

Chapters 11 and 12

Monopoly



Monopoly



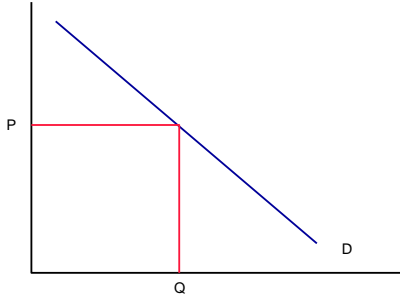
- Suppose that a single firm sells all of the output in a market. This is a monopoly.
 - Further, suppose that this monopolist must sell to all customers at a single price.
- Since the monopoly is the only seller, its demand curve is the market demand curve.
 - The market demand curve is downward sloping, so the firm's price varies with its output.
 - The firm is NOT a price taker; this is really the defining characteristic of a firm with monopoly power.

Marginal Revenue: Monopoly

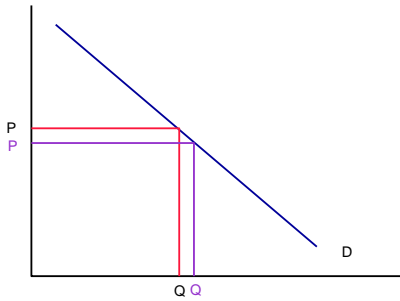


- Marginal Revenue: $\Delta TR / \Delta Q$
- For a monopolist, marginal revenue is NOT equal to price.
- Suppose that you are a monopolist in the South Carolina watermelon market:
 - Given knowledge of the demand curve you face, you choose how many watermelons to plant
 - Once your output is produced, you sell it at the price the market will bear (given by the demand curve at your chosen quantity).
 - Selling more watermelons requires that you sell at a lower price!
- Marginal revenue reflects two effects:
 - When you sell another melon, you get revenue from that sale.
 - When you sell another melon, the price must be lower for all units you sell.

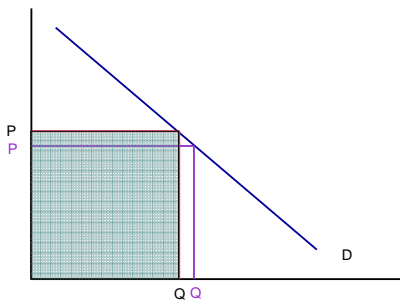
Marginal Revenue: Monopoly



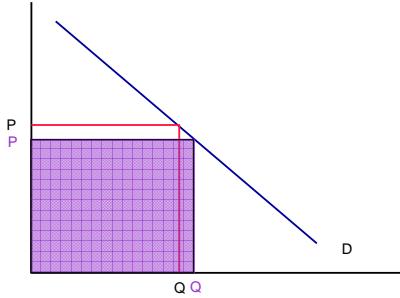
Marginal Revenue: Monopoly



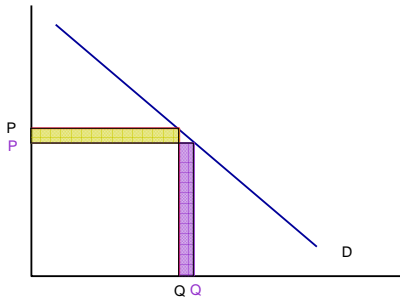
Revenue Before



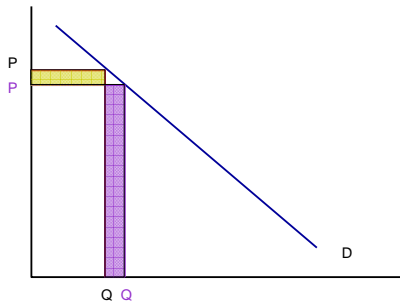
Revenue After



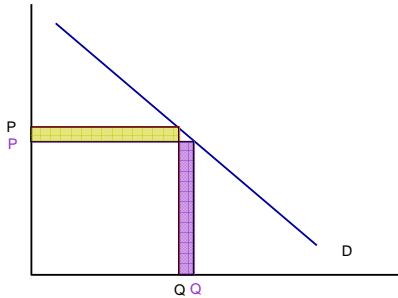
Change in Revenue Marginal Revenue



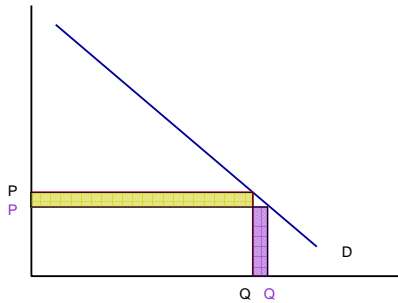
Change in Revenue Marginal Revenue: Positive



