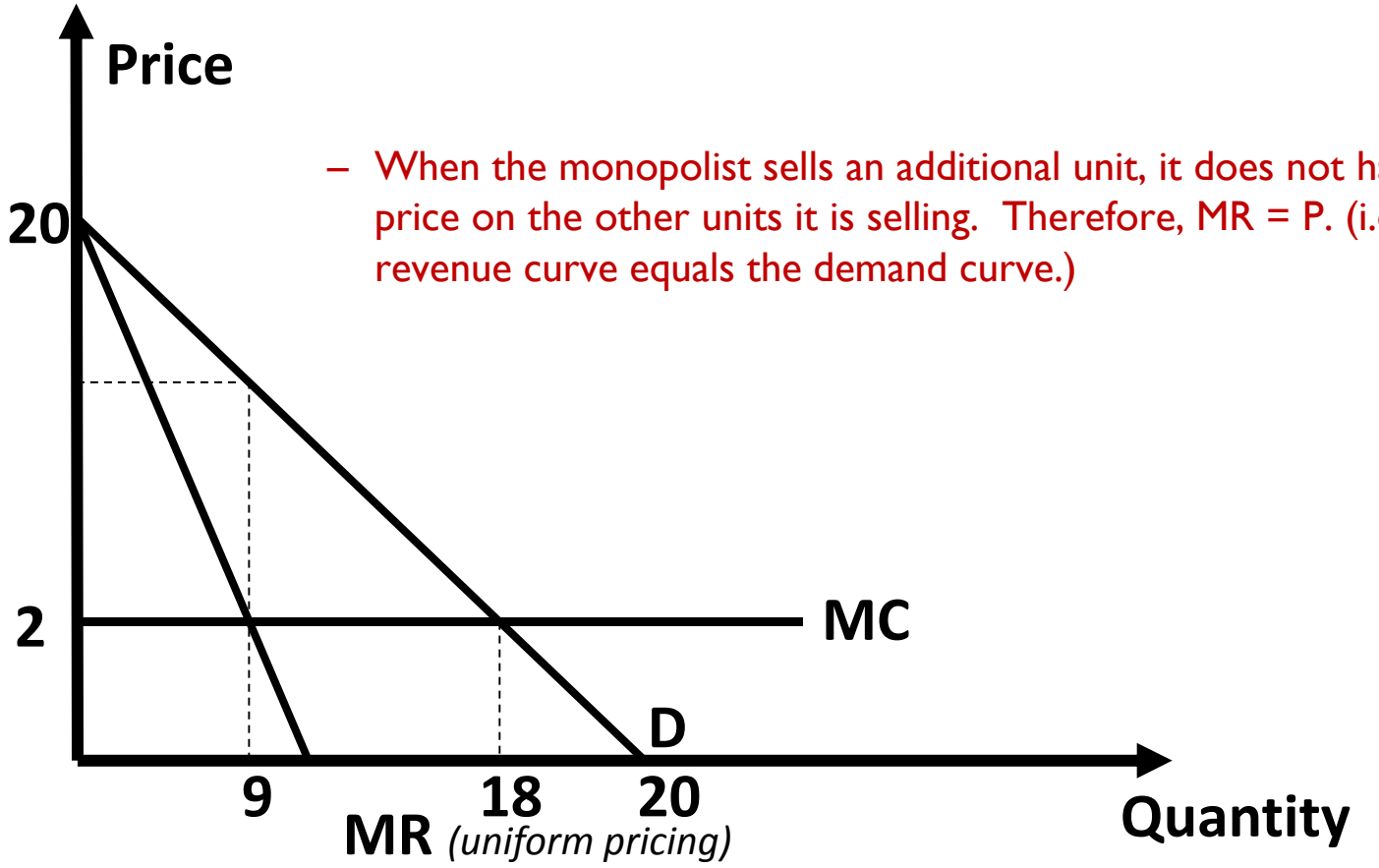
- What is the marginal revenue curve for a perfectly price discriminating monopolist?



