



ECON1001 Final Notes

Introductory Microeconomics (University of Sydney)



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Opportunity Cost and Scarcity

Opportunity Cost: Opportunity cost = The value of the next best alternative foregone = Explicit costs + Implicit costs

Marginal Analysis: If $MB > MC$, an agent is better off doing that activity
If $MB < MC$, an agent is worse off by doing it

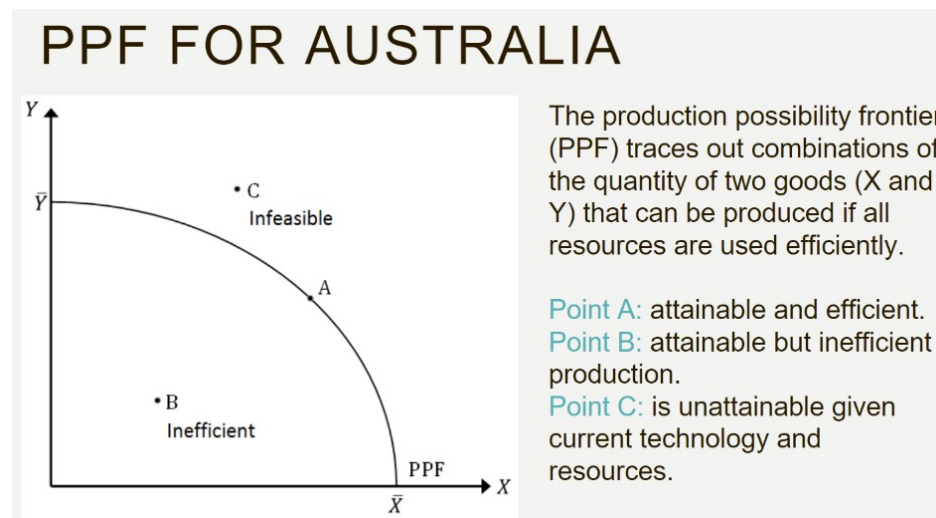
Gains from Trade

Trade = Economic interaction (where goods/services are exchanged)

Absolute Advantage: Party A has an absolute advantage over Party B in the production of a good if, for a given amount of resources, A can produce a greater number of that good than B.

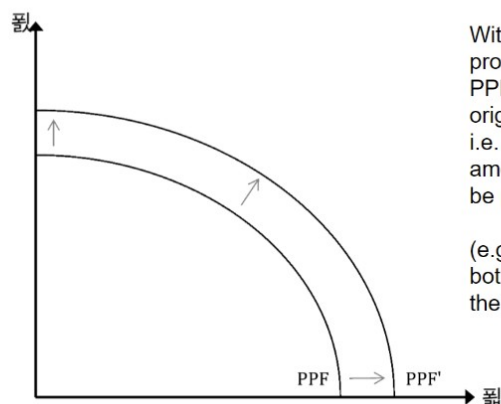
Comparative Advantage: Party A has a comparative advantage over Party B in the production of a good if A's opportunity cost of producing that good is lower than B's opportunity cost.

Production Possibility Frontier



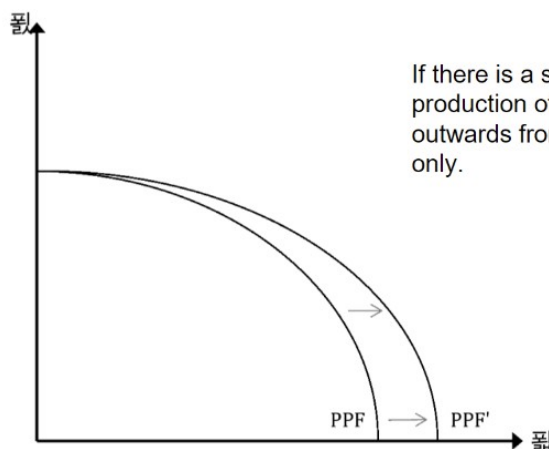
Slope of a PPF: The slope of the PPF measures the opportunity cost of producing an extra unit of a good (in terms of the other), for a particular point on the frontier.

CHANGES IN THE PPF



With a shock that boosts the production of both goods, the PPF will shift outwards from origin along both axes, i.e. increasing the maximum amount of both goods that can be produced.

(e.g. new technology used in both industries, an increase in the labour force, and so on).



If there is a shock that boosts the production of X only, the PPF will shift outwards from origin along the X-axis only.

Demand

Benefit and Willingness to Pay: Benefit from item = Willingness to pay (WTP)

Maximum price a consumer will pay for good = benefit they anticipate from getting the item ($P = MB$)

Total and Marginal Benefit: Total benefit = total benefit derived from consuming certain amount of g/s
Marginal benefit = extra benefit derived from consuming extra unit of g/s (diminishing)

Individual Demand: Individual demand curve = MB curve

Law of Demand: Holds that a consumer consumes fewer units when the price is higher

Movement Along Demand Curve: Change in P or Q only = movement along demand curve

- Movement downwards along demand curve = increase in quantity demanded

- Movement upwards along demand curve = decrease in quantity demanded

Change in Demand: Change in demand (change in factors other than P and Q) = Shift in demand curve

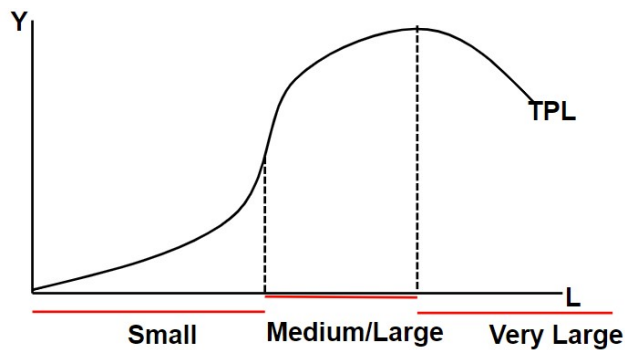
- Rightward shift = increase in demand
- Leftward shift = decrease in demand

Market Demand: Market demand curve = Horizontal summation of individual demand curves in market

The Firm

Production Function: $Y = A F(K, L)$ where Y is total output, K is capital, L is labour and A is the level of technology

Short Term Total Product of Labour:



Small amount of labour, more labour input = increasing returns

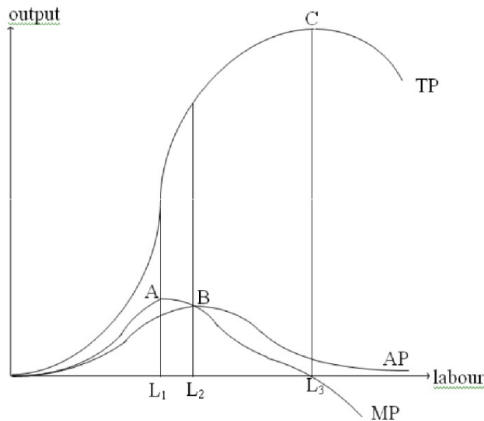
Medium-high amount of labour, more labour input = diminishing returns

Large amount of labour, output decreases

Average Product of Labour: $APL = \frac{Y}{L} = \frac{Q}{L}$ (average output each worker can produce)

Marginal Product of Labour: $MPL = \frac{\Delta Q}{\Delta L} = \frac{dQ}{dL}$ (additional output when employing additional worker; slope of production function)

Short Run Production Function:



MPL = APL when APL is maximised

When $MPL > APL$, average is increasing with L

When $MPL < APL$, average starts falling too with L

Output is Maximum When: $MPL = 0$ or $\frac{dQ}{dL} = MPL = 0$

Production in the Long Run

Returns to Scale:

Constant returns to scale = Output increases by the same proportional increase in inputs

Increasing returns to scale = Output increases by more than proportional to increases in inputs

Decreasing returns to scale = Output increases by less than proportional to increases in inputs

Economic Profit

Profit: Economic Profit = Revenues – Total Opportunity Cost

$$\pi = TR - TC$$

Total Revenue: TR = Amount a firm receives for the sale of its output

Total Cost: TC = Amount a firm pays to buy the inputs of production + forgone opportunities = total opportunity cost of producing goods/services

- Opportunity costs include
 - explicit costs (that are not sunk)
= direct payments for inputs or factors of production
 - implicit costs (value of foregone opportunities)

Short-Run Costs

Cost Function: $TC = f(q)$ where TC is total cost and q is quantity of output

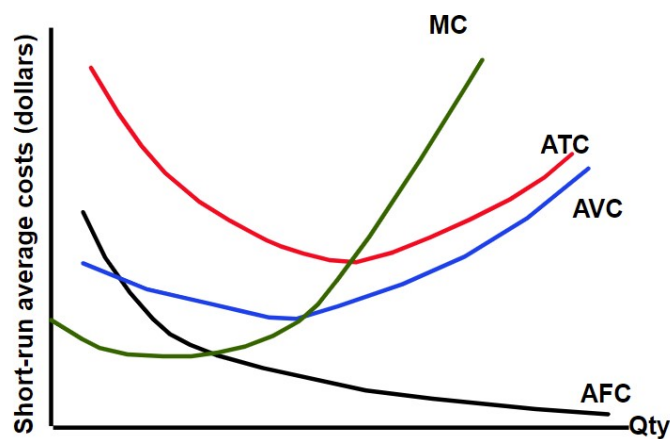
Total Costs in the Short Run: $TC = \text{Total fixed costs} + \text{total variable costs}$

Average Fixed Costs: $AFC = \frac{TFC}{Q}$

Average Variable Costs: $AVC = \frac{TVC}{Q}$

Average Total Costs: $ATC = \frac{TC}{Q} = AFC + AVC$

Relationship Between ATC, AVC and MC:



AFC declines as Q increases because the same amount of fixed costs is being spread over a larger number of units of output

AVC declines initially, reaches a minimum, then increases again. This is because of the LDR (MPL increases then, at a point, decreases again)

MC also declines sharply, reaches minimum, then increases sharply

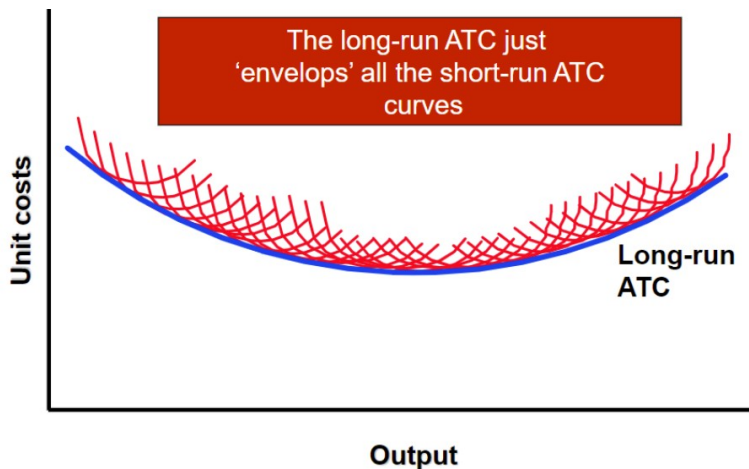
When $MC > ATC$, ATC increases

When $MC < ATC$, ATC falls

When $ATC = MC$, ATC is at its minimum

Long Run Costs

Long Run Average Cost: Long run ATC shows the lowest per-unit cost at which any output can be produced after the firm has had time to make appropriate adjustments, so long run ATC curve = lower envelope of all short-run ATC curves



Supply

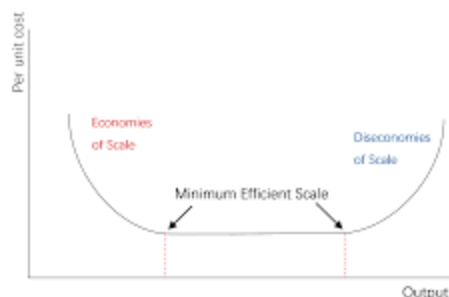
Economies of Scale: Factors that cause a producer's average cost per unit to fall → portion of LRAC curve that is increasing

Diseconomies of Scale: Forces that cause larger firms to produce goods and services at increased per unit costs → portion of LRAC curve that is decreasing

Returns to Scale and Economies of Scale:

- Increasing returns to scale = Economies of scale
- Decreasing returns to scale = Diseconomies of scale
- Constant returns to scale = Average cost of production is constant

Minimum Efficient Scale: MES = Smallest level of output at which firm can minimise long run average costs



Firm Supply: Supply curve = all combinations of (a) market price and (b) output quantities firm is willing and able to supply at that price

Produce one more good/service if $P > MC$ for next good/service

Do not produce one more good/service if $P < MC$ for next good/service

Profit maximising firm increases supply until $P = MC$

In short run, firms produce only when $P = MC \geq AVC$

Law of Supply: Holds that the higher the market price the higher quantity a firm is willing to supply.