Change in Revenue Marginal Revenue: Zero



Change in Revenue Marginal Revenue: Negative



Marginal Revenue: Linear Demand



Suppose demand is given by: $P = A - BQ$

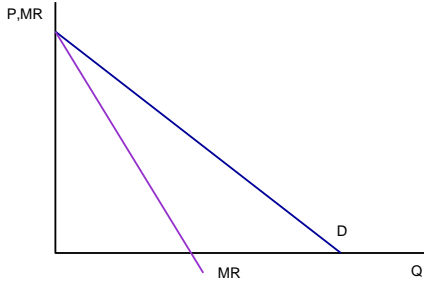
Total Revenue is: $TR = PQ = (A - BQ)Q = AQ - BQ^2$

Marginal revenue is $\Delta TR / \Delta Q$, for small ΔQ . So:

$$MR = \lim_{\Delta Q \rightarrow 0} \frac{\Delta TR}{\Delta Q} = \frac{dTR}{dQ} = A - 2BQ$$

Note: For a linear demand curve, the MR curve has the same vertical intercept and is twice as steep.

Demand and Marginal Revenue

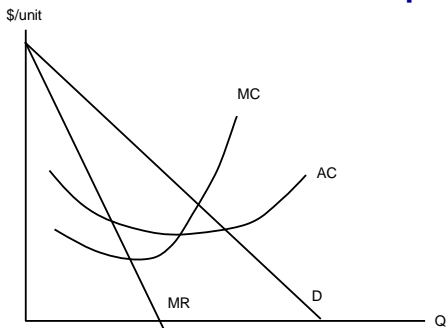


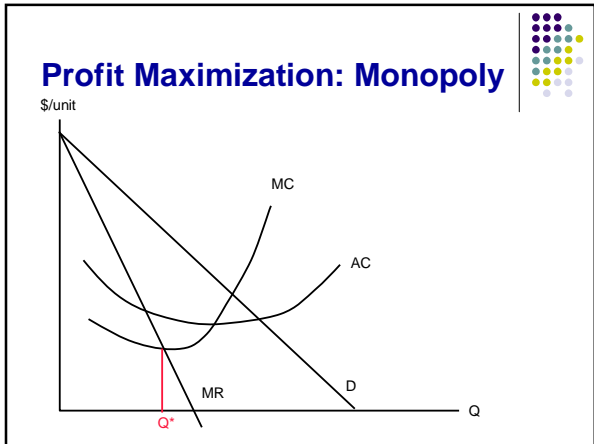
Profit Maximization: Monopoly

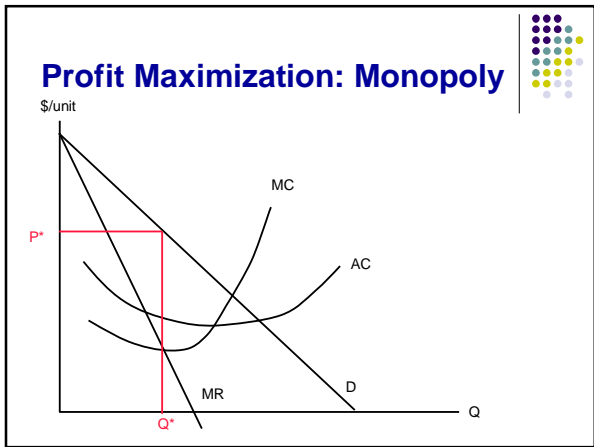


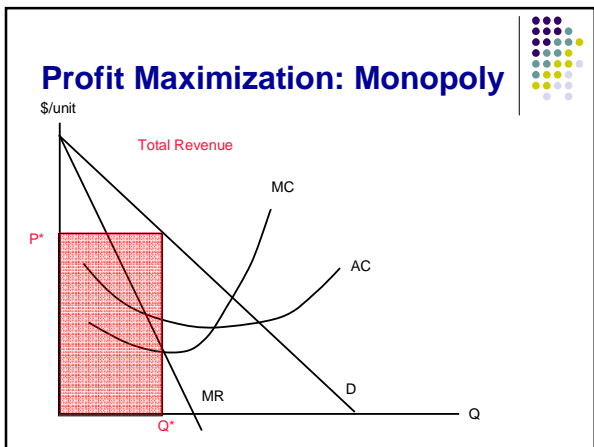
- A monopoly firm will choose an output such that marginal revenue is equal to marginal cost.
- Price is found on the demand curve at the firm's chosen quantity.
- Price exceeds marginal cost and the firm can make positive economic profit