– When the monopolist sells an additional unit, it does not have to reduce the price on the other units it is selling. Therefore, MR = P. (i.e., the marginal revenue curve equals the demand curve.)

Price Discrimination
3rd degree Price Discrimination

- Find ways of segmenting the market

Price Discrimination
3rd degree Price Discrimination

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- A policy **of third degree price discrimination** offers a different price for each segment of the market (or each consumer group) when membership in a segment can be observed.

- Most frequently found form of price discrimination – involves charging different prices for the same product in different segments of the market

  - Key is that 3rd degree discrimination is linked directly to consumers' willingness (and ability) to pay for a good/service
  - Eg. Charge a higher price of a branded drug in the U.S. than in Europe
  - Find other ways of segmenting the market

Price Discrimination
3rd degree Price Discrimination

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- Foreign market is charged lower price
  - More price sensitive due to a greater degree of competition from other firms (more elastic demand)
- Prices will be lower in market where demand is more elastic and arbitrage is not possible
  - For example, elasticity of demand for movie matinees is more elastic than evening movies
    - Matinee prices are lower because opportunity cost of going to a matinee is higher
      - Working and going to school coincide with matinee time
    - Similarly, senior citizens and college students are groups with relatively lower incomes
      - Resulting in a more elastic demand for commodities
- If a firm is able to segment its market based on these demographics
  - It can price discriminate and potentially enhance its profits

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Price Discrimination
3rd degree Price Discrimination

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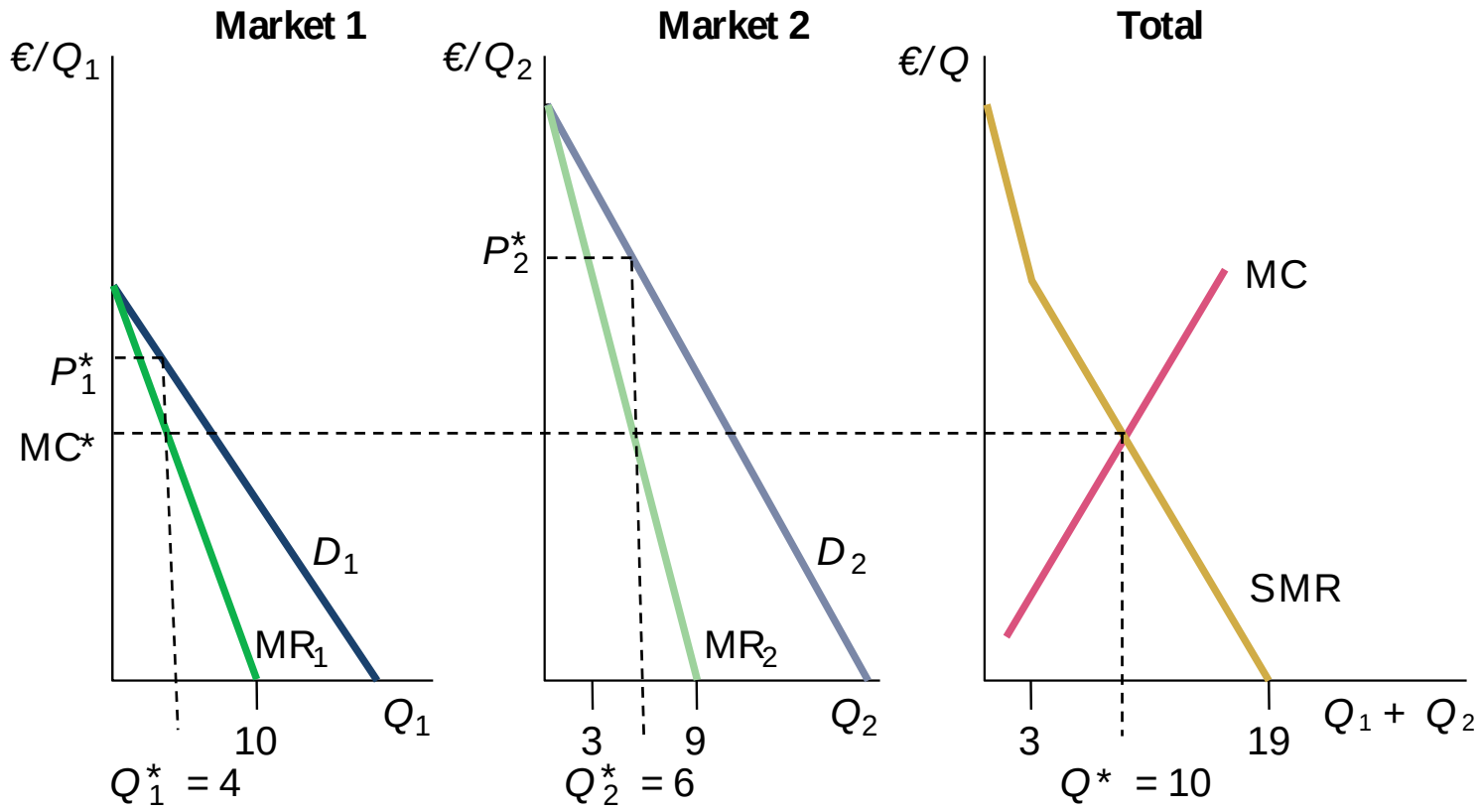
- Suppose a monopolist is selling in two different markets but marginal costs for the two markets are the same.
- How does a monopolist maximize profit with this type of price discrimination?

