**Lecture Two:**

Cost of an action:
*Opportunity cost*: value of resources if they were used in their next best alternative
*Sunk cost:* resources already used before making the choice about an action, not included in calculating opportunity cost

Benefit of an action:
*Consumers*: measured by willingness to pay
*Producers:* revenue received from making a decision

*Marginal Cost:* incremental cost associated with making a decision
*Marginal Benefit:* incremental benefit associated with making a decision
When MB>MC a decision should be taken
*Economic surplus:* when the gain/benefit that results from taking an action outweighs the costs

**Lecture Three:**
*Market:* somewhere in which trade between groups of buyers and sellers of an item takes place

Perfectly competitive market:

- Many buyers and sellers
- Sellers are 'price-takers'
- Homogeneous good (all exact substitutes)
- Free entry and exit
- Perfect information

Supply and Demand Model:

- Graphical representation describing consumers' willingness to pay and suppliers' willingness to sell
- Interaction of supply and demand determines the quantity and price of good sold

*Demand:* quantities of good or service that people are willing to buy at various prices within some given period of time, given other factors held constant (ceteris paribus)

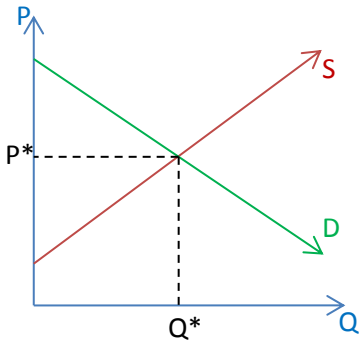
*Law of Demand:* when the price of a good increases, the quantity will decrease (for normal goods) with the assumption of ceteris paribus (that other influences on demand are held constant)

*Supply:* given a firm is supplying a good then they have the resources and technology to produce it, and have a definite plan to produce and sell it

*Factors determining supply:* price of good, expected future prices, price of inputs, price of substitutes in production, introduction of newer technology, random events (eg. weather)

*Causes in shift in demand:* price of other goods – substitutes or complements, income – normal or inferior good, price expectations of the future, consumer tastes and preferences, number of buyers

Supply and Demand Curves:

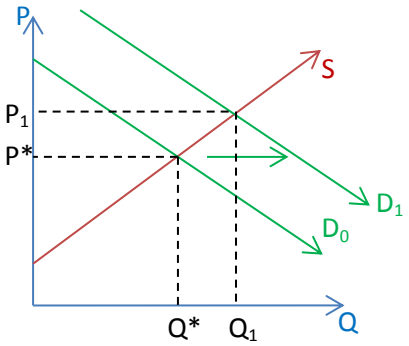



(Q*, P*) is market

**Lecture Four:**

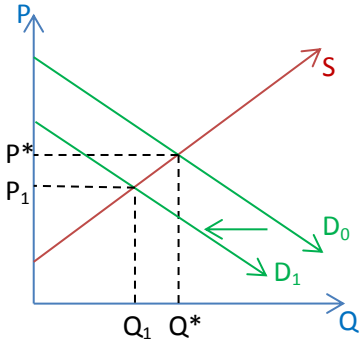
When the market is not in equilibrium, it will adjust until it returns to equilibrium.

If there is an increase in demand,
the demand curve will shift to the right:



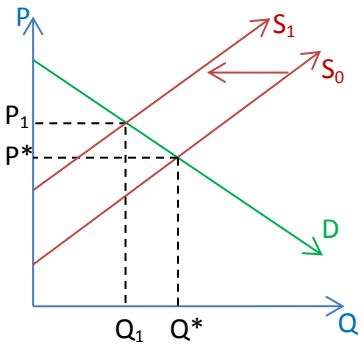

Price increases, Quantity increases

If there is a decrease in demand,
the demand curve will shift to the left:



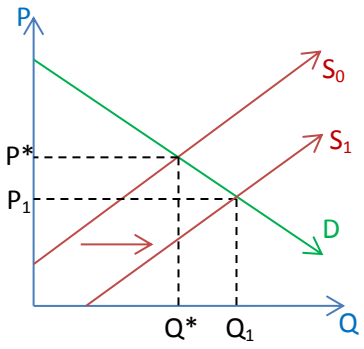

Price decreases, Quantity decreases

If there is an increase in supply,
the supply curve will shift to the right:




Price increases, Quantity decreases

If there is a decrease in supply,
the supply curve will shift to the left:




Price decreases, Quantity increases

If P>P* there is a surplus and there will be a tendency for prices to fall
If P<P* there is a shortage and there will be a tendency for prices to increase

**Lecture Five:**

*Elasticity* measures the responsiveness of quantity demanded or supplied to one of its determinants

Demand:

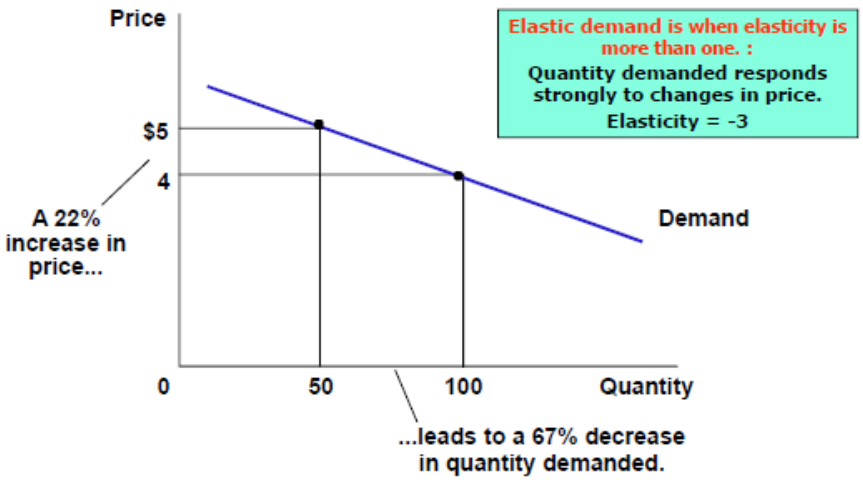
- Price elasticity of demand
- Cross price elasticity of demand
- Income elasticity of demand

Supply:

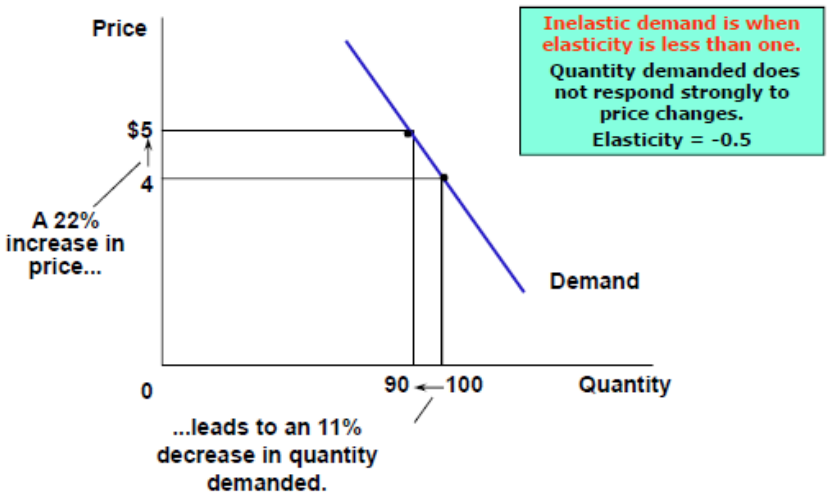
- Price elasticity of supply

*Price elasticity of demand* measures how much the quantity demanded of a good responds to a change in the price of that good: $\frac{\%\Delta Q}{\%\Delta P}$ or $\frac{\Delta Q}{\Delta P} \times \frac{\sum P}{\sum Q}$