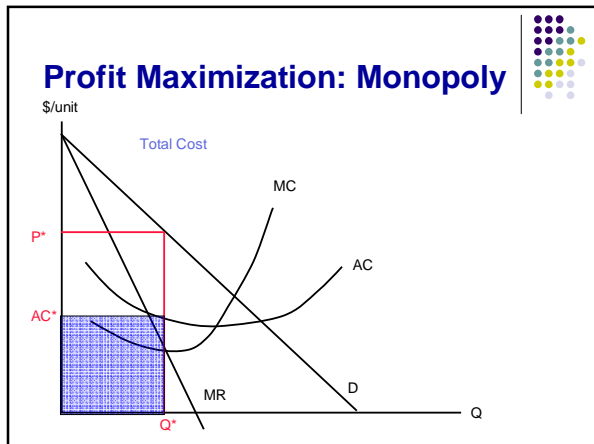
Profit Maximization: Monopoly

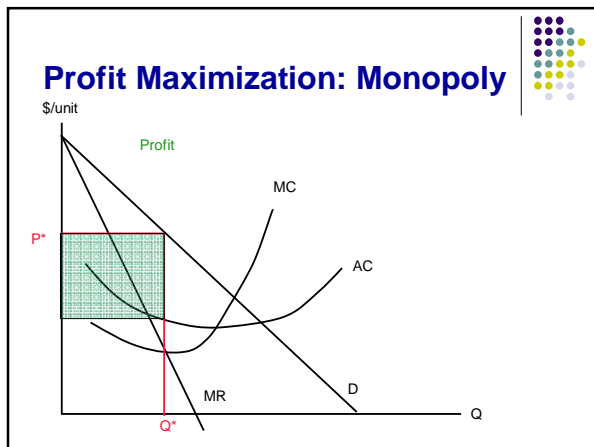












Monopoly Mark-up Formula

Suppose that a monopolist has this profit function:

$$\pi = P(Q)Q - C(Q)$$

Show that:

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

What Determines Observed Elasticities?



- Substitutes?
- Necessity?
- Durability?
- Derived demand?
- Fraction of consumers' budgets?
- Time frame?

Monopoly and Entry



- For a true monopoly, positive economic profits need not induce entry
 - Entry barriers prevent new firms from entering when the incumbent firm earns positive profit
 - Patents, secret technology, strategic considerations can all produce entry barriers.

Monopoly vs. Competition



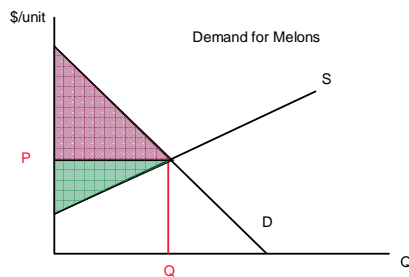
- Under perfect competition, $P = MC$
- Under monopoly, $MR = MC$, but $P > MC$
- A monopolist “contrives” a scarcity, resulting in a higher price and higher profit.

Economic Efficiency



- Economists are often interested in “efficiency.”
- When we evaluate the efficiency of a market outcome, we are concerned with the gains from trade achieved by all market participants.
 - We will sometimes refer to these gains as the “surplus” achieved under a given outcome.
- Efficiency requires that the total surplus to all market participants be at a maximum
 - If we are dividing a pie, society is better off with a big pie rather than a small one.