  – Optimal Pricing

  – Set the marginal revenue in each market equal to marginal cost. (i.e., the monopolist maximizes total profits by maximizing profits from each group individually.)

  – This implies that $MR_1 = MC = MR_2$ at the optimum. Otherwise, the monopolist could raise revenues by switching sales from the low MR group to the high MR group.

Price Discrimination
3rd degree Price Discrimination



Price Discrimination
3rd degree Price Discrimination

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- A numerical example …
- Say MC = AC = 20
- Demand curves in the two markets are
  - $P_1 = 100 - Q_1$
  - $P_2 = 80 - 2Q_2$
- Solution:

  $MR_1 = 100 - 2Q_1 = MC = 20$
  $MR_2 = 80 - 4Q_2 = MC = 20$

  Solve for Q_1 and Q_2 :
  $Q_1^* = 40$
  $Q_2^* = 15$

  Plug back in demand curves to get prices:
  $P_1^* = 60$
  $P_2^* = 50$

Price Discrimination
2nd degree Price Discrimination

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- Posting discrete schedule of declining prices for different range of quantities

Selling blocks of tickets / products in larger quantities

Getting rid of excess inventories / stocks when demand is low

Standby tickets for hotels, theatres, flights etc

Peak and off-peak pricing schemes e.g. travel, telecommunications

Price Discrimination
2nd degree Price Discrimination

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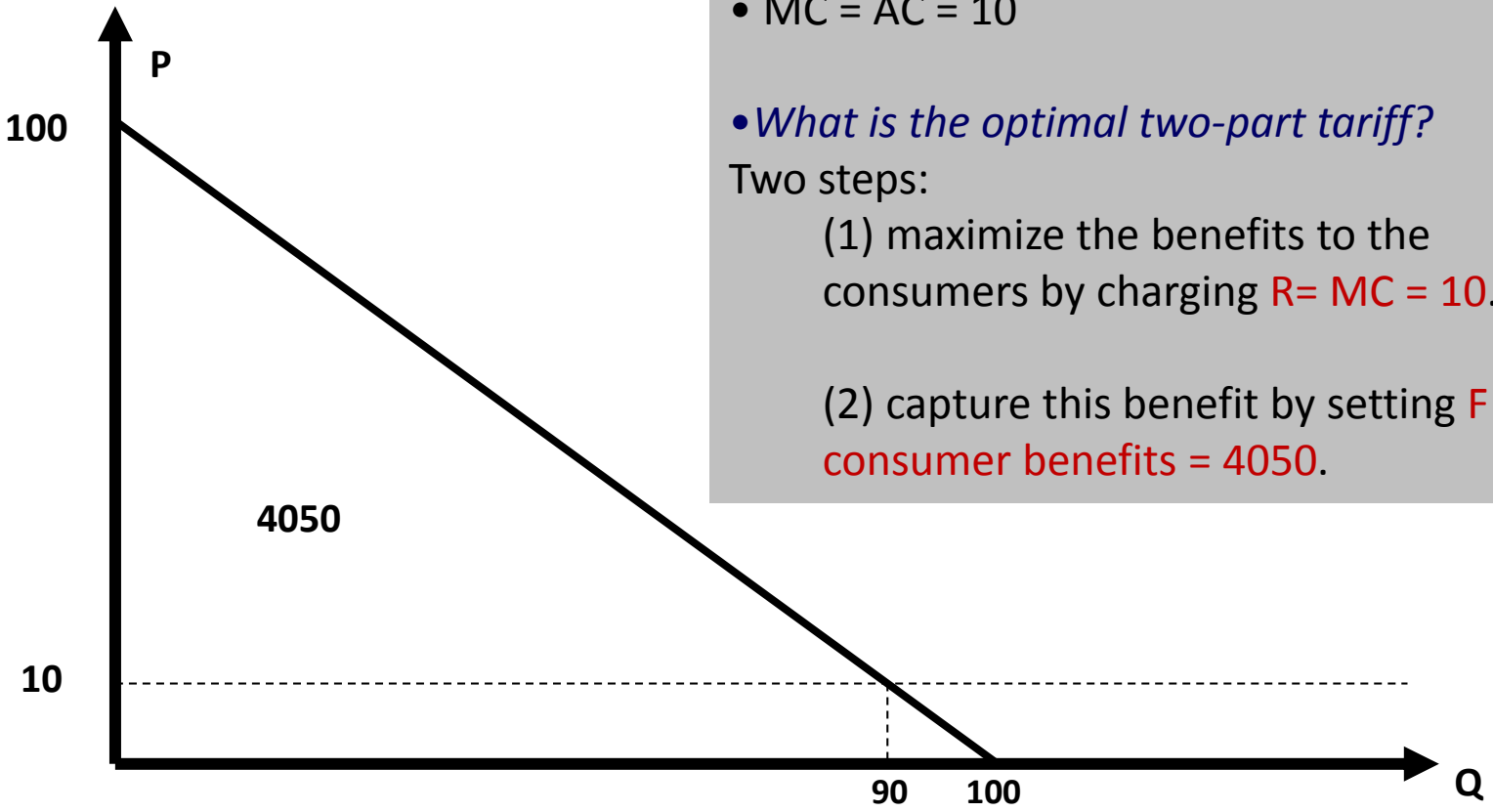
- Two Part Tariff -- an example of 2nd degree price discrimination