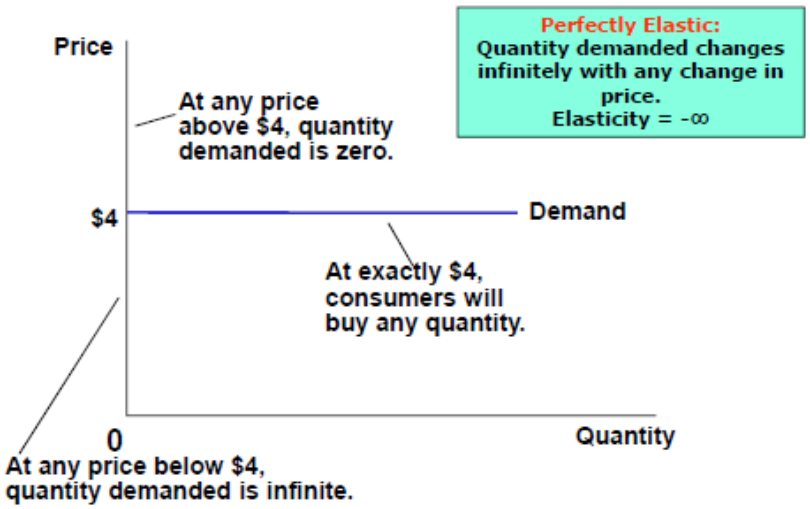
- Demand is *elastic* when elasticity is greater than 1



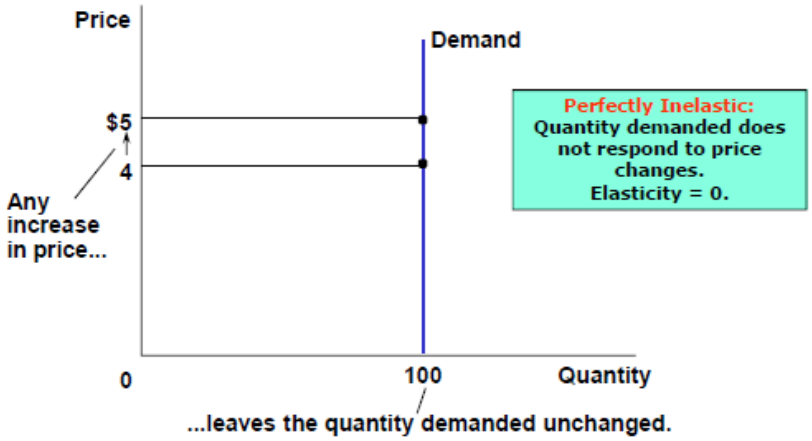

- Demand is *inelastic* when elasticity is less than 1



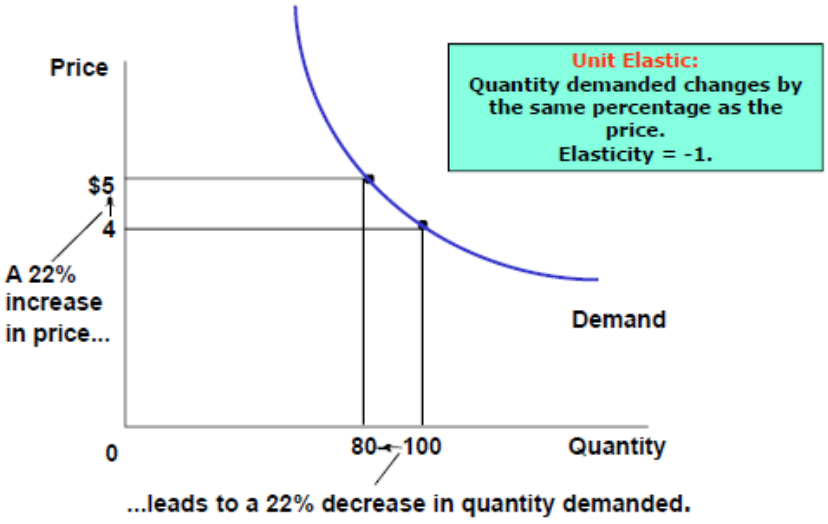

- If elasticity is undefined demand is *perfectly elastic*




- If elasticity is 0, demand is *perfectly inelastic*




- If elasticity is 1, there is *unit elasticity:*



Determinants of price elasticity of demand:

- More substitutes available makes price elasticity more elastic
- If a good is more of a necessity, it is less price elastic
- The longer the time period, the more price elastic it is
- The higher the budget share in the household, the more price elastic a good is
- The more broadly defined the definition of the market, the less price elastic it is