Movement Along Supply Curve: Change in P or Q only = movement along supply curve:

- Movement downwards along supply curve means P has fallen, so decrease in quantity supplied
- Movement upwards along supply curve means P has risen, so increase in quantity supplied

Change in Supply: Change in supply (change in factors other than P or Q) = Shift in supply curve:

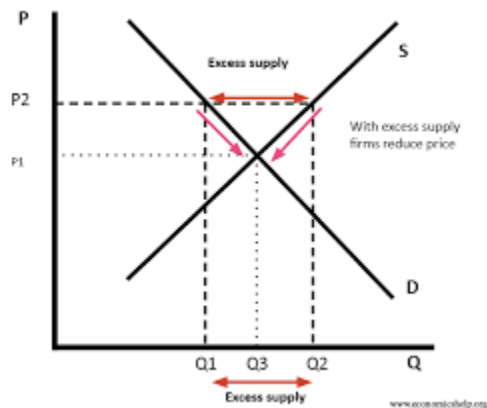
- Rightward shift = increase in supply
- Leftward shift = decrease in supply

Market Supply: Market supply curve = Horizontal summation of individual supply curves

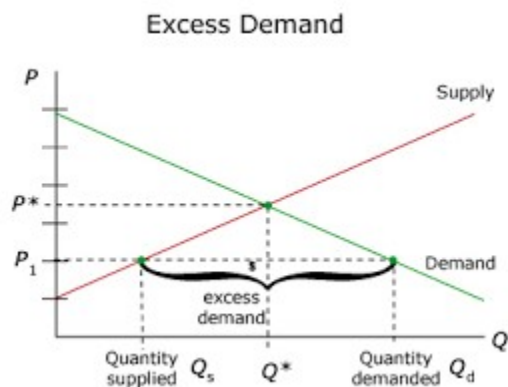
Market Equilibrium

Equilibrium: Market-clearing price (equilibrium price) = point where, at the market price, quantity demanded by consumers is equal to quantity supplied by firms

Excess Supply: Market price > Equilibrium price → Quantity supplied > Quantity demanded → Downward pressure on prices to bring market towards equilibrium



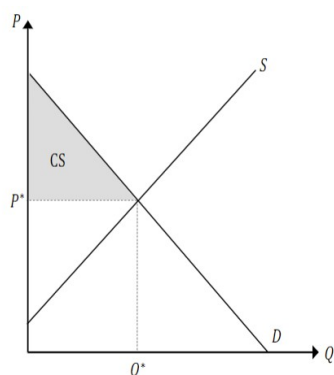
Excess Demand: Market price < Equilibrium price → Quantity demanded > Quantity supplied → Upward pressure on prices to bring market towards equilibrium



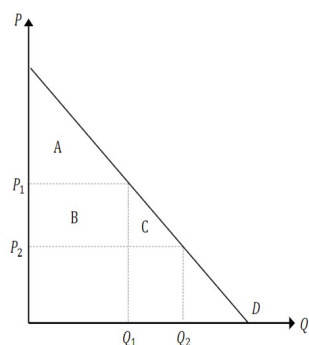
Comparative Static Analysis: Markets are affected by a change or event beyond the direct control of buyers or sellers in that market (shifts in demand or supply)

Welfare - The Benefit to Market Participants

Consumer Surplus: CS = Welfare consumers receive from buying units of a good or service = Consumer's willingness to pay – Price actually paid for it (for each unit bought) = Area underneath demand curve and above price line



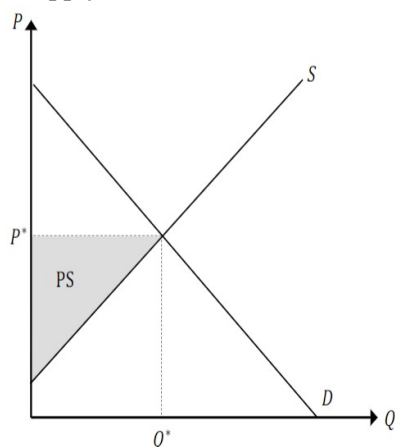
Change in CS With a Decrease in Price:



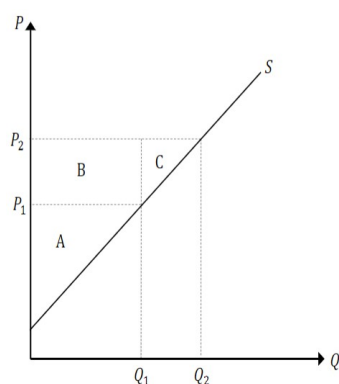
If price falls from P_1 to P_2 , CS increases from A to $A+B+C$, due to 2 reasons:

- (1) on all the units previously consumed, the difference between MB and price is now larger, increasing the net benefit from consuming each of these units (area B); and
- (2) the lower price now means that more units are purchased, generating an additional net benefit to consumers (area C).

Producer Surplus: PS = Welfare producers (firms) receive from selling units of good/service in market = Price producer receives – Cost of production (for each unit bought) = Area below the price line and above the supply curve



Change in PS With an Increase in Price:



When the market price increases from P_1 to P_2 , PS increases from A to $A+B+C$, again due to 2 reasons:

- 1) area B represents the increase in PS from an increase in the net benefit of selling units that would have been sold previously.
- 2) area C is the increase in PS from the sale of additional units.

Total Surplus: $TS = CS + PS$

Pareto Efficiency: Pareto efficient = Not possible to make someone better off without making someone worse off

Pareto efficient \neq If it is possible to reallocate resources and make someone better off without making someone worse off

Pareto efficient outcome maximises total surplus

Competitive Market Outcome and Efficiency: Outcome in market is Pareto efficient for all trades up to competitive market equilibrium (Q^*): $MB \geq MC$

Not Pareto efficient if $MC > MB$ (more than Q^* units are traded) or if fewer than Q^* goods are traded

Price mechanism ensure people who values goods highest get them and firms who produce cheapest make them

Elasticity of Demand

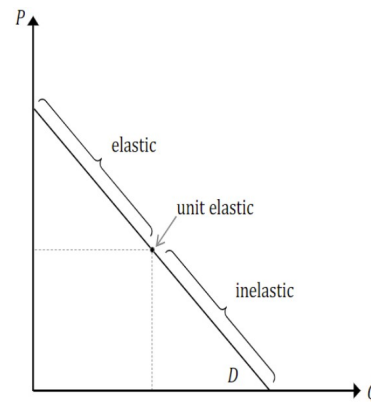
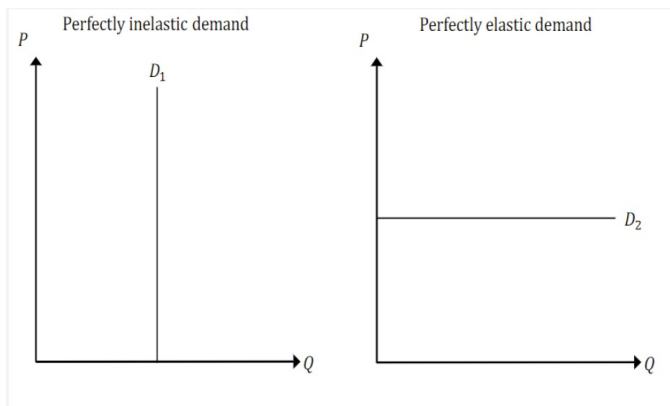
Elasticity: $\varepsilon = \frac{\% \Delta y}{\% \Delta x}$ (for 1% change in x there will be an ε change in y)

Own Price Elasticity (Point Method): $\varepsilon = \frac{dQ_D}{dP} \times \frac{P}{Q_D}$

Own Price Elasticity (Arc/Midpoint Method): $\varepsilon = \frac{\Delta Q_D}{\Delta P} \times \frac{P^m}{Q_D^m}$

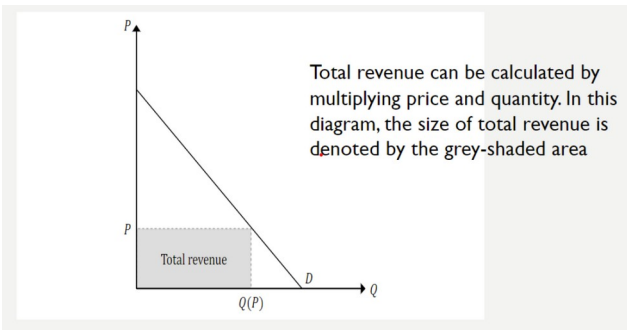
Interpretation of Price Elasticity of Demand:

- If $\varepsilon_D = 0$ demand is *perfectly inelastic* (for 1% change in price, there is no change in quantity demanded)
- If $-1 < \varepsilon_D < 0$ demand is *inelastic* (for 1% change in price, quantity demanded changes by less than 1%)
- If $\varepsilon_D = -1$ demand is *unit elastic* (for 1% change in price, quantity demanded changes by 1%)
- If $\varepsilon_D < -1$ demand is *elastic* (for 1% change in price, quantity demanded changes by more than 1%)
- If $\varepsilon_D = -\infty$ demand is *perfectly elastic* (for small increase in price, quantity demanded drops to 0)



Total

Revenue and Elasticity:



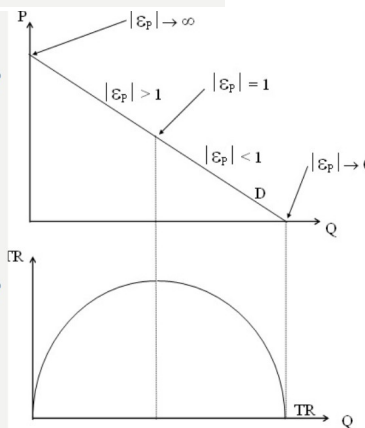
$$TR = p \times q$$

if $p \uparrow$ then $q \downarrow$ so what happens to TR?

- elastic demand ($\epsilon_p > 1$): $TR \downarrow$
- unitary elasticity ($\epsilon_p = 1$): TR constant
- inelastic demand ($\epsilon_p < 1$): $TR \uparrow$

if $p \downarrow$ then $q \uparrow$ so what happens to TR?

- elastic demand ($\epsilon_p > 1$): $TR \uparrow$
- unitary elasticity ($\epsilon_p = 1$): TR constant
- inelastic demand ($\epsilon_p < 1$): $TR \downarrow$



When demand is inelastic, price cut increases total revenue → TR maximised when demand is unit elastic (middle of demand curve)

Changes in Revenue and Elasticity:

$$\frac{dTR}{dP} = q \left(1 + \frac{P}{q} \cdot \frac{dq}{dP} \right) = q(1 + \epsilon_d)$$

For TR to increase with price increase, RHS must be positive. This will be true if and only if $1 < \epsilon_D < 0$ (demand is *inelastic*). If $\epsilon_D \leftarrow 1$, TR will fall when market price rises

On the elastic part of the demand curve (the upper part) the price needs to be lowered in order to increase total revenue. On the inelastic part of the demand curve (the lower part) the price needs to be raised to increase revenue. This means the total revenue is maximised when demand is unit-elastic, in the middle of the demand curve.

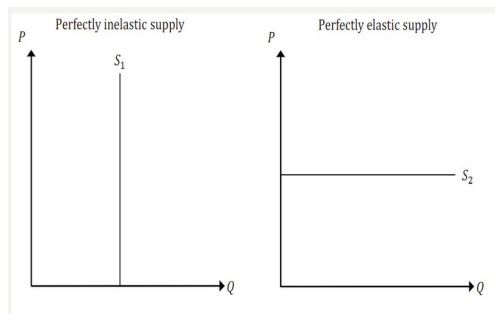
Elasticity of Supply

Own Price Elasticity (Point Method): $\epsilon = \frac{dQ_s}{dP} \times \frac{P}{Q_s}$

Own Price Elasticity (Arc/Midpoint Method): $\epsilon = \frac{\Delta Q_s}{\Delta P} \times \frac{P^m}{Q_s^m}$

Interpretation of Price Elasticity of Supply:

- If $\epsilon_S = 0$ supply is *perfectly inelastic* (for 1% change in price there is no change in quantity supplied)
- If $0 < \epsilon_S < 1$ supply is *inelastic* (for 1% change in price, the change in quantity supplied is less than 1%)
- If $\epsilon_S = 1$ supply is *unit elastic* (for 1% change in price, quantity supplied changes by 1%)
- If $\epsilon_S > 1$ supply is *elastic* (for 1% change in price, quantity supplied changes by more than 1%)
- If $\epsilon_S = \infty$ supply is *perfectly elastic* (for small decrease in price, quantity supplied drops to 0)



Cross-Price Elasticity

Cross-Price Elasticity (Point Method): $\epsilon_{AB} = \frac{dQ_A}{dP_B} \times \frac{P_B}{Q_A}$

Cross-Price Elasticity (Arc/Midpoint Method): $\epsilon_{AB} = \frac{\Delta Q_A}{\Delta P_B} \times \frac{P_B^m}{Q_A^m}$

Interpretation of Cross-Price Elasticity:

- If $\epsilon_{AB} < 0$, an increase in the price of Good B is associated with a fall in the quantity demanded of Good A (at a given price of Good A) → Goods A and B are *complements*
- If $\epsilon_{AB} > 0$, an increase in the price of Good B is associated with an increase in the quantity demanded of Good A (at a given price of Good A) → Goods A and B are *substitutes*
- If $\epsilon_{AB} = 0$, an increase in the price of Good B is not associated with any change in the quantity demanded of Good A (at a given price of Good A) → Goods A and B are *independent*

Income Elasticity

Income Elasticity (Point Method): $\eta = \frac{dQ}{dY} \times \frac{Y}{Q}$

Income Elasticity (Arc/Midpoint Method): $\eta = \frac{\Delta Q}{\Delta Y} \times \frac{Y^m}{Q^m}$

Interpretation of Income Elasticity:

- If $\eta < 0$, demand decreases when income rises → *inferior good*
- If $\eta = 0$, demand is invariant to changes in income → *neutral good*
- When $0 < \eta \leq 1$, if income rises by 1%, demand for the good increases by no more than 1% → *normal good*
- If $\eta > 1$, if income rises by 1%, demand for the good increases by more than 1% → *luxury good*

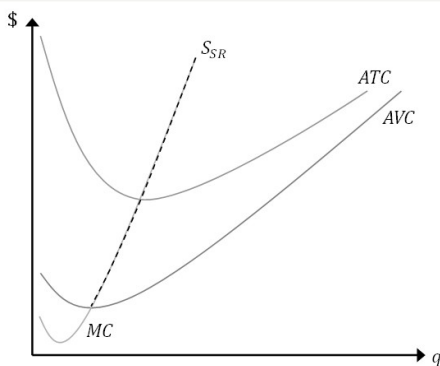
Perfect Competition

Short-Run: Number of firms = fixed ∴ inputs = fixed

Supply in the Short Run: Supply curve = MC curve
If $q = 0$ in SR, firm shuts down

The Short-Run Supply Decision for a Firm: Shut-down condition: $TR < TVC$
or $P < \min AVC$

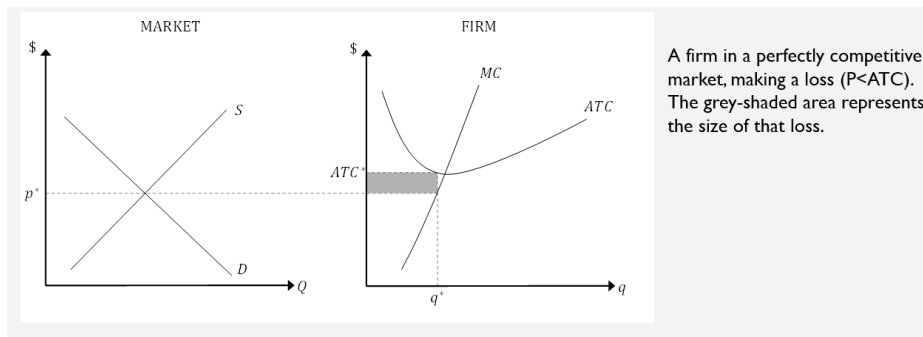
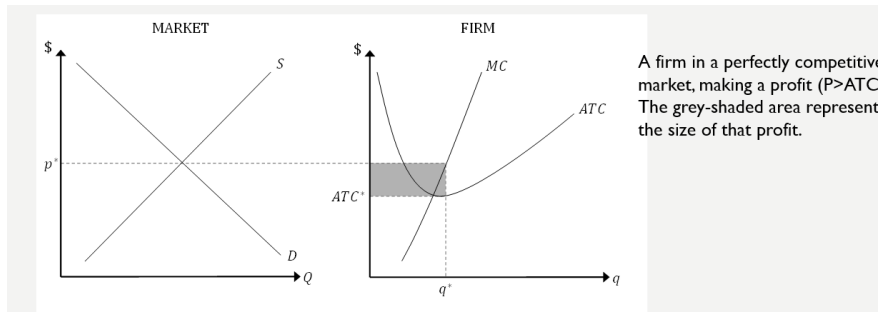
Alternatively, a firm will supply positive quantity provided $P \geq \min AVC$