  - A monopolist charges a two part tariff if it charges a per unit fee, R plus a lump sum fee F (paid whether or not a positive number of units is consumed).
  - This, effectively, charges demanders of a low quantity a different average price than demanders of a high quantity.
  - Example: hook-up charge plus usage fee for a telephone, club membership, or the like

Price Discrimination
Two Part Tarrif

- **Example:**



All customers are identical and have demand
- P = 100 - Q
- MC = AC = 10

- *What is the optimal two-part tariff?*

Two steps:

(1) maximize the benefits to the consumers by charging R= MC = 10.

(2) capture this benefit by setting F = consumer benefits = 4050.

A Surprise: Price Discrimination

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- Some monopolies allow less deadweight loss through price discrimination: discounts, buy-one-get-one free, peak-off peak rate, case by case lawyer's fees, Multiplex movie theatre pricing

- A monopolist tries to increase its volume and profit and reduces deadweight loss because along with profit output volume also increases (charging a different price to every consumer)

- In this universe, certain forms of monopoly can be as good as perfect competition
  - Really? No

Takeaway Messages

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- Prices, Quantities and Social Welfare
  - Monopolist sets output where MR = MC
  - Perfect competition vs monopoly

- Disadvantages of monopoly
  - High prices / low output
  - Lack of incentive to innovate

- Advantages of monopoly
  - Economies of scale
  - More investment and risk-taking

What's Wrong With M?