*Total Revenue* = price x quantity

- When demand is *inelastic* a price increase raises total revenue and a decrease lowers revenue – there is a positive relationship between price changes and total revenue
- When demand is *elastic* a price increase lowers total revenue and a decrease raises revenue – there is a negative relationship between price changes and changes in total revenue
- If there is *unit elastic* demand, a change in price does not affect total revenue

Income elasticity of demand:

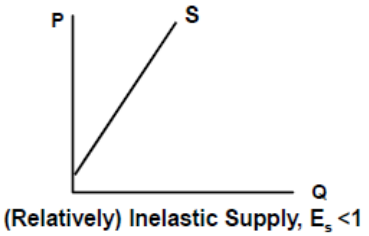
- Measures how the quantity demanded of a good responds to a change in consumers' income: $\frac{\%\Delta Q}{\%\Delta(income)}$
- Normal goods have positive elasticities
- Inferior goods have negative elasticities

Cross-price elasticity of demand:

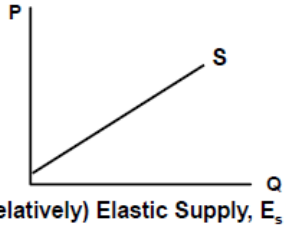
- Measures how much the quantity demanded of a good responds to a change in the price of another good: $\frac{\%\Delta Q}{\%\Delta(P\ of\ other\ good)}$
- If cross-price elasticity is positive or negative is dependent upon whether the two goods are substitutes or complements

Price elasticity of supply:

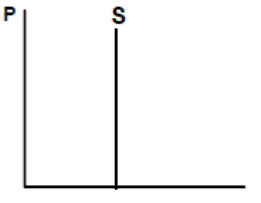
- Measures how much the quantity supplied of a good responds to a change in the price of a good: $\frac{\%\Delta Q}{\%\Delta P}$



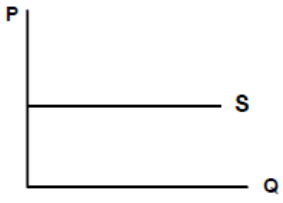
(Relatively) Inelastic Supply, $E_s$ <1



(Relatively) Elastic Supply, $E_s$ >1



Perfectly Inelastic Supply, $E_s$ = 0



Perfectly Elastic Supply, $E_s$ = ∞

**Lecture Six:**

*Welfare economics:* study of how the allocation of resources affects economic well-being measured by the sum of benefits buyers and sellers receive from participation in market trade

- MB>MC – more should be produced
- MB<MC – less should be produced
- MB=MC – efficient allocation

*Consumer Surplus* is the consumer gaining a net benefit from trade when MB>Price, it is represented by the area above price, below the demand curve
*Producer Surplus* is the producer gaining a net benefit from trade when Price>MC, it is represented on the supply and demand model by the area above the supply curve and below price

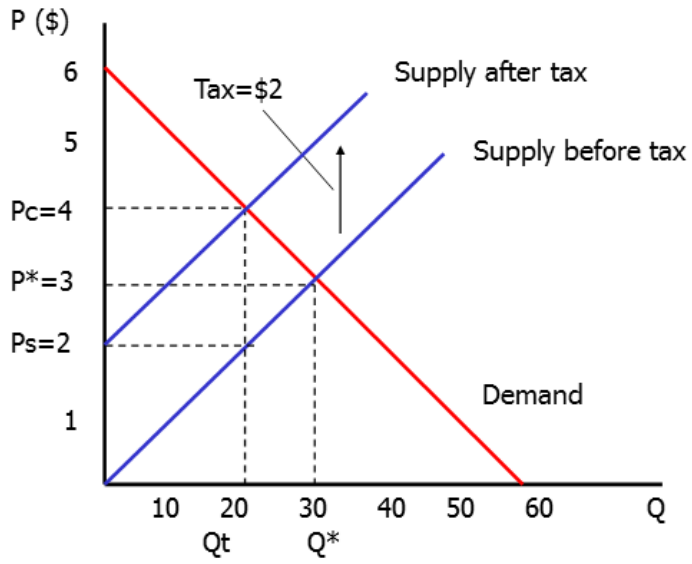
Sources of inefficiency:

- Market failure – where a good or service is over/under-produced
- Government control – taxes, subsidies, quotas
- Externalities and public goods
- Imperfect competition – Monopoly

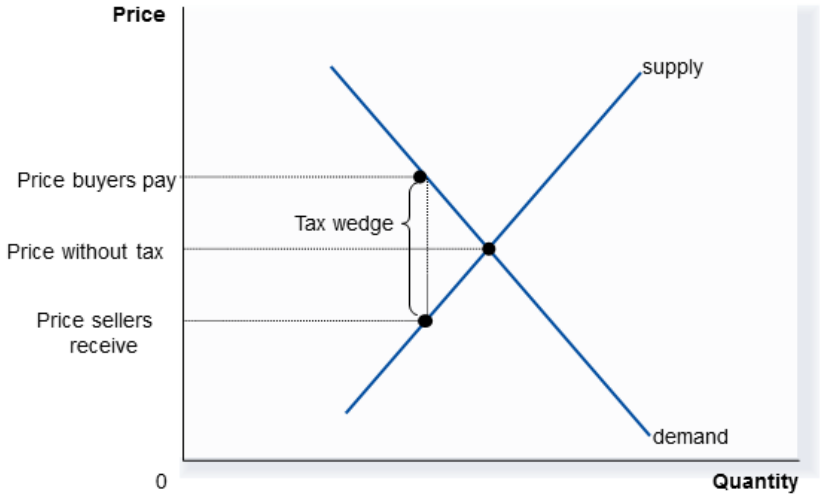
The extent to which a market does not achieve an efficient level of resource is measured by *dead weight loss;* it is the decrease in consumer and supplier surplus resulting from an inefficient level of production which is a social loss.

**Lecture Seven:**

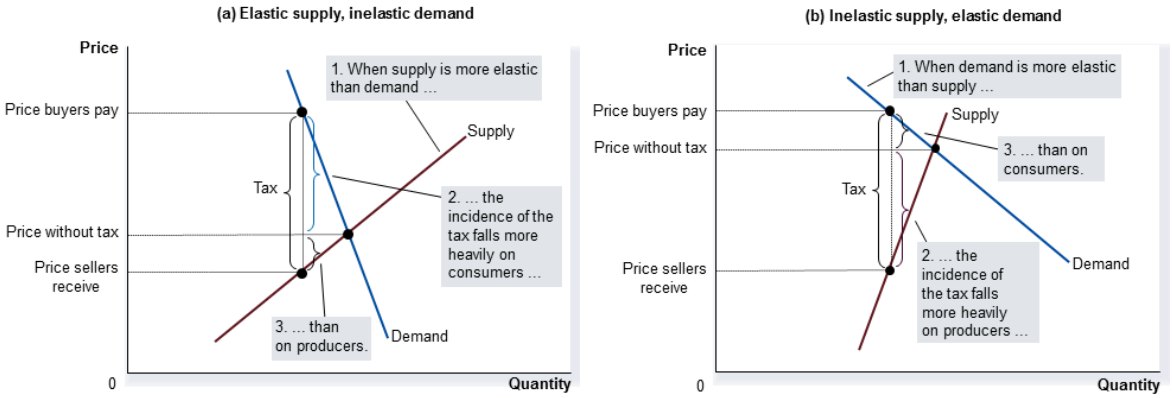
*Indirect taxes* are a payment to government per unit of the good sold – can legally be imposed on buyers or sellers
Tax on sellers: Tax wedge: Price received by supplier = price paid by consumer – per unit tax