Market Supply in Short Run: Market supply curve = Horizontal summation of individual supply curves

Profits and Losses in the Short Run: Economic loss: $P < ATC$
Economic profits: $P > ATC$
Economic profit = Difference between P and ATC at Q supplied

Firm willing to sell in SR when making loss provided $P \geq AVC$



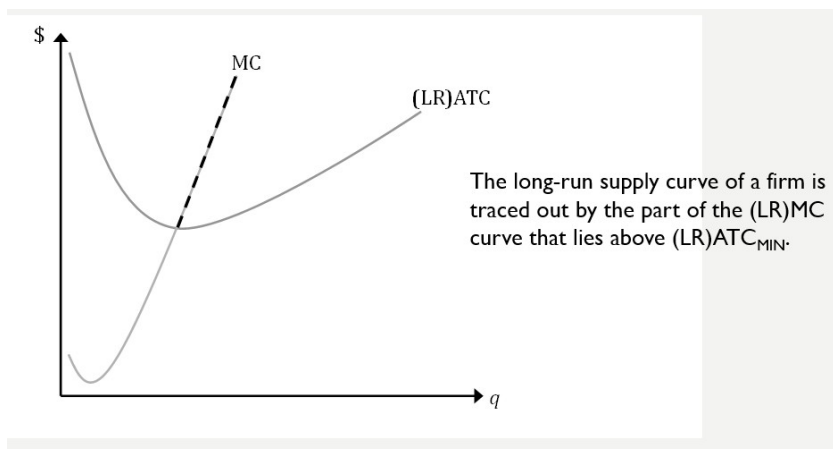
Long-Run: Number of firms = Variable \because Inputs = Variable

Supply in the Long Run: Firm enters or exits depending on anticipated level of economic profit or loss
 Long-run equilibrium = No longer any entry into or exit from the market
 = Firms are making zero (economic profits)

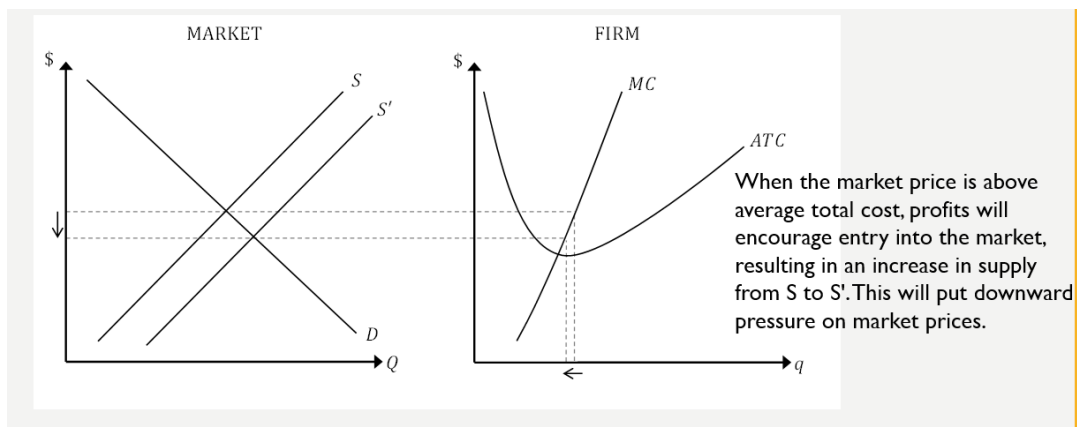
Long Run Exit/Entry Decision: Exit if $P < \min ATC$

Hence, firm's LR supply curve = Section of LR MC above LR min

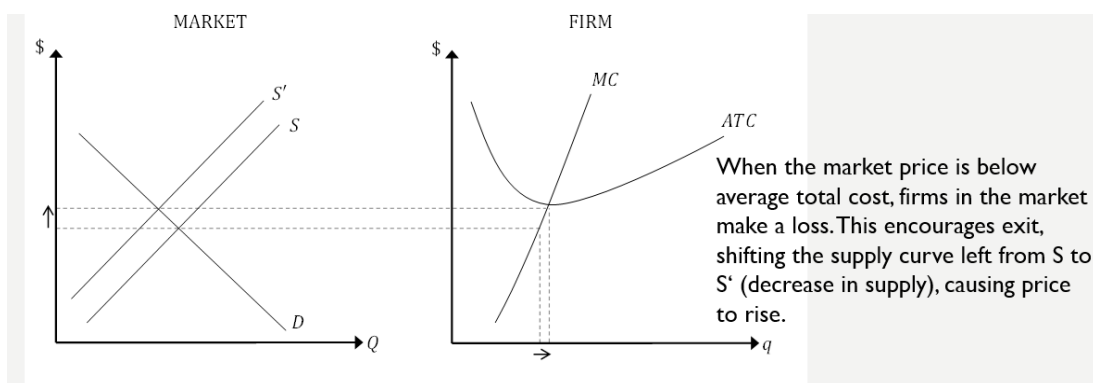
ATC



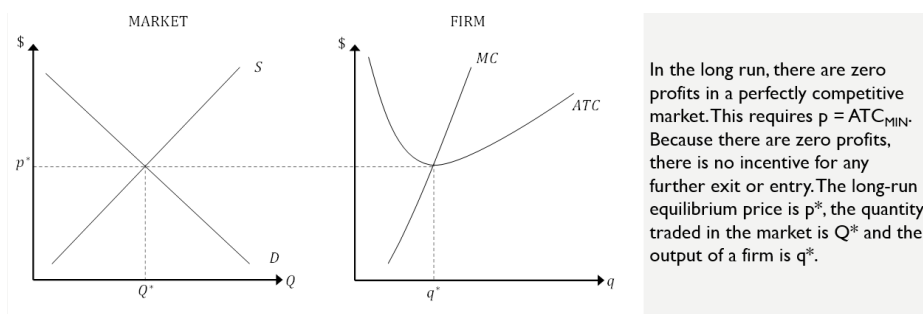
Potential Profit Induces Entry:



Losses Induces Exit:

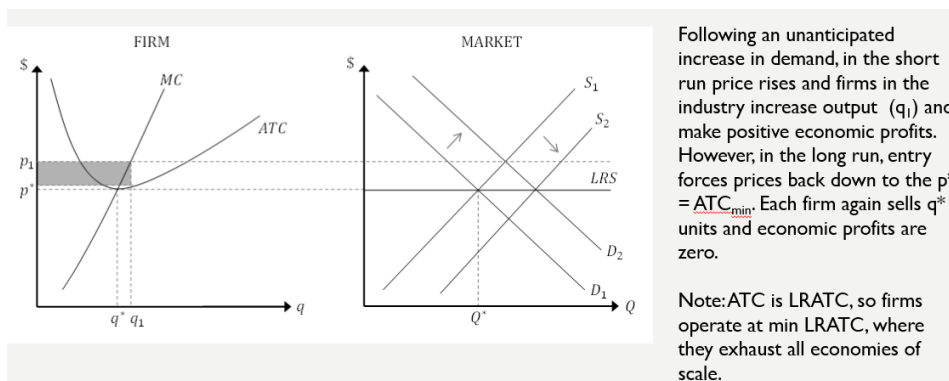


Long-Run Equilibrium:

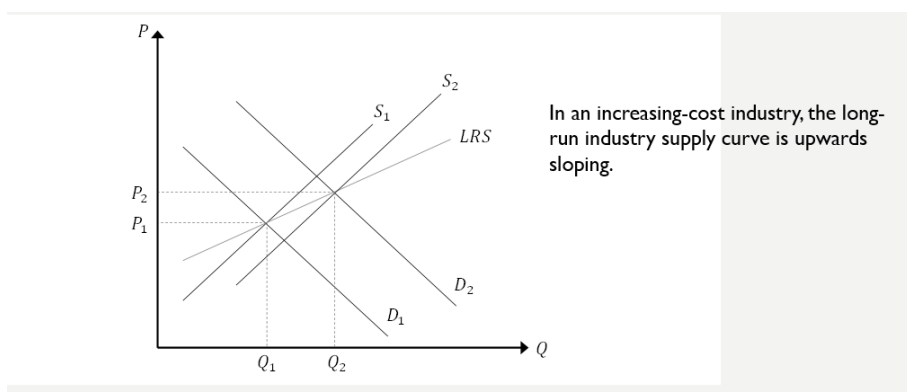


Market Supply Curve in the Long-Run: LR industry supply curve = Horizontal at min ATC
 Constant-cost industry
 = industry with perfectly elastic LR market supply curve

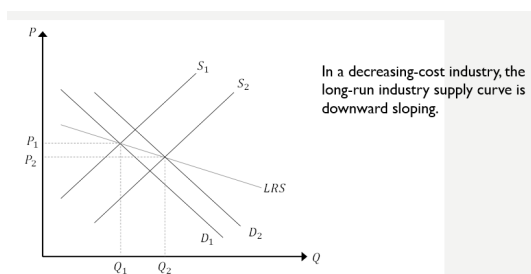
Dynamics in the Long-Run:



Increasing-Cost Industry: Increasing-cost industry = Industry with upward sloping LR supply curve (potential entrants have higher costs than incumbent firms; resources used in production are limited, raising costs for all firms; and congestion may rise with industry output)



Decreasing-Cost Industry: Decreasing-cost industry = Industry with downward sloping LR supply curve



Monopoly

Characteristics of a Monopoly: Monopoly = Market with single seller

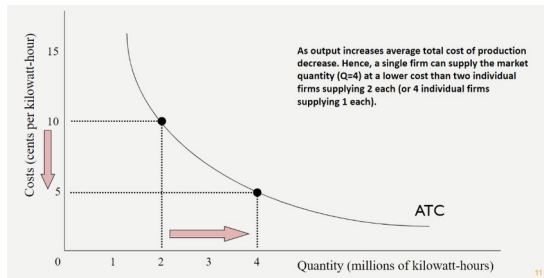
One seller, many buyers

Monopolist has market power (price maker)

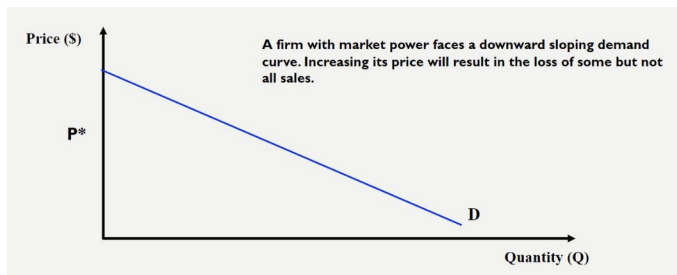
Barriers to entry (legal and natural)

Natural Monopoly: Natural monopoly = Situation where single firm can supply entire market at lower cost than two or more firms could supply that market

Declining (LR) ATC implies natural monopoly:



Market Power: Market power = Firm can raise its prices above the level that would exist in a perfectly competitive industry and not lose all its customers



Monopoly Pricing Strategies: Single-price monopolist = Firm that must sell each unit of its output for same price (monopolist chooses quantity and price to maximise profit)

Price discrimination = Practice of selling different units of g/s for different prices (monopolist sets variety of prices for profits)

Single-Price Monopolist: Faces all demand in market:

- Faces downward sloping market demand curve
- Market power (inelastic demand)
- Chooses price (or quantity)

Can alter price in market by changing quantity:

- If it increases output by one unit the price will fall by some amount:
 - ◆ if produce more, price falls
 - ◆ if produce less, price rises
- *Tradeoff*: Sell less Q for higher P or vice versa

Monopolist and Marginal Revenue: MR incorporates two effects:

- (i) *Output effect*: Selling more units means obtaining extra revenue from additional units sold; and

(ii) *Price effect*: Selling more units means price falls and you lose revenue and existing units sold

$$MR \neq P \rightarrow MR < P$$

$$TR = P \times Q$$

$$AR = TR / Q$$

$$MR = \Delta TR / \Delta Q$$

MR decreases as quantity increases

$$MR < P = AR$$

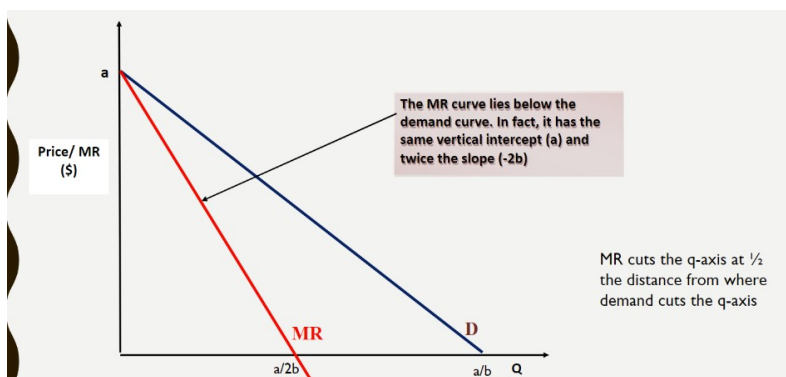
Deriving MR from Monopolist's Demand Curve:

$$MR = \frac{dTR}{dq} = a - 2bq$$

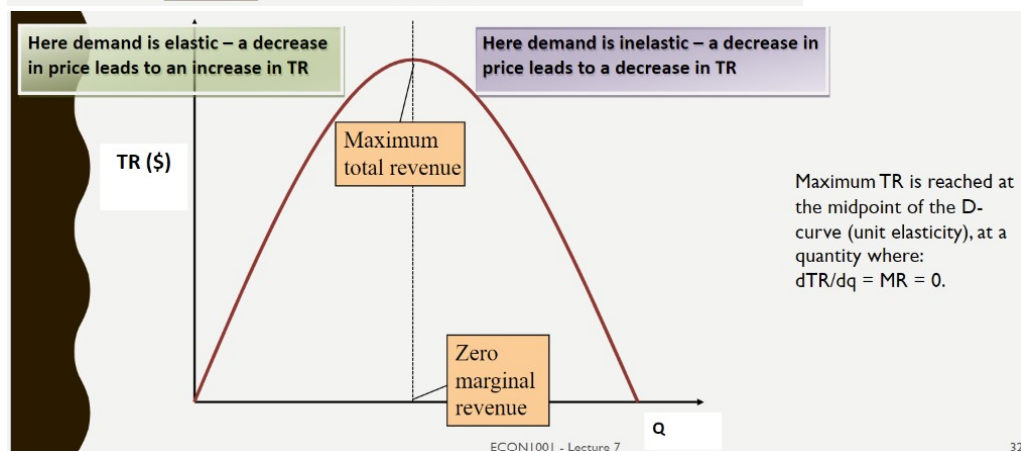
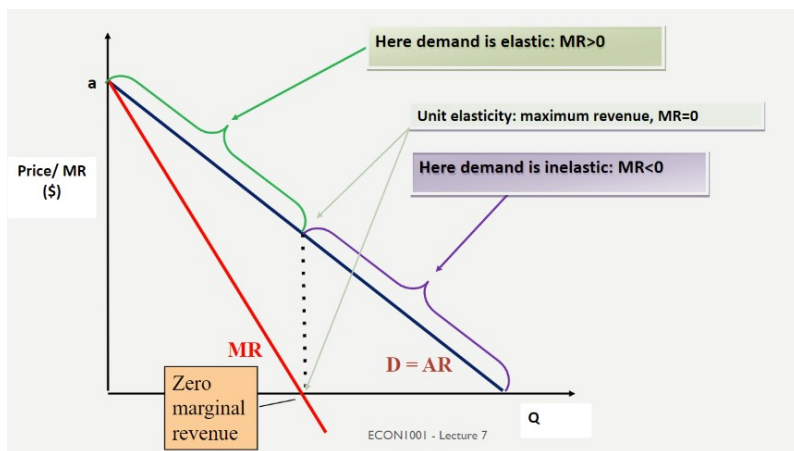
Interpretation:

- MR has same vertical intercept as the demand curve (at a); and
- MR is linear and has twice the slope of demand curve: the MR curve has slope of $-2b$ whereas demand curve has slope of $-b$

Monopolist's Marginal and Average Revenue:



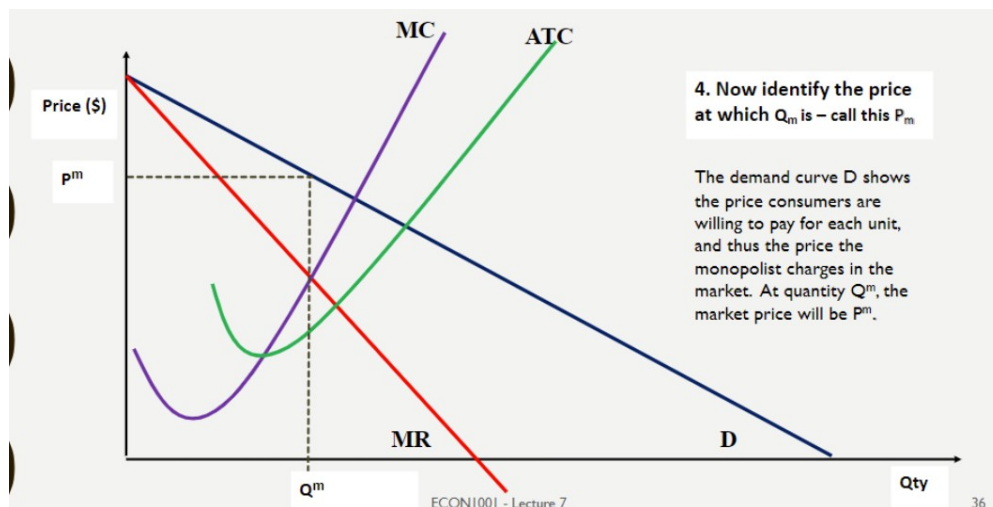
Marginal Revenue and Elasticity:



Monopoly and Profit Maximisation: Profits maximised when $MR = MC$:

- If $MR > MC$, monopolist can increase profit by selling one extra unit
- If $MR < MC$, profit falls from selling last unit; monopolist would be better off not selling it

Monopoly Output and Price:



Monopoly Profits:

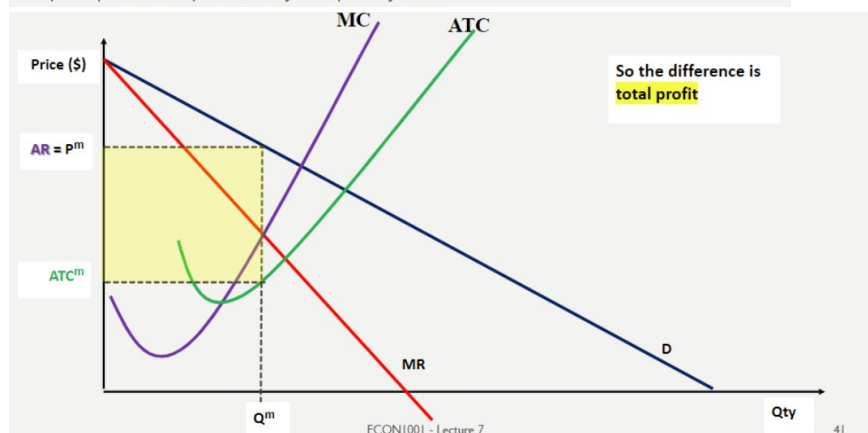
- The monopolist's profit is

$$\begin{aligned}\pi &= TR - TC \\ &= (TR/q - TC/q) \cdot q\end{aligned}$$

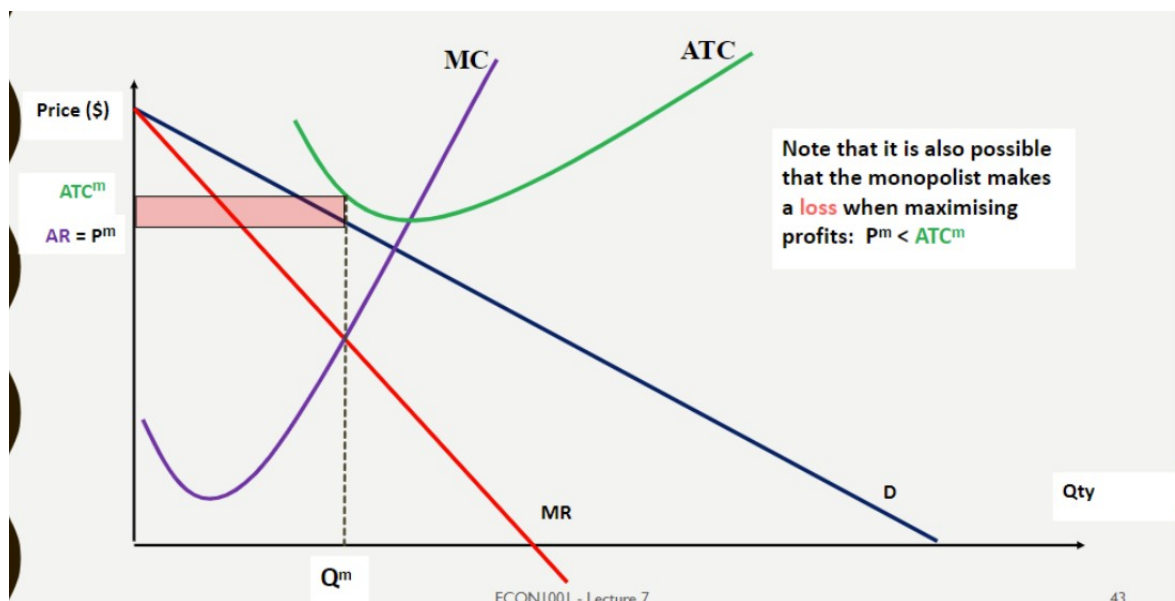
- As before $TR/q = AR = P$; $TC/q = ATC$, so

$$\begin{aligned}\pi &= (AR - ATC) \cdot q \\ &= (P - ATC) \cdot q\end{aligned}$$

- $(P - ATC)$ is the profit per unit sold, q is the quantity sold; profit is then the average profit per unit output times by the quantity sold

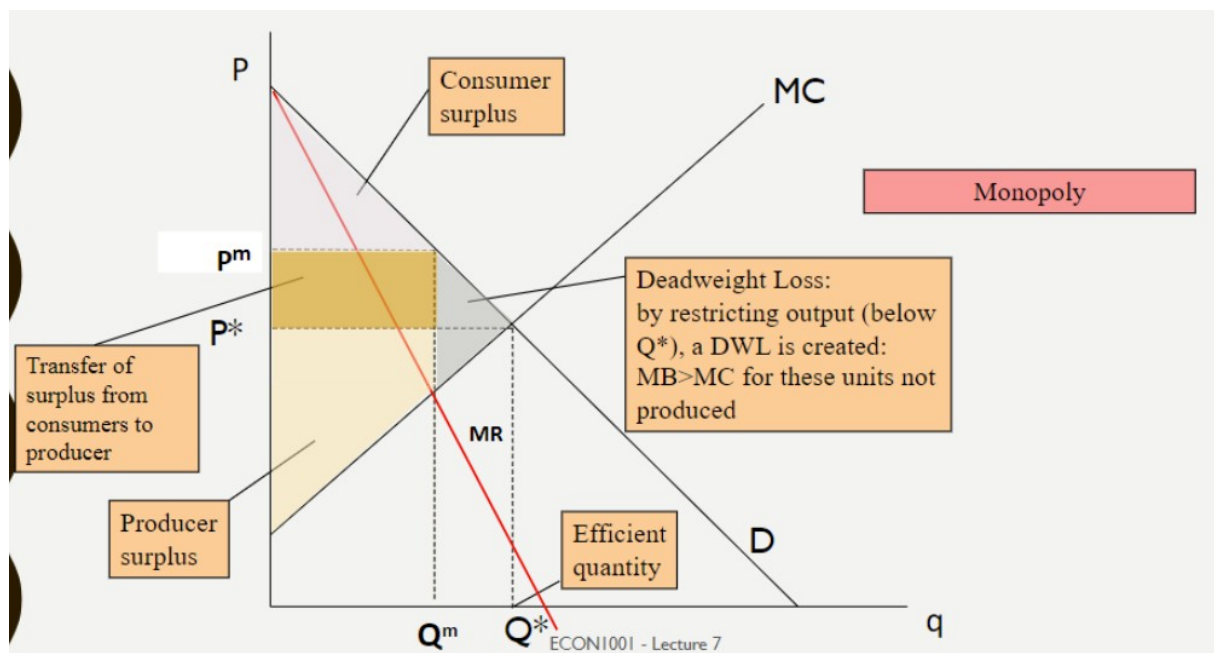


Monopoly Loss:



Welfare/Efficiency in Monopoly: Monopolist produces where $MR = MC$:

- For every level of output $MR < MB = P$
- Monopolist restricts output to $Q^m < Q^i$
- Surplus \neq Maximised
- Monopolist creates wedge, like tax, between consumer's WTP and producer's costs = Deadweight loss



Deadweight Loss: $DWL = \text{Loss in total surplus compared to efficient outcome } Q^*$

Higher prices = Transference of surplus from consumer to producers

= Reduction in output causing DWL

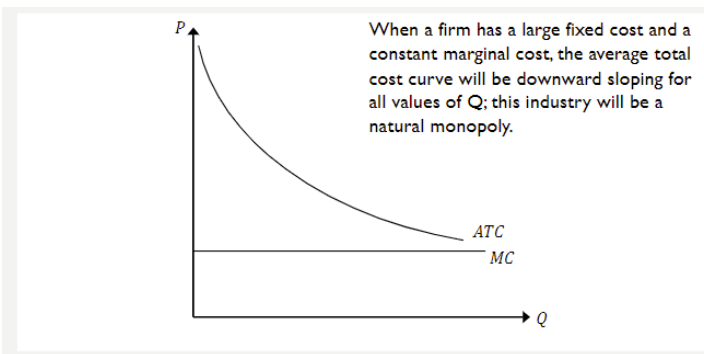
Public Policies Towards Monopolies: Australian Competition and Consumer Commission (ACCC):

- Cartels (price-fixing agreements) illegal
- Oppose mergers
- Misuse of market power

Price regulation:

- Regulate price of monopolist
- Two basic forms: MC price regulation; ATC price regulation

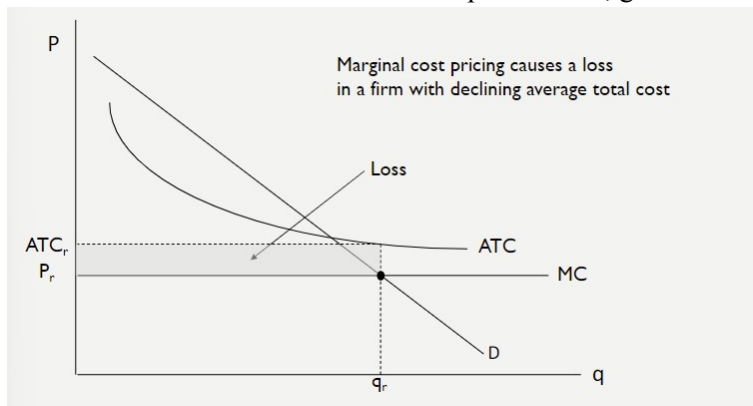
Natural Monopoly:



Marginal Cost Price Regulation: Under regulation, government sets monopoly price at $P = MC$ ($DWL = 0$)

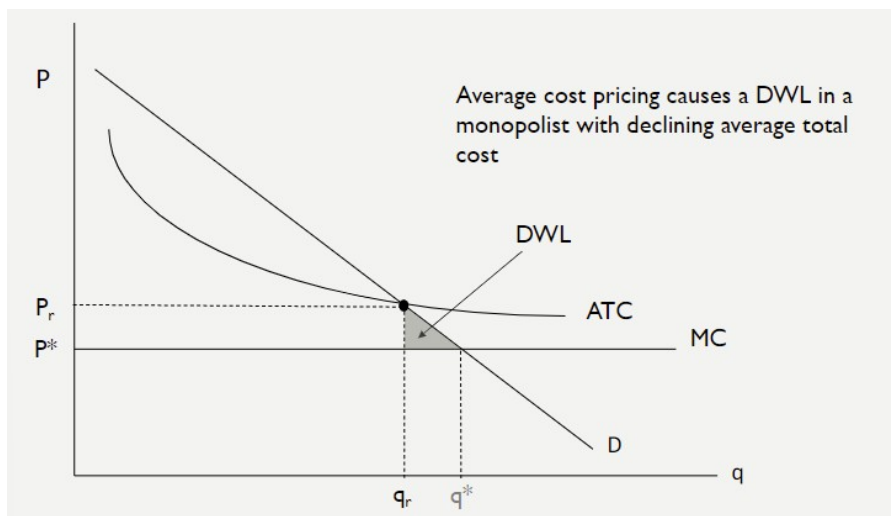
This causes economic loss (equal to grey area and fixed costs), meaning monopolist will exit market when it can

To prevent this, government subsidises monopolist that amount



Average Cost Price Regulation: Under regulation, $P = ATC$

However, monopolist produces $<$ efficient quantity (does not produce where $MB = MC$), so there is still DWL (which is nevertheless reduced)