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- Monopoly is bad, not because it charges more, but because it produces less (leaving opportunities unexploited: deadweight loss)
- Same behavioral rule: it is not profitable for a monopolist to produce up to the socially optimum point
- Under perfect competition firms cannot help to produce up to the socially optimum point

Extra Slides

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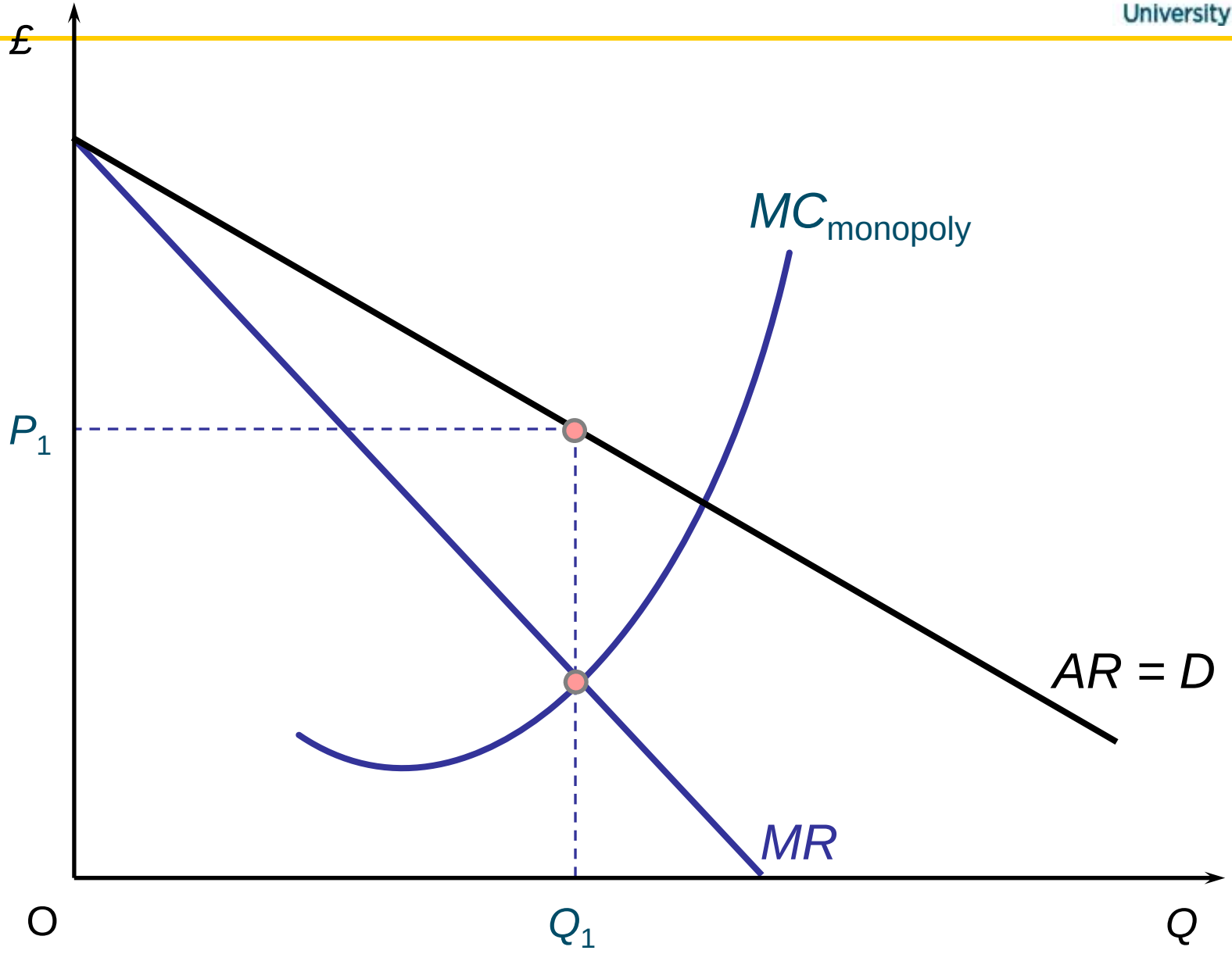
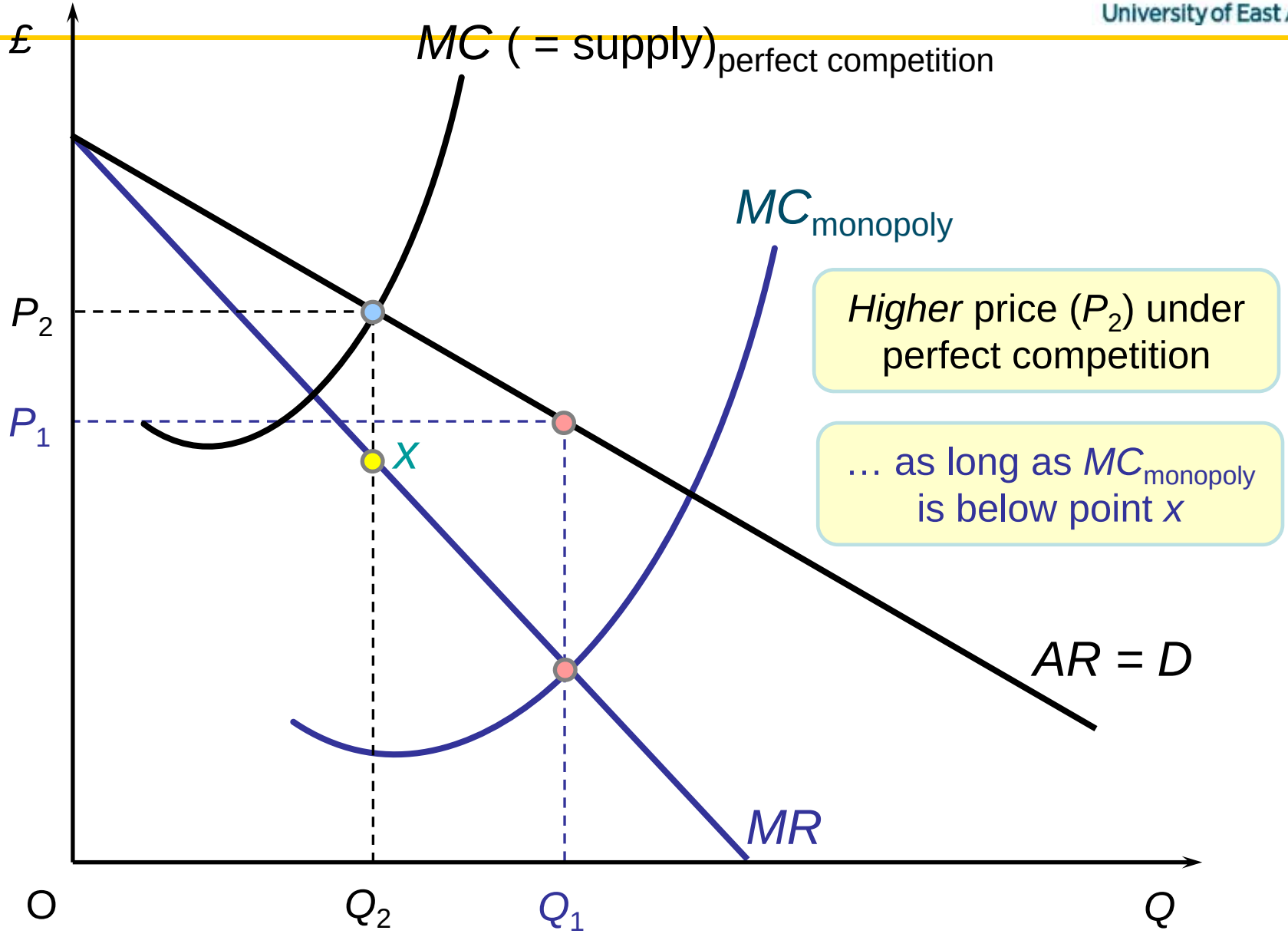
- Different MC curves
- Examples of AR and MR curves