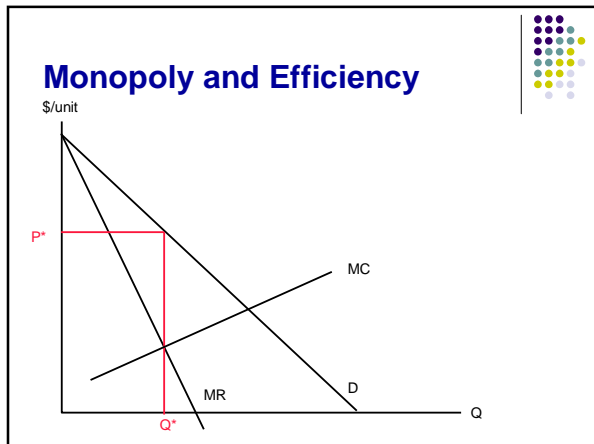
Consumer and Producer Surplus

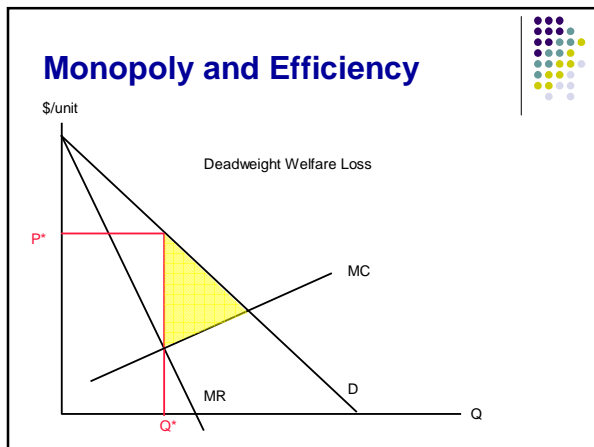


A Competitive Equilibrium is Efficient



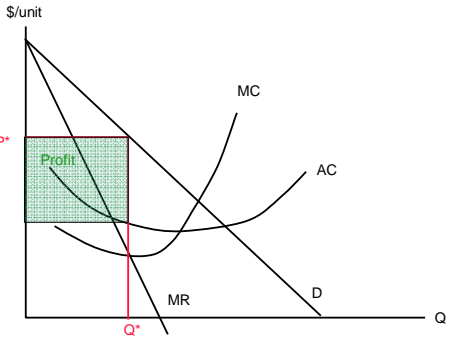
- The competitive equilibrium occurs at the price and quantity where demand and supply curves intersect.
- The sum of producer and consumer surplus is maximized at the equilibrium point.
- Show that surplus must decline if output is either increased or decreased.
 - If output were lower, we are failing to provide a unit that would have been valued above its cost; if output were higher, we are incurring a cost of production that exceeds consumers' valuation of the good produced.



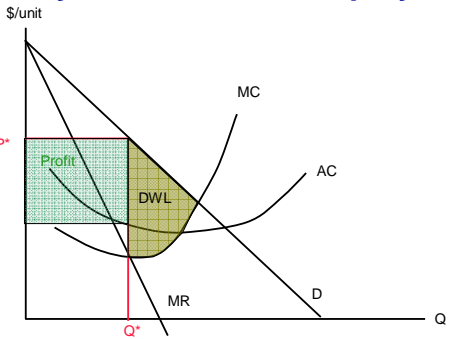


- ### Monopoly and Efficiency
- At the monopoly output, the marginal valuation of consumers (equal to price on the demand curve) exceeds the marginal cost of production.
 - Welfare would be higher if an additional unit of output were produced, but it is not.
 - Efficiency requires that the marginal value (price) to a consumer be equal to the marginal cost of production, but the monopolist equates marginal revenue to marginal cost.
 - The failure to achieve the highest possible surplus results in a deadweight efficiency loss under monopoly.

Why Do I Dislike Monopoly?



Why Do I Dislike Monopoly?



Why Do I Dislike Monopoly?

- At the monopolist's chosen output, a consumer values an extra unit of the good at the market price (willingness to pay). The cost of the resources needed to produce an extra unit is given by marginal cost. Since $P > MC$, the value to society of an extra unit of output would exceed its cost, but the monopolist does not produce it.

Price Discrimination: Introduction



- We now return to the topic of pricing strategies for firms with market power
- Our topic is price discrimination: the practice of charging different prices to different customers
- Remember consumer surplus?
 - Firms would like to transform consumer surplus into producer surplus by price discriminating

First: A Policy Question



- The same prescription drugs are sold at different prices in Canada and the U.S. (with lower prices in Canada)
 - This appears to be price discrimination
- Should reimportation of prescription drugs from Canada be legal in the U.S.?