Price Discrimination

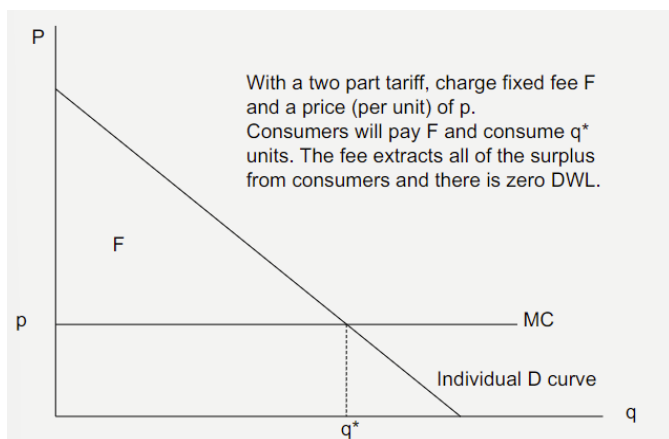
First-Degree (or Perfect) Price Discrimination: First degree price discrimination = Monopolist knows each consumer's willingness to pay and charges each consumer exactly their willingness to pay = Extracts all of consumer surplus (monopolist gets all surplus in transaction) = sells to all consumers with $WTP \geq MC$: all mutually beneficial trades take place, thus NO DWL

Two-Part Tariff: Two part tariff charges consumers two fees:

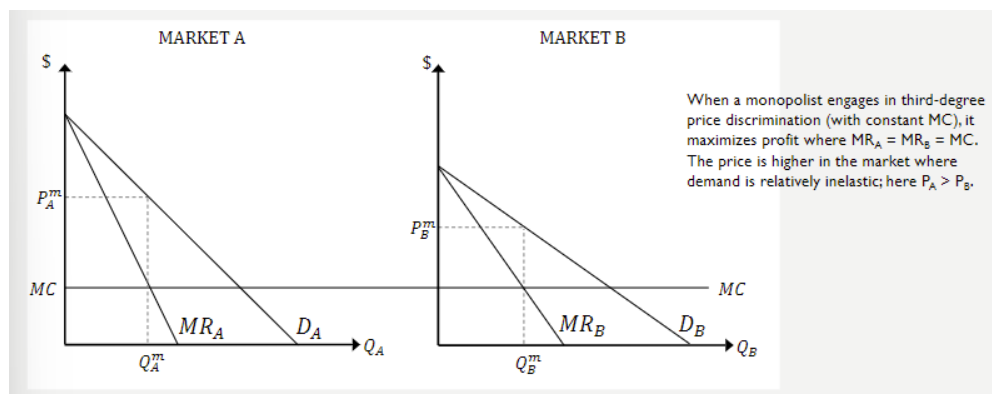
- (i) A fixed fee F (access fee, membership or joining fee, price of essential element of product)
- (ii) A per-unit fee p (fee per unit that consumer consumes)

To profit maximise:

- (i) monopolist sets per unit price $P = MC$; and
- (ii) charges all potential consumer surplus as fixed fee F



Third-Degree Price Discrimination: Third-degree price discrimination = Monopolist separates consumers into 'markets', charges different price in each market = Charge a higher price to the more price-inelastic segment of the market (segment with higher WTP) = Equating $MR = MC$ in each market and charging market-specific monopoly price to each group



Second-Degree Price Discrimination: Second-degree price discrimination = Consumers have different WTP, but this is unobservable to monopolist = Sorting different consumers by offering different packages/versions of a good = Consumers choose (or self-select into) a package based on WTP

Monopolistic Competition

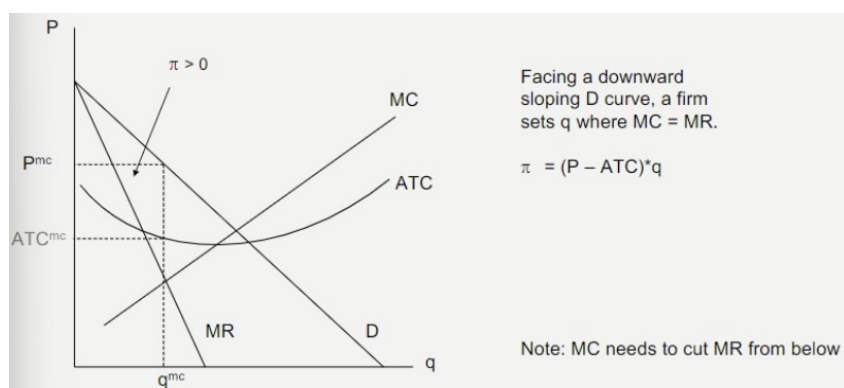
Monopolistic Competition: Monopolistic competition = Market structure in which many firms sell products that are similar but not identical (heterogeneous products) = Many sellers = Product differentiation (each firm faces downward sloping D – some market power; not a price taker – but this demand is rather price elastic) = Free entry and exit of firms in LR (economic profit is zero in LR)

Monopolistic Competition in the Short Run: Profit maximising rule: $MR = MC$

Price determined by demand curve

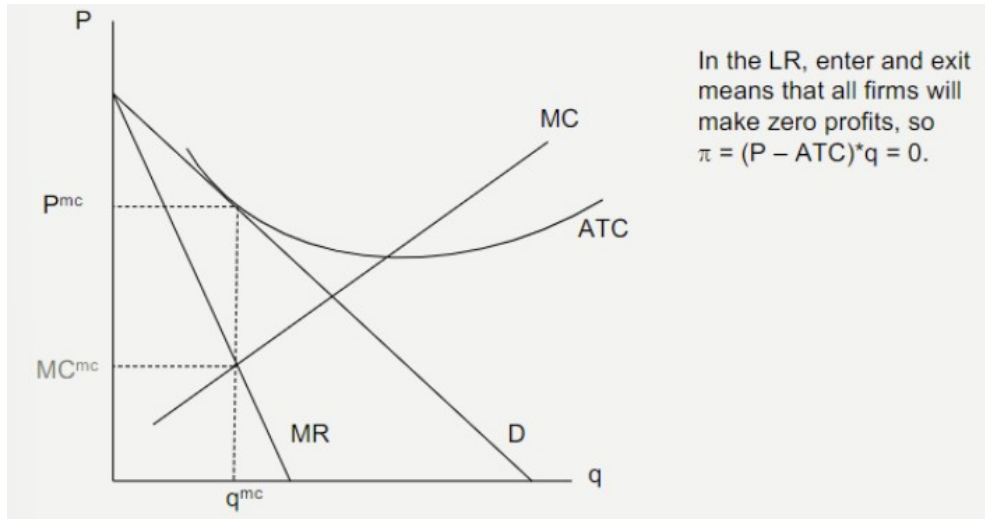
Can earn SR economic profit

Firm produces < capacity: lower output than the level that minimises ATC



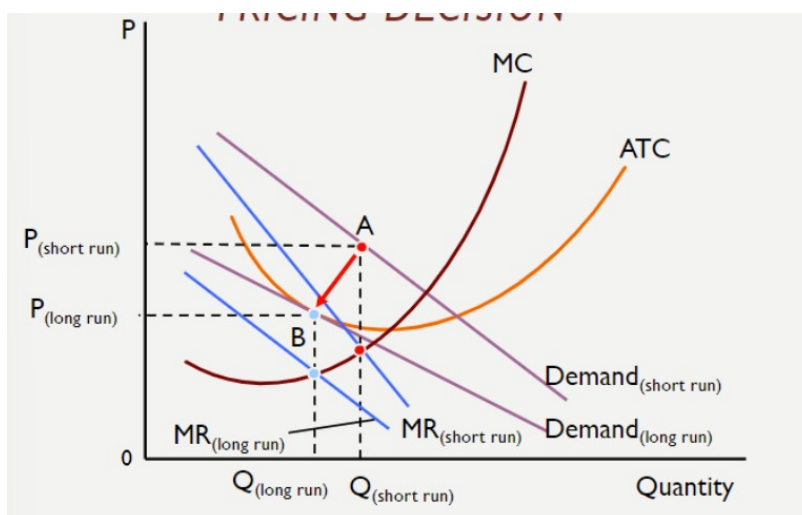
Monopolistic Competition in the Long Run: Profits provide incentive for new firms to enter
 → increase in supply of differentiated products in market → Reduces demand for all incumbent firms (entry shifts firm's demand curve leftward) → Continues until zero economic profits

In LR, if firms are making losses, firms will leave industry → Decrease in supply of differentiated products in market → Increases demand for all incumbents (demand shifts rightward) → Continues until no more economic losses



- Demand just touches ATC curve – curves are tangent
- D and ATC curves must be tangent once entry + exit has driven profit to zero
- Profit per unit = Difference between price (or AR found on demand curve) and ATC
- Maximum economic profit is zero only if these curves are tangent

Dynamics – Long-Run Output and Pricing Decision:



A Monopolistically Competitive Firm in the Long Run: In LR:

→ $P > MC$

- ◆ Profit maximisation occurs when $MR = MC$, and as each firm faces downward sloping demand curve, MR is less than price

→ $P = ATC$

- ◆ Because of free entry and exit economic profits are driven to zero

Comparison Between Monopolistic Competition and Perfect Competition

Higher Average Costs: In monopolistic competitive market in LR, firm produces where $P = ATC$ (zero profits)

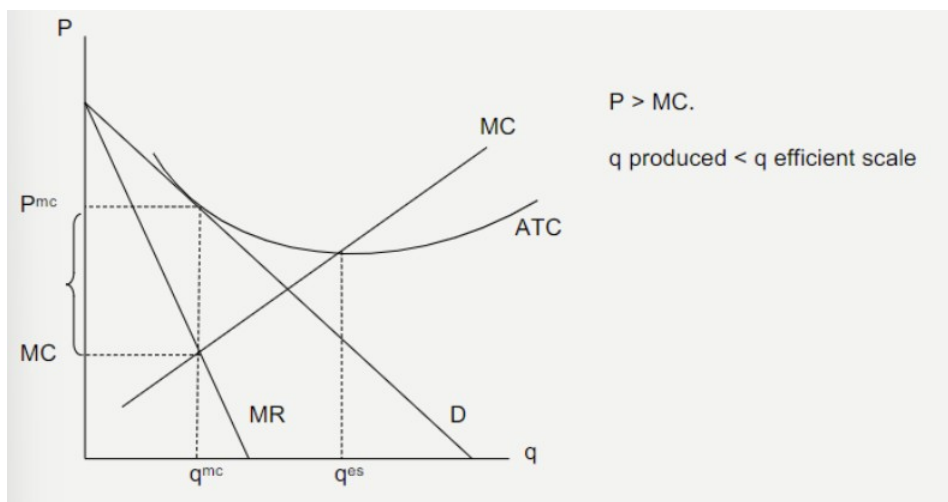
This point must be leftward of min ATC (efficient scale because firm produces where $MC = MR < P$)

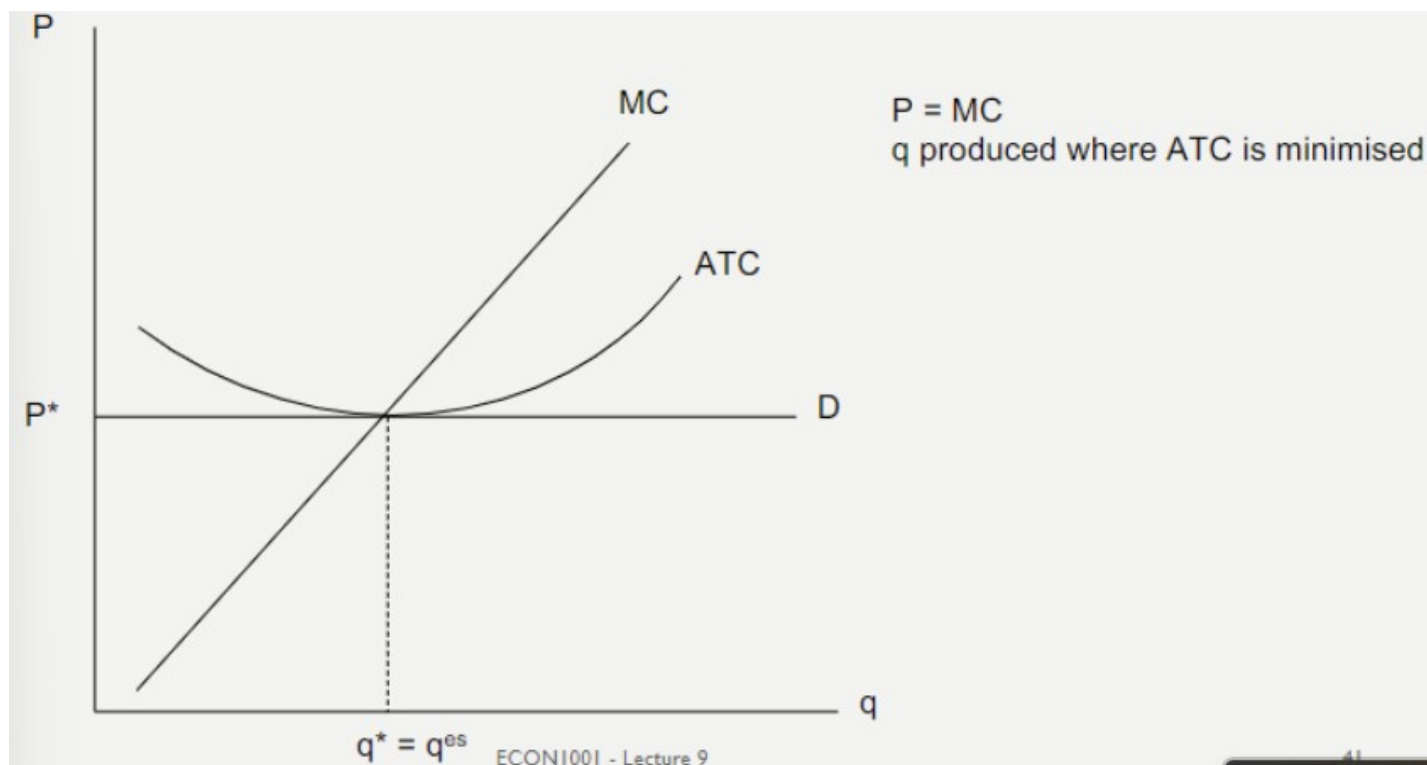
Monopolistic competitive firm produces at downward-sloping portion of ATC

In LR, ATC are not minimised with monopolistic completion

Mark-up Over Marginal Cost: For monopolistic firm $P > MC$ → Consistent with free entry and zero economic profit

As monopolistic competitive firm produces on downward sloping section of ATC, $MC < ATC$. Thus, since $P = ATC$: $P > MC$