Different MC Curves



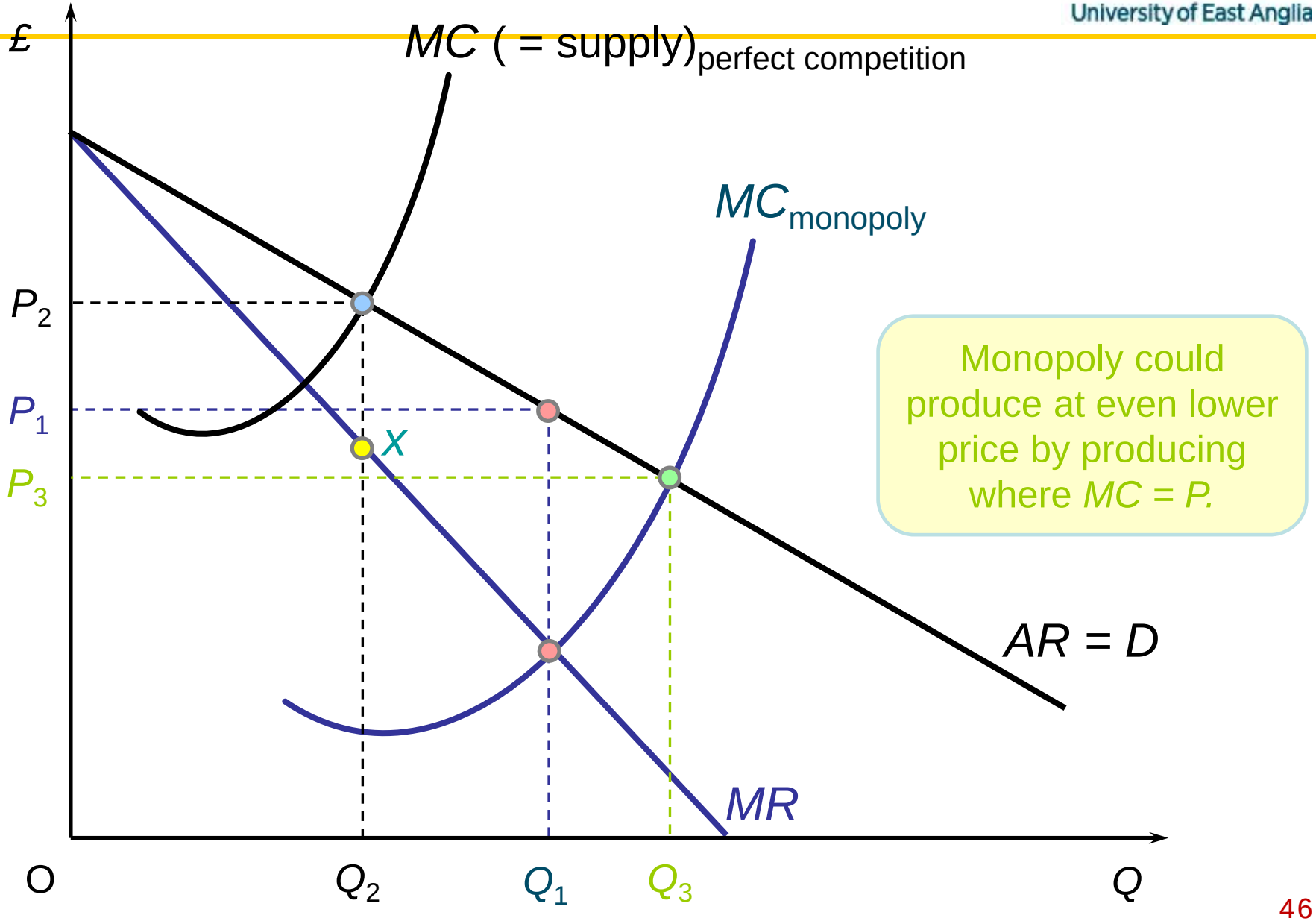
Different MC Curves (II)