And Another: Is Price Discrimination Illegal?



- The Robinson-Patman Act (amending the Clayton Act) forbids price discrimination “where the effect of such discrimination **may be substantially** to lessen competition or tend to create a monopoly in any line of commerce, or to injure, destroy, or prevent competition”

Necessary Conditions



- There are 3 necessary conditions for profitable price discrimination
 - The firm must have market power
 - There must be detectable differences across buyers
 - Sellers must be able to prevent resale between buyers

Preventing Resale



- Why resale might be difficult
 - Services cannot be resold
 - Warrantees may be void if the good is transferred
 - Transportation costs may segment markets

A Caveat



- If price differences simply reflect cost differences related to serving different customers, this is NOT price discrimination
 - As a practical matter, there are often both cost-based and discrimination-based explanations for observed price differences

Types of Price Discrimination



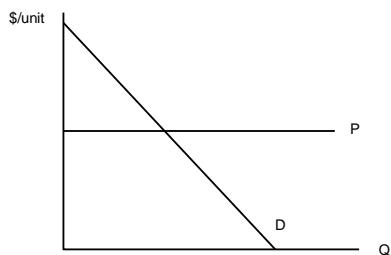
- Three types
 - 1st Degree: Personal Pricing
 - 2nd Degree: Menu Pricing (nonlinear pricing)
 - 3rd Degree: Group Pricing (linear pricing)
- We will consider 1st and 3rd degree in this presentation, 2nd degree will be considered later

1st Degree Price Discrimination

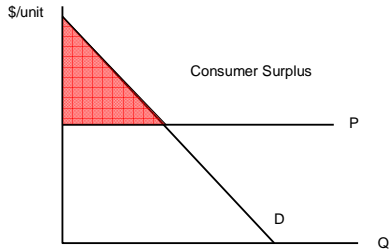


- In competitive or monopoly markets, consumers normally gain some surplus when they buy

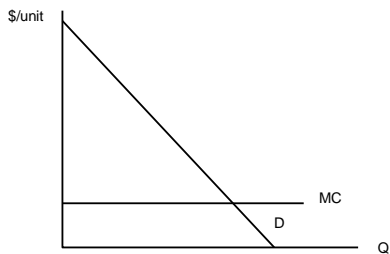
Individual's Demand Curve



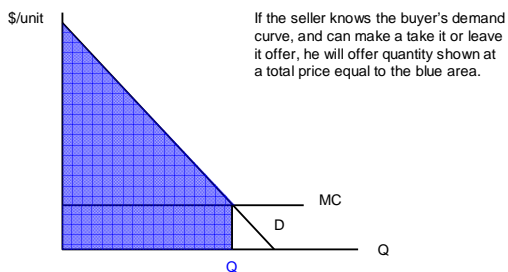
Individual's Demand Curve



1st Degree Price Discrimination



1st Degree Price Discrimination



Efficiency



- The outcome under 1st degree price discrimination is very favorable to the seller
 - The seller gains all surplus, the buyer none
- The outcome is economically efficient
 - Under ordinary monopoly, at the equilibrium outcome, an extra unit would be worth more to a buyer than its cost of product, but it is not produced.
 - At the outcome under 1st degree price discrimination, the marginal willingness to pay is just equal to the marginal cost of production

Examples?



- There are no good examples of first degree price discrimination
 - The information requirements are extreme; the seller must know the exact shape of each buyers' demand curve
 - There may be cases where 1st degree price discrimination is approximated (tuition payments are high personalized, for example).

3rd Degree Price Discrimination



- 3rd degree price discrimination involves charging different prices to different groups
 - Selling in different distinct geographic markets
 - Selling to different customer groups within a geographic market

3rd Degree Price Discrimination



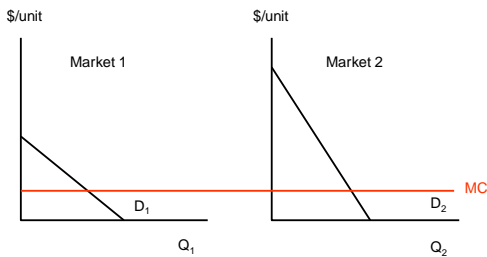
- Examples
 - Haircuts for children and adults
 - Discounts for students and senior citizens
 - Couponing
 - Hardback, paperback books
 - Dining discounts before 5 pm
 - Software: Discount for owners of previous versions
 - International versions of textbooks
 - Journal prices for libraries and individuals
 - Freight (transportation cost) absorption
 - 1st class and coach tickets by airlines
 - Discounts for Saturday night layovers by airlines
- Could there be cost explanations for these price variations?