Welfare in Monopolistic Competition: Inefficiency arises because $P > MC$, causing DWL (hard to regulate because so many different firms and products + firms facing regulation that reduces price will require subsidy)

Welfare Implication of Monopolistic Competition: *Product-variety:*

- Consumers enjoy wide range of products
- Increase CS, not all of which is captured by firm

Business-stealing effect:

- Firm does not consider that its entry takes customers away from incumbent firms
- Switching consumers between firms does not necessarily increase surplus, but it involves society bearing another firm's fixed costs of production

First effect suggests entry will be too low; second effect suggests entry will be too high (from welfare perspective, may be too many or too few firms in monopolistically competitive industry)

Review of Perfect Competition

• Perfect competition

1. Many sellers (and buyers)
2. Identical products
3. Free entry and exit in the long run

Firms are price takers

- maximise profit where $P = MC$ (here $P = MR$)
- the MC curve is the supply curve for the firm

In the short run – supply where $P = MC$ provided $P > AVC$

In the long run – supply where $P = MC$ provided $P > ATC$

In the short run – no entry or exit (but firms can shutdown)

Market supply is the horizontal summation of individual MC curves (above AVC)

In the long run, free entry and exit

Profit seeking means $\pi = 0$

- this implies $P = ATC$; remember $\pi = (P - ATC) \cdot q$
- Long-run firm supply curve is its (long-run) MC, where $P \geq ATC$

In the long run supply perfectly elastic at the efficient scale

Review of Monopoly

• Price discrimination

1. Perfect price discrimination

Charge consumer marginal benefit for every unit

Supply until $MB = MC$ (i.e., the efficient level of production)

Monopolist captures all available surplus – no DWL

Two part tariff can also capture all surplus

- set a fixed fee equal to consumer surplus at efficient consumption level, and charge $P=MC$ per unit.
- again, no DWL

2. Other types of price discrimination do generate a DWL

Review of Monopolistic Competition

• Monopolistic competition

1. Many sellers
2. Differentiated products
3. Free entry and exit

Because of differentiated products, each firm faces a downward sloping demand curve – maximises profit at $MR = MC$ (note, like a monopoly, $P > MR$)

With free entry, in the long run, $\pi = 0$

Note in the LR, $P = ATC > MC$ monopolistic comp does not minimise ATC (unlike competition)

Is level of entry **inefficient**?

Entry is determined by a firm's profits, not by society's welfare

(a) entry benefits society by increasing the range of products available to consumers (product-variety effect)

(b) entering firm steals business from other firms (this is a transfer, not an increase in total welfare), while an additional sunk cost might have to be incurred (business stealing effect)

So, in monopolistic competition, entry can be too low or too high as compared with the efficient level.

Game Theory, Oligopoly

Characteristics of an Oligopoly: Oligopoly = Market that contains small number of firms

Price making; barriers to entry; and product differentiation

Strategic interaction (game theoretic models)

Simultaneous-Move Games: Game = Strategic situation with two or more players

Simultaneous-move game = Game in which each player chooses action without knowing actions chosen by other players

Nash-Equilibrium: NE = Both players playing best response (neither player has a strictly profitable unilateral deviation to a different action)

= Players play dominant strategy (does not maximise payoff)

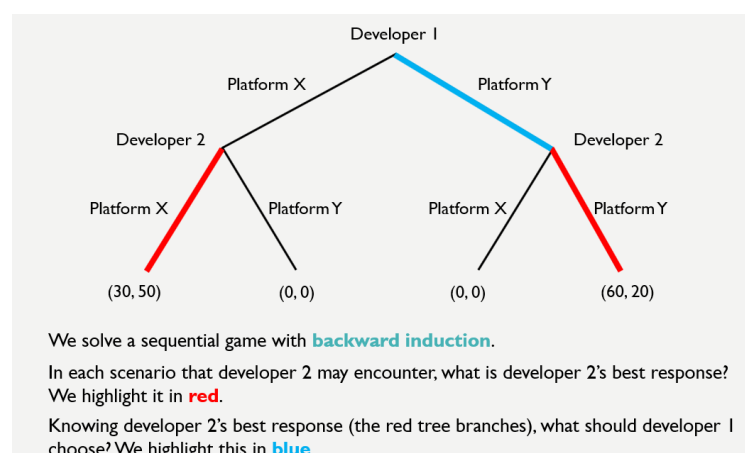
= Predict all the stable outcomes that are immune to one-sided deviations.

Coordination Game: $NE > 1$

Lessons from Coordination Games on Product Choice: Firms offer either minimal or maximal product differentiation in oligopoly

Avoiding Coordination Failures: Pre-game communication; social norm or customs to anticipate; move sequentially

Sequential Games:



Advantages: First-mover advantage = Mover chooses equilibrium it prefers

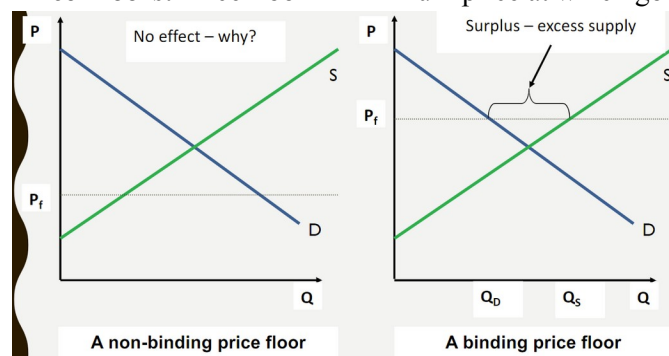
Second-mover advantage = Mover reaps benefits of first-mover investment or risk

Market Failure and Government Intervention

Sources of Market Failure: Market inefficiency:

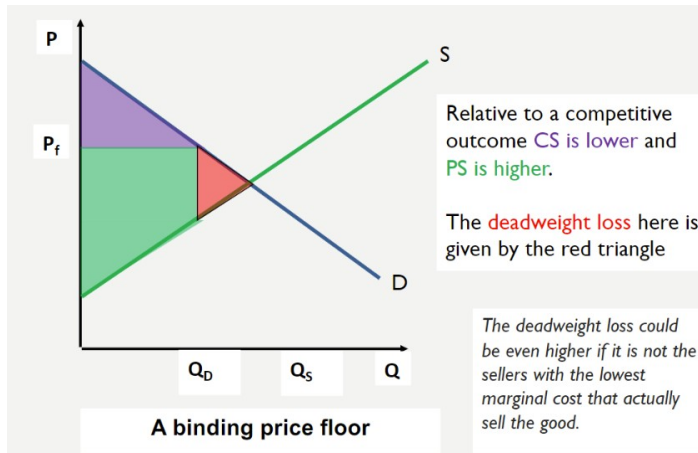
- (i) Market power
- (ii) Price ceilings and floors
- (iii) Taxes and subsidies
- (iv) Public goods
- (v) Externalities

Price Floors: Price floor = Minimum price at which good can be sold

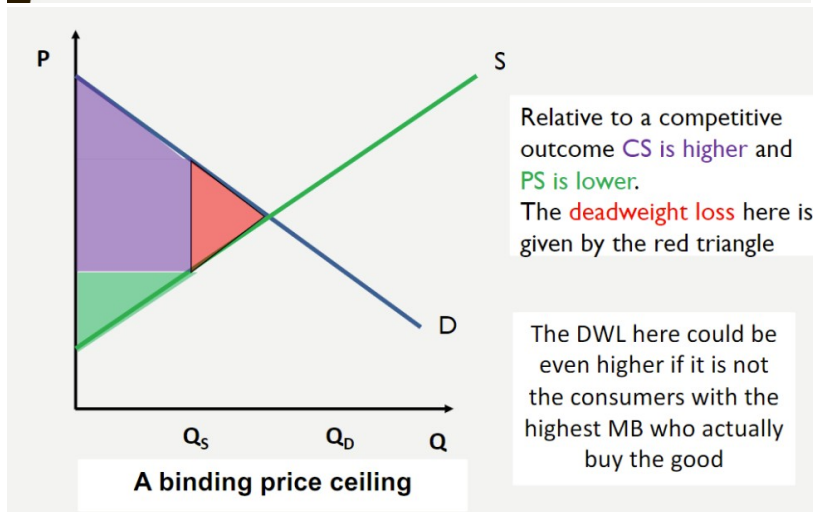
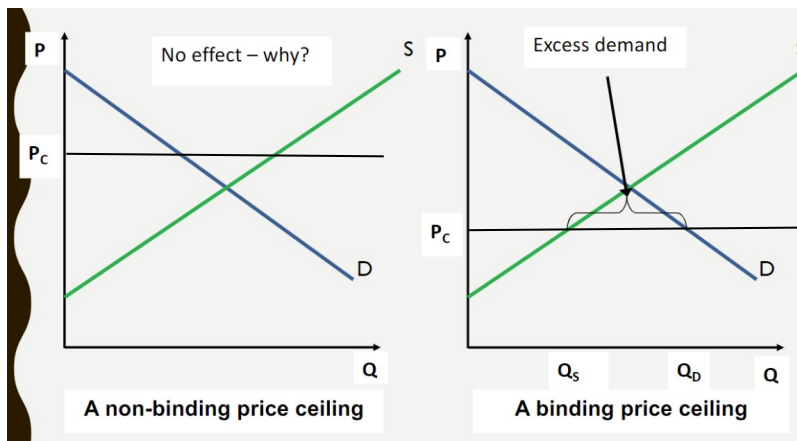


Non-price rationing means = Inefficient allocation of resources

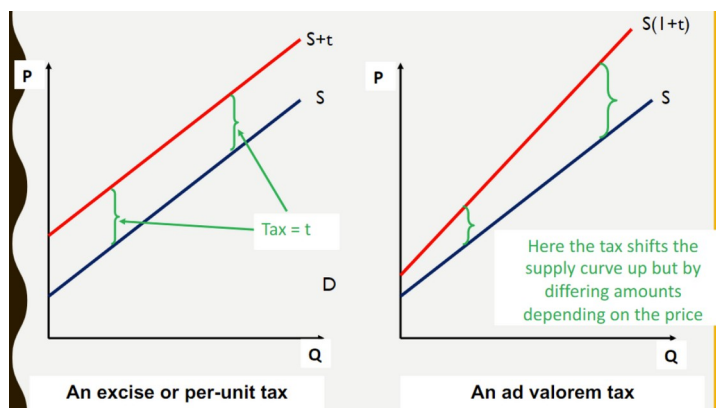
Binding price floor → welfare loss



Price Ceiling: Price ceiling = Maximum price at which good can be sold

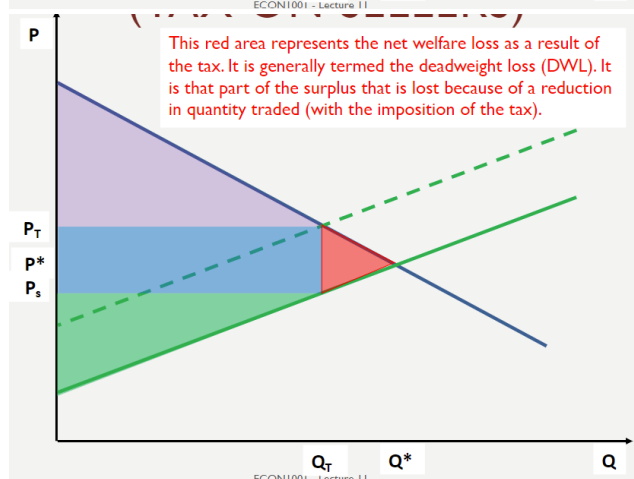
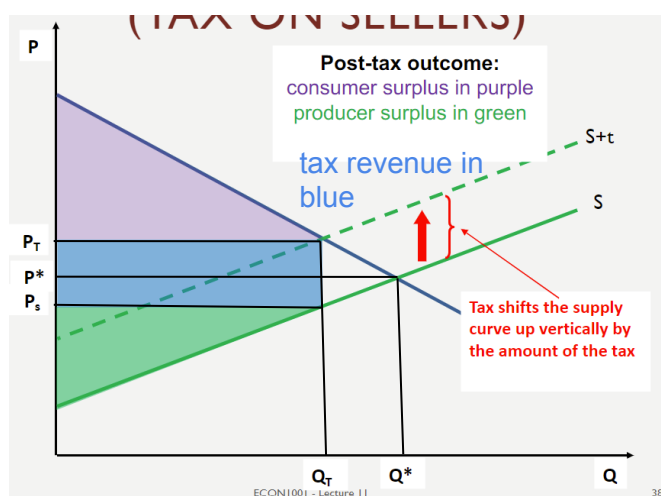


Taxes:

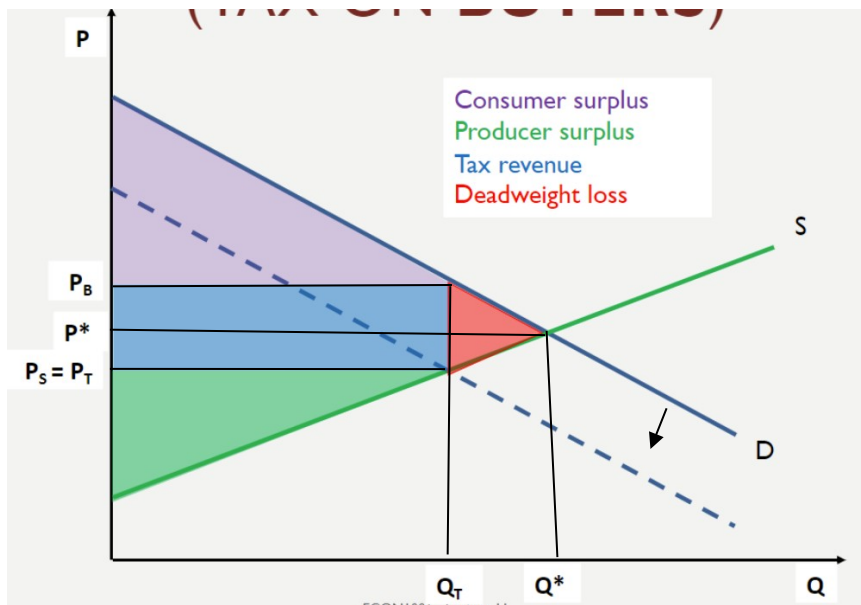


For per-unit tax, MC is increased by how ever much the tax is, causing S to shift upwards
 For ad valorem tax, MC increases as P increases, causing S to shift upwards but with a tilt

Incidence of Taxation (Tax on Sellers):



Incidence of Taxation (Tax on Buyers):



Incidence of Taxation: The more inelastic the supply \rightarrow the more the seller pays (of the tax)