Higher price (P_2) under perfect competition

… as long as $MC_{monopoly}$ is below point *x*

Different MC Curves (III)



Monopoly could produce at even lower price by producing where *MC = P.*

AR and MR Curves: Examples

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- Equation for the inverse demand curve (note p is same as AR)

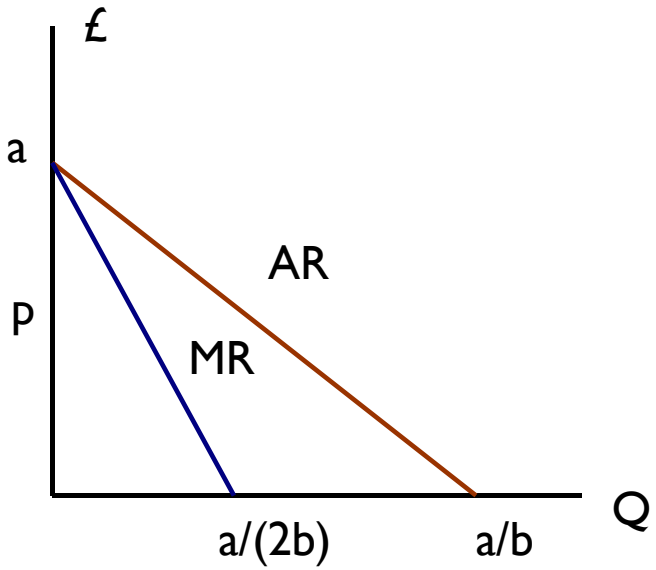
- AR = a – bQ [same as p = a -bQ]
- (under monopoly) MR = a – 2bQ

- Suppose AR = 20 -2Q. Then MR = 20 -4Q
- Under competition MR=AR=p

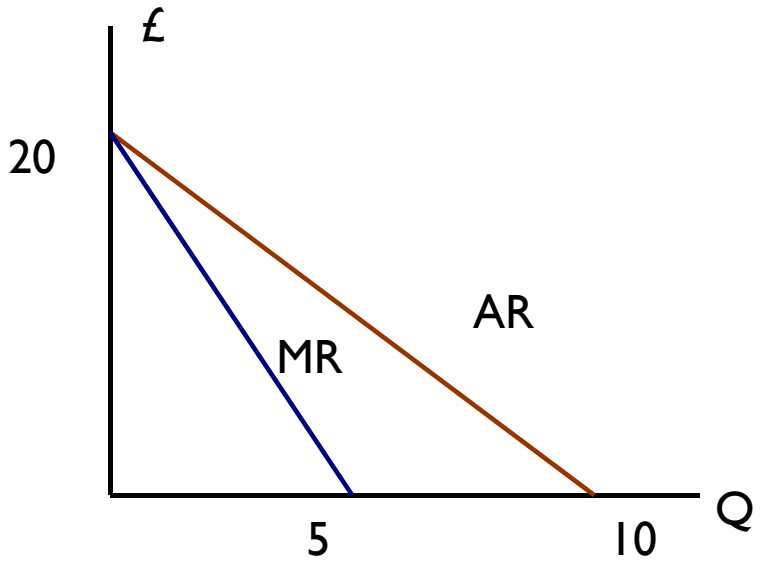
MR and AR Curves: Monopoly

- p= a -bQ

p = 20 - 2Q



MR = a – 2bQ



MR = a – 4Q

AR And MR Curves: Examples

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NO
SENIOR CITIZENS
DISCOUNTS.
YOU HAVE HAD TWICE
AS LONG TO GET THE
MONEY