3rd Degree/Constant Marginal Cost

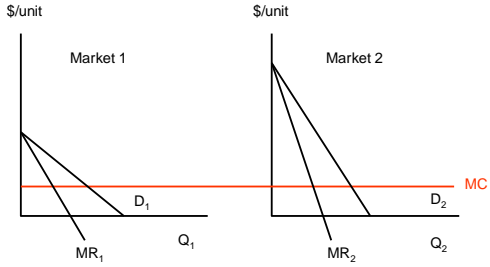


- In this case, we can simply apply monopoly theory that we already know
- In each market, choose an output such that marginal revenue equals marginal cost, then select a price from the market demand curve
- If the demand curves differ, then prices will differ.

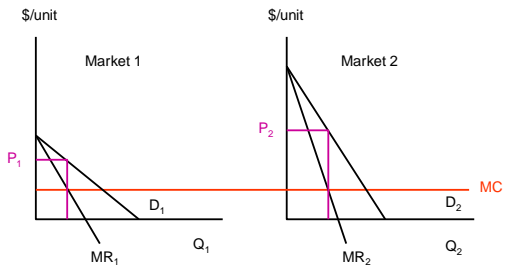
3rd Degree/Constant Marginal Cost



3rd Degree/Constant Marginal Cost



3rd Degree/Constant Marginal Cost



Recall: Optimal Markup



- The markup in each market will follow the condition we previously derived for a monopoly
- The higher price will be charged in the market in which the price elasticity of demand is lower.

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

More Generally



$$MR_1 = MR_2 = MC$$

- This is a necessary condition for profit maximization for a monopolist engaging in 3rd degree price discrimination
 - If MR differed in the two markets, one could always increase profit by transferring a unit of output from the low MR market to the high MR market
 - This condition holds when marginal costs are constant or not
 - The out-of-class presentation provides additional analysis of the case where marginal costs are not constant

Two-Part Tariff



- A two-part tariff is a similar pricing scheme
 - Instead of varying price over output ranges, the seller charges a fixed fee plus a constant marginal price.

Two-Part Tariff and Arbitrage



- Everyone pays the same marginal price under a two-part tariff
- Sometimes a two-part tariff is feasible when other nonlinear pricing schemes are not
 - A two-part tariff does not require the seller to be able to track the quantity bought by each customer, nor does it require that resale be prevented.
 - Under block pricing, sellers must be able to prevent buyers who have reached a lower priced block from reselling to those who have not.

Two-Part Tariff: All Customers Alike



- If all customers have identical demand curves, and if the seller knows the demand curve, a result equivalent to 1st degree price discrimination could be achieved

Diagram: All Customers Alike

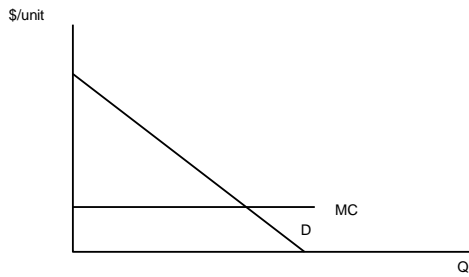


Diagram: All Customers Alike

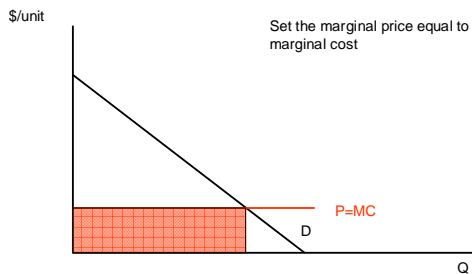
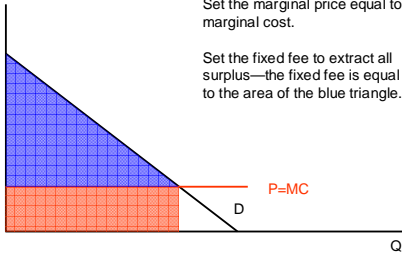


Diagram: All Customers Alike



\$/unit



Set the marginal price equal to marginal cost.