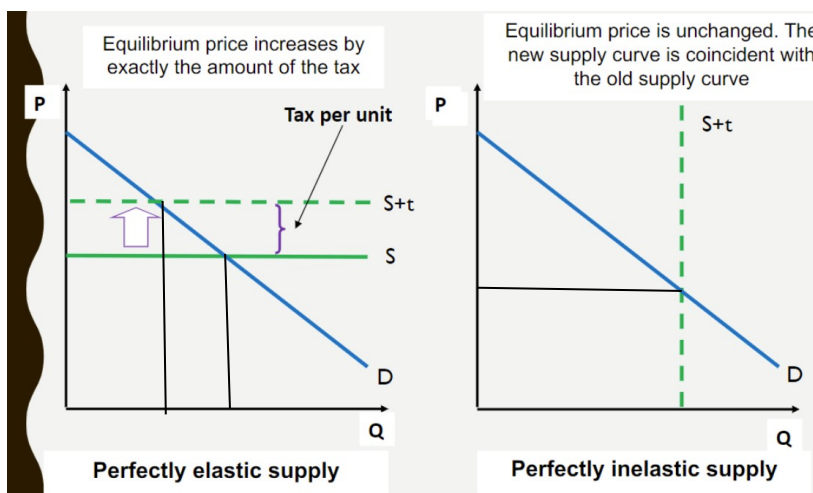
The more elastic the supply \rightarrow the more the buyer pays

The more inelastic the demand \rightarrow the more the buyer pays

The more elastic the demand \rightarrow the more the seller pays

Incidence of Taxation and Supply Elasticity: Perfectly elastic supply = Consumer bears full economic burden of tax

Perfectly inelastic supply = Seller bears full economic burden of tax

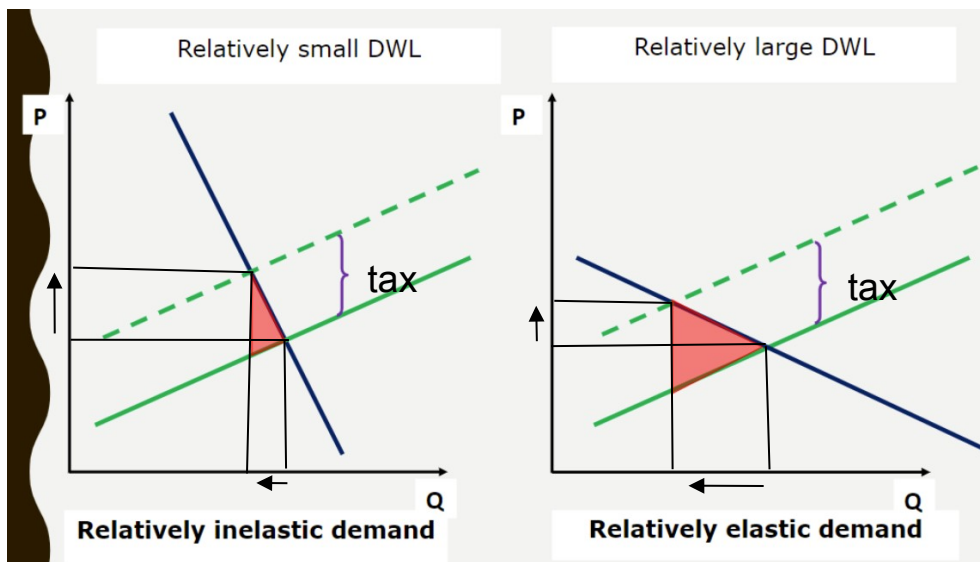


Incidence of Taxation and Elasticity: Relatively inelastic demand and relatively elastic supply = Large price increase (burden of tax is largely borne by buyers)

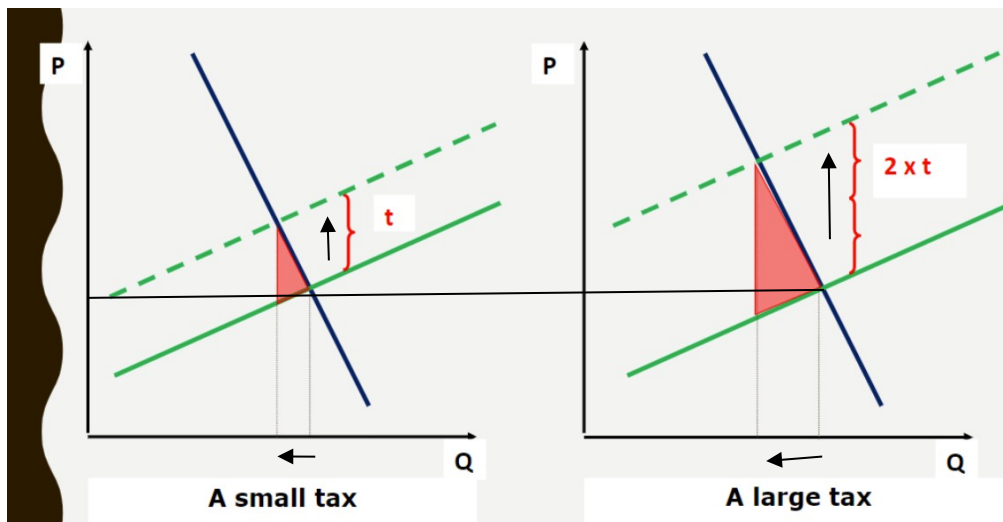
Relatively elastic demand and relatively inelastic supply = Small price increase (burden of tax is largely borne by sellers)

Determinants of Deadweight Loss: Size of DWL = Change (decline) in market equilibrium output that stems from tax

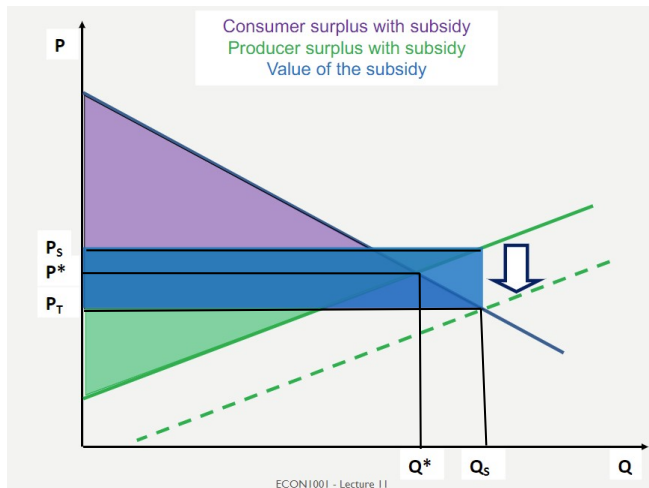
The more elastic are supply and demand → the larger the reduction in quantity traded → the larger the DWL



In general, DWL increases more rapidly than tax

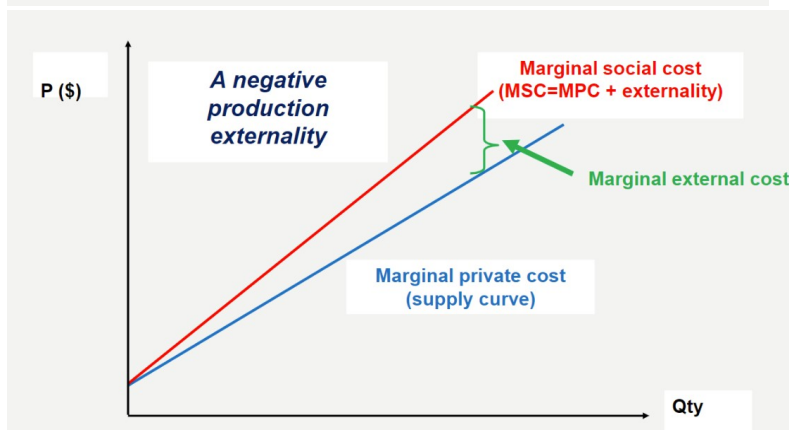
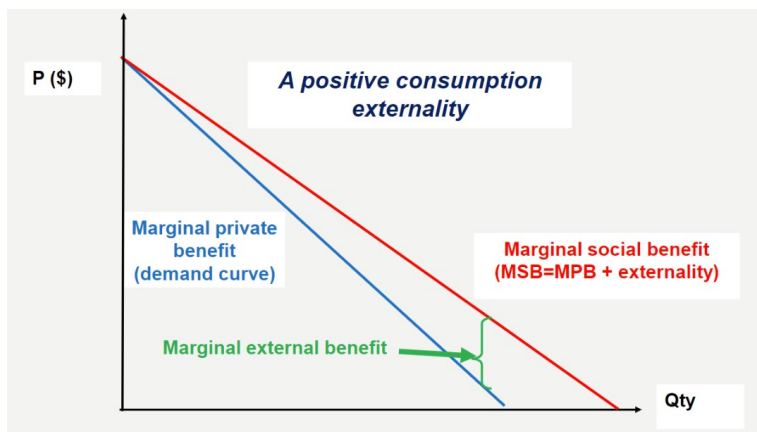


Subsidies:



Externalities: Externalities = Costs or benefits to parties other than those within the initial transaction = Uncompensated impact of person's actions on wellbeing of a bystander

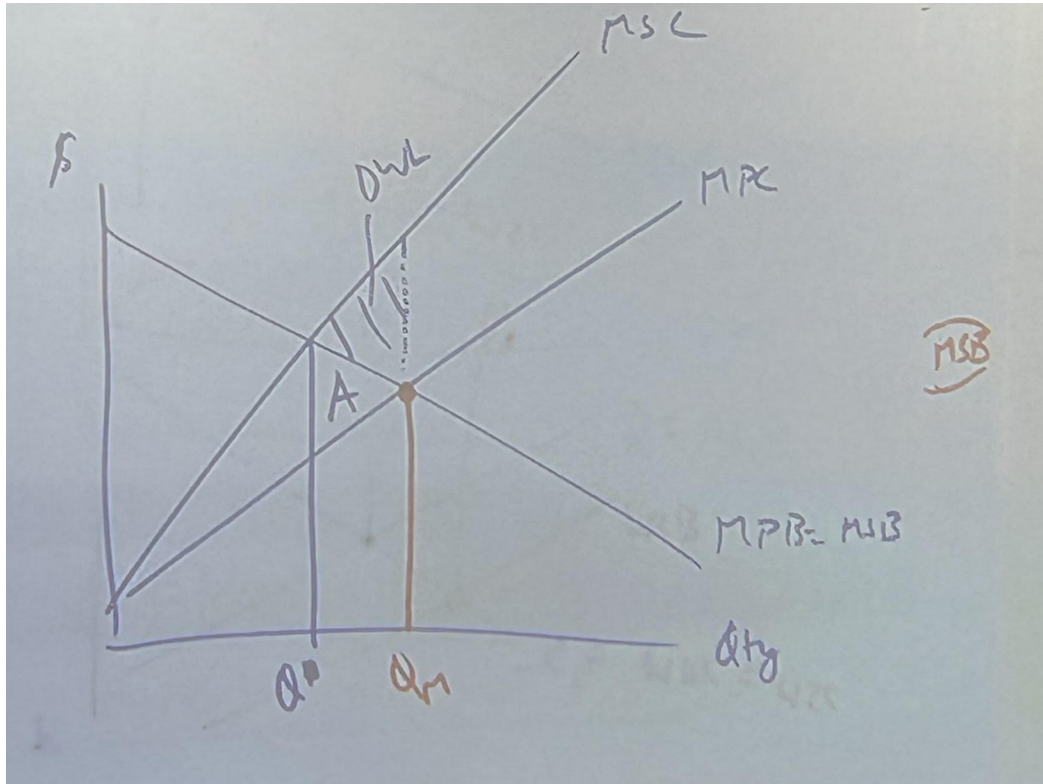
In absence of externality, $MB = MC = P$, but in the presence of externality $MPB = MPC$



Property Rights: Property rights = Rights individuals or firms have to the exclusive use of their property, including the right to buy or sell it

Lack of property rights → Externalities arise

Inefficiency from an Externality: Efficient outcome is where $MSB = MSC$, Q^*



To find DWL, at Q_m , find MSB, MSC and efficient point

The Coase Theorem: Coase Theorem = With low transaction costs and complete property rights the efficient outcome will be achieved

Property Rights and the Coase Theorem: If the polluter has property rights → Victim pays polluter to reduce pollution = MPC shifts to MSC

If the victim has property rights → Polluter pays victim to pollute = MPC shifts to MSC

Limits = Transaction costs
Distributive concerns

Ways of Addressing Externalities: Control and command = Regulate pollution for each firm (restrict production to Q^*)

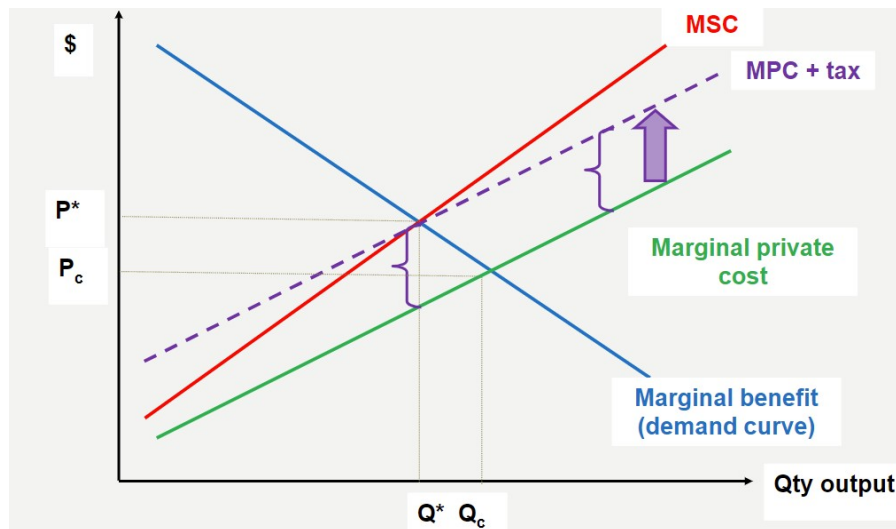
Emission charges = Charge firms for each unit of pollution

Taxes = Impose tax on each unit of output

Marketable permits = Impose limit on total pollution (permits can be bought and sold in market)

Addressing Externalities – Pigouvian Tax:

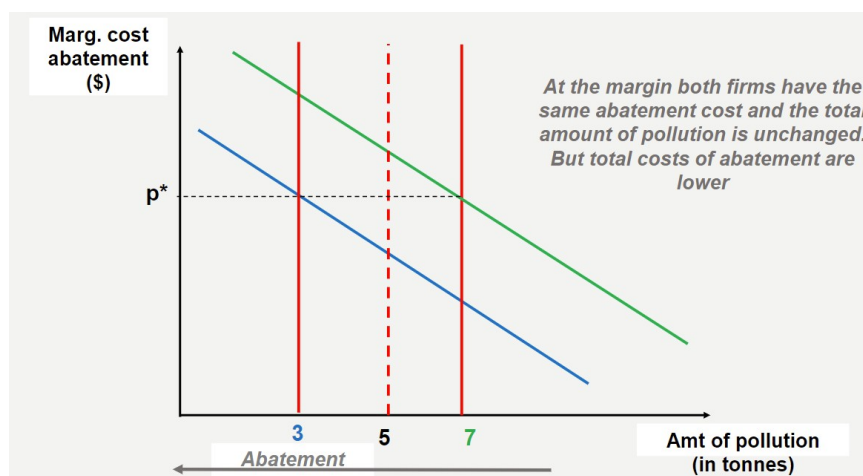
Pigouvian tax = Impose tax on activity equal to the level of the externality at Q^*



Addressing Externalities: Pigouvian subsidy = Use a subsidy which shifts perceived MPC down

Marketable permit scheme = Directly regulate the total quantity of pollution

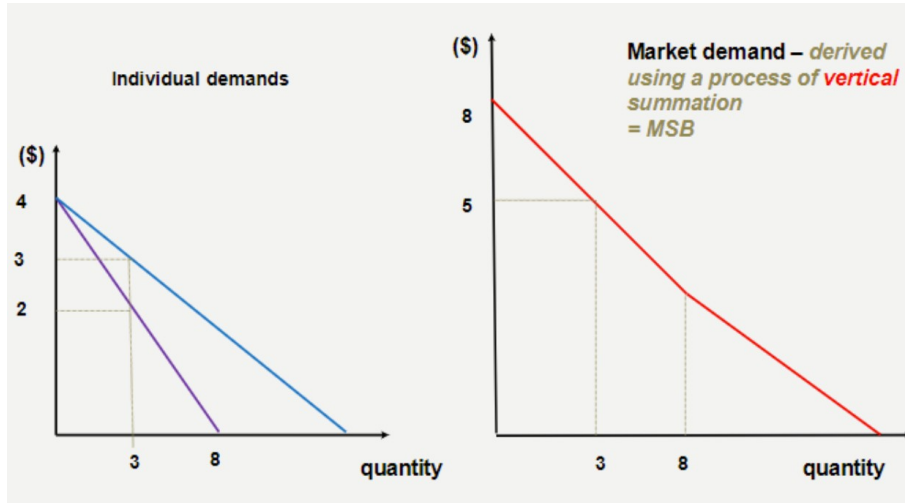
Marketable Permit Scheme:



Optimal for firms to trade pollution rights until abatement cost of last unit for each firm is equal

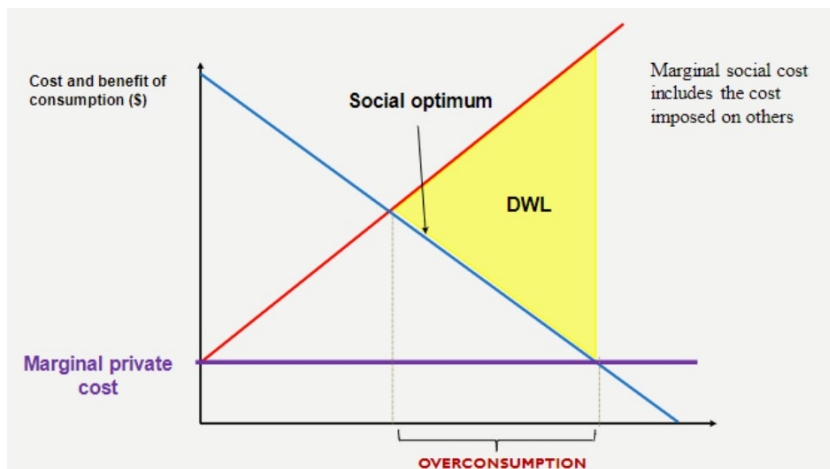
Public Goods: Public goods = Non-rivalrous in consumption = Non-Excludable = Problem of free riding

Provision of Public Goods: Compare marginal social benefit with marginal social cost (to derive demand curve, use vertical summation instead of horizontal because public goods are non-rivalrous)



Common Resources: Common resources = Rivalrous in consumption = Non-excludable

Tragedy of the Commons: Tragedy of the commons = Individuals consume too much of good = Individuals consume until private MB equals private MC = Consumption more than socially optimal quantity



Tragedy of the Commons – Remedies: Remedies = Grant property rights or make resources excludable (eg. regulate individual consumption by tax or fee)

Summary of Product Types:

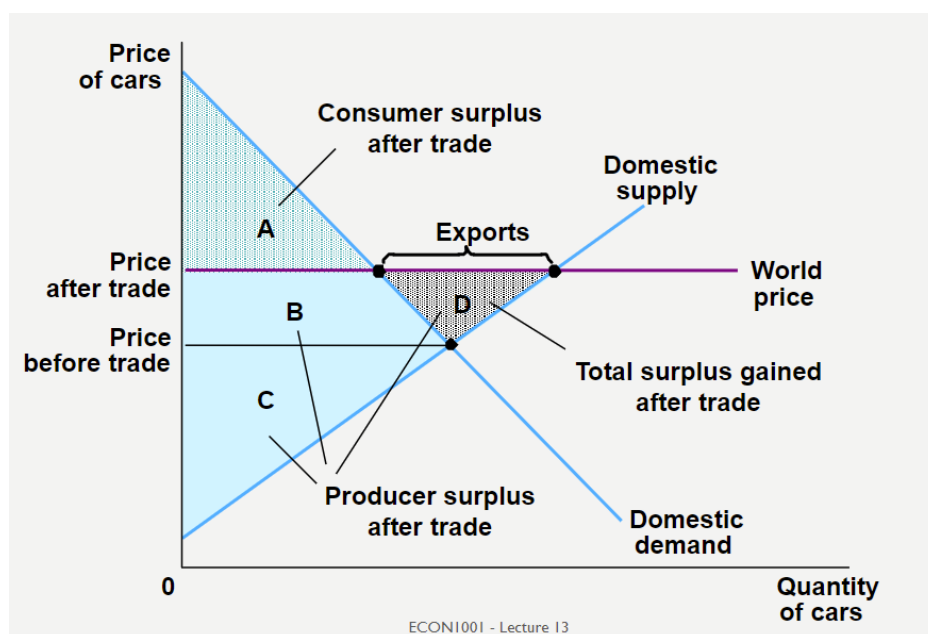
	Excludable	Non-excludable
Rivalrous	Private goods E.g. snickers, oil, hamburgers	Common resources E.g. highways, public parks <i>overconsumption</i>
Non-rivalrous	Quasi public goods E.g. lecture?, cable TV, private waterfall	Public goods E.g. national defense, safe streets <i>underprovision in the private market</i>

Lecture 12 - ECON1001

International Trade

Determination of Trade Patterns: Comparative advantage = Country with lowest OC of producing good → Specialisation in production of good → Exporting good

Benefits from Trade (Exports): If a country has a comparative advantage in producing a good, $P_w > P_d$ and country exports good



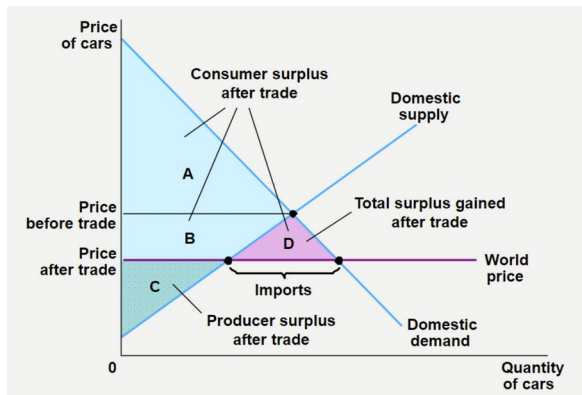
Trade and Welfare (Exports): When domestic price rises until it equals world price:

→ Sellers in exporting country are better off (PS rises because price received rises)

- Buyers in exporting country are worse off (CS falls because payment rises)
- Country as a whole is better off (PS rises more than CS falls)

Benefits from Trade (Imports):

If a country has a comparative disadvantage in producing a good, $P_w < P_d$ and country imports good

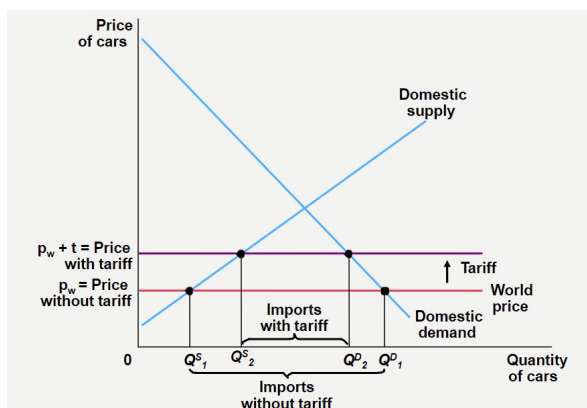


Trade and Welfare (Imports): When domestic price falls until it equals world price:

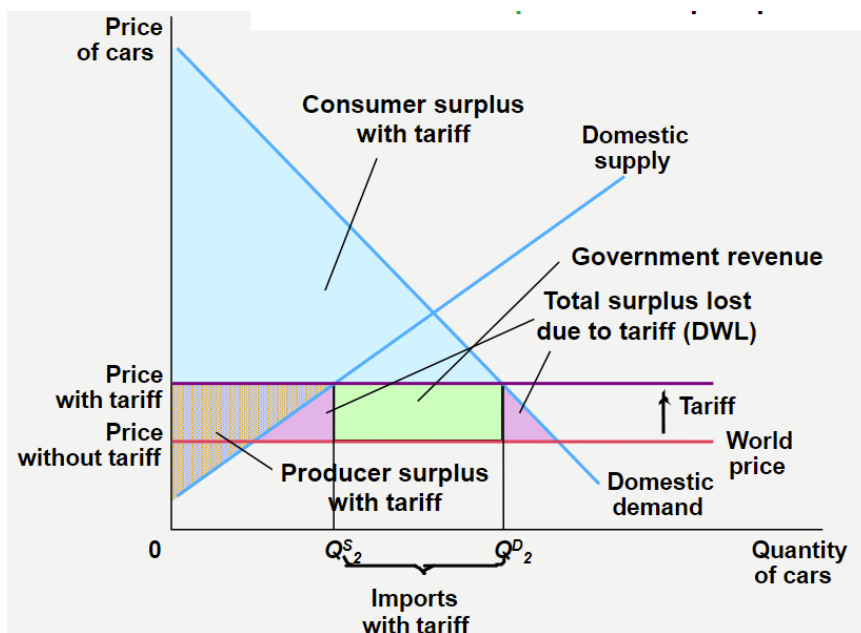
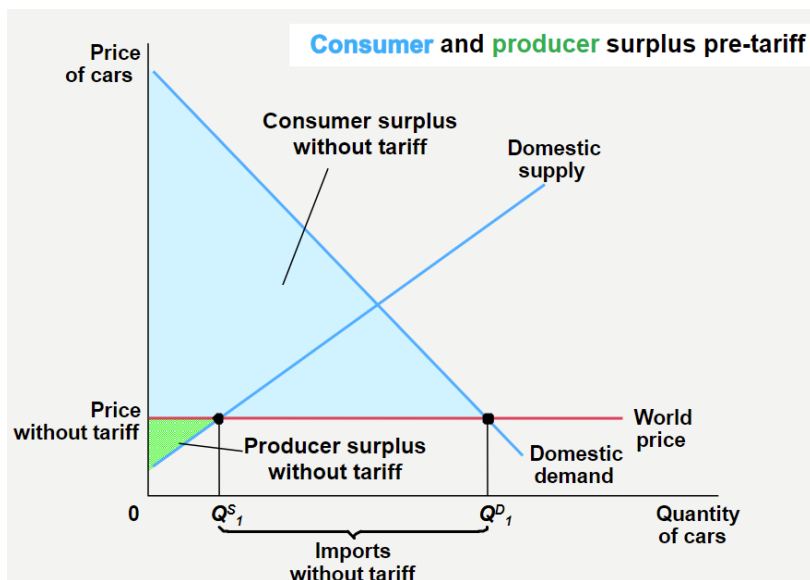
- Sellers in importing country are worse off (PS falls because price received is lower than pre-trade)
- Buyers in importing country are better off (CS rises because payment falls)
- Country as a whole is better off (CS rises faster than PS falls)

Barriers to Trade

Effects of a Tariff:



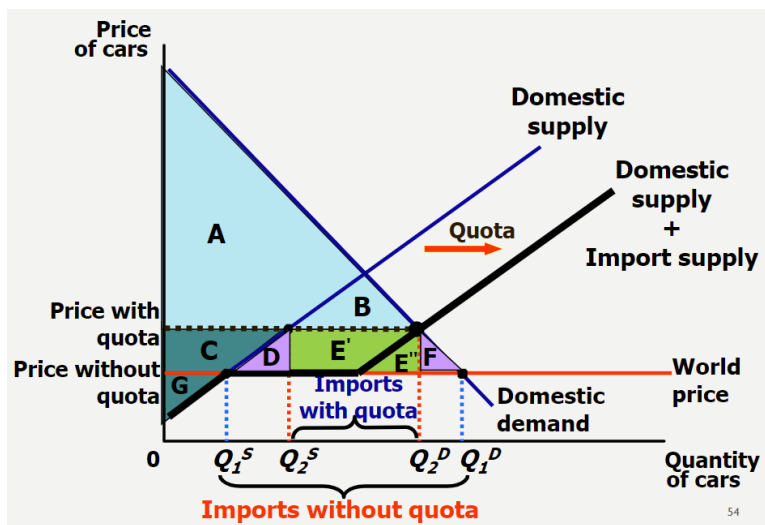
Tariffs and Welfare:



Post Tariff:

- CS falls
- Domestic PS rises
- Government revenue – a transfer from buyers to government that does not represent a net loss
- DWL: A loss in CS because the price of the good is now higher = a net loss
 - ◆ DWL consists of two inefficiencies: overproduction by inefficient domestic producers + underconsumption by domestic consumers

The Effects of a Quota:



Post Quota:

- CS falls
- Domestic PS rises
- Import licence holders are better off
 - ◆ Profit is made from buying imports at lower P_w and selling at higher P_d
- DWL

Arguments for and Against Free Trade:

- *For*
 - ◆ Facilitates specialisation and increases welfare
- *Against*
 - ◆ Strategic trade policy
 - ◆ Infant industry argument
 - ◆ National security
 - ◆ Environmental and labour standards
 - ◆ Foreign subsidies
 - ◆ Globalisation