Set the fixed fee to extract all surplus—the fixed fee is equal to the area of the blue triangle.

Two-Part Tariff Again: Two Buyer Types

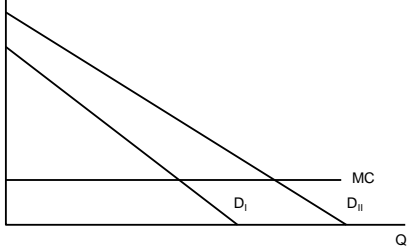


- Now assume that there are two types of customers
- The seller knows the demand curves for each type
- The seller cannot distinguish customers by type

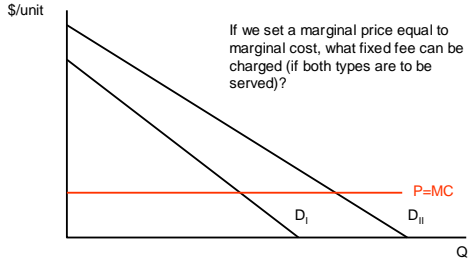
Two-Part Tariff: Two Demand Types



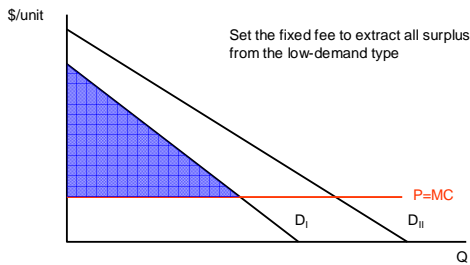
\$/unit



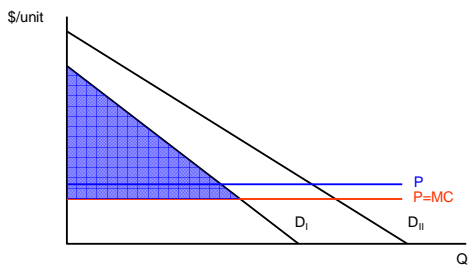
Two-Part Tariff: A Guess



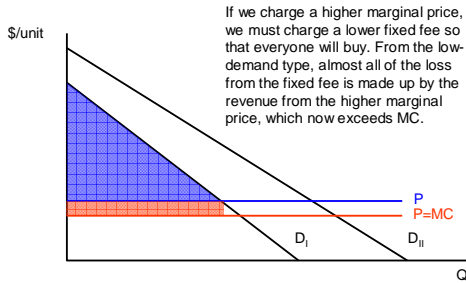
Two-Part Tariff: A Guess



Consider a Higher Marginal Price

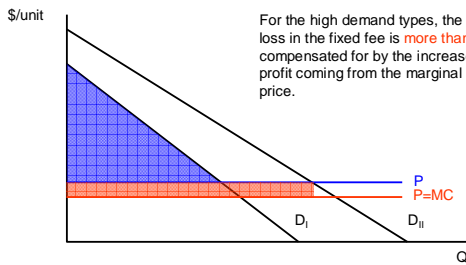


Consider a Higher Marginal Price



If we charge a higher marginal price, we must charge a lower fixed fee so that everyone will buy. From the low-demand type, almost all of the loss from the fixed fee is made up by the revenue from the higher marginal price, which now exceeds MC.

What About High-Demand Types?



For the high demand types, the loss in the fixed fee is **more than** compensated for by the increase in profit coming from the marginal price.

A Result



- When customers differ, the optimal two-part tariff will have a marginal price that exceeds marginal cost
 - The preceding example showed that raising the marginal price above marginal cost resulted in a very small loss for low-demand types, but a notable increase in profit for the high demand types
 - So a price above marginal cost will normally increase overall profit.
 - Example: printer ink.

Another Result



- The marginal price under the two-part tariff will be lower than the price charged by an ordinary monopolist charging a single price (and no fixed fee)
 - Consider the ordinary monopolist—from the optimum, a small decrease in price has a negligible impact on profit (because the profit function is flat at the optimum)
 - However, under a two-part tariff, that same small reduction in price would again have a negligible impact on profit from the marginal price, but the marginal price reduction would permit a non-negligible increase in the fixed fee
 - So a marginal price **lower** than the ordinary monopoly price will prevail under the optimal two-part tariff

The End