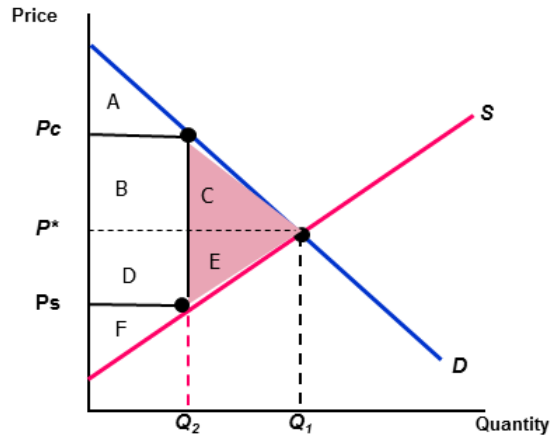
*Tax incidence* is how the burden of the tax is shared between buyer and seller




Tax burden is shared differently dependent upon elasticity:




Welfare outcomes:




| Surplus | No tax | With tax | Change (effect on well-being) |
|---|---|---|---|
| CS | A+B+C | A | –B-C |
| PS | D+E+F | F | –D-E |
| Government revenue | 0 | B+D | B+D |
| TS | A+B+C+D+E +F | A+B+D+F | -C-E (DWL) |

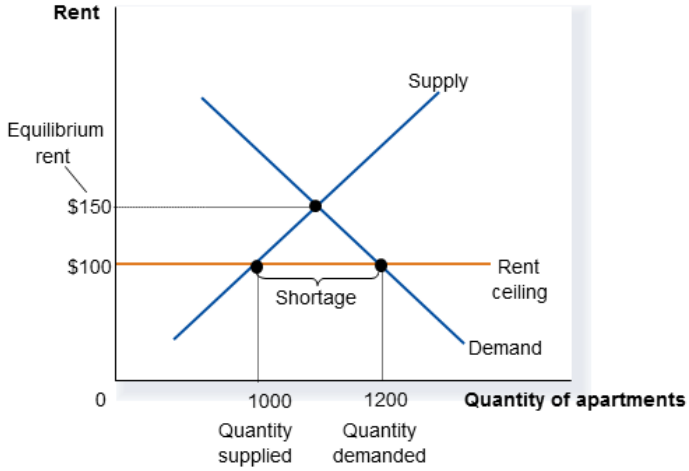
Dead weight loss is caused because MB>MC therefore preventing society to realise all the gains available from trade

Price Controls:

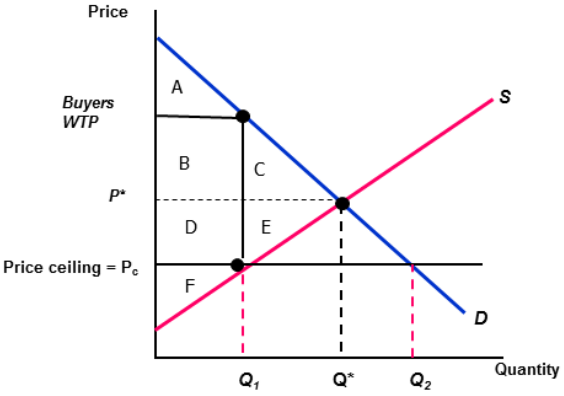
*Price ceiling:* a legal maximum on the price at which a good can be sold

*Price floor:* a legal minimum on the price at which a good can be sold

A *price ceiling* below market equilibrium will cause a shortage in a good

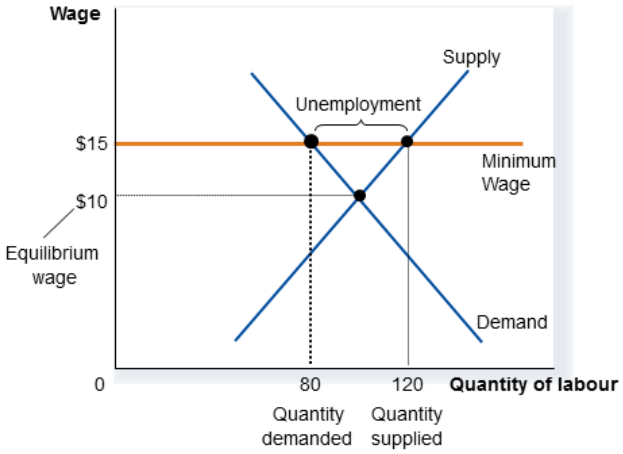



Welfare outcomes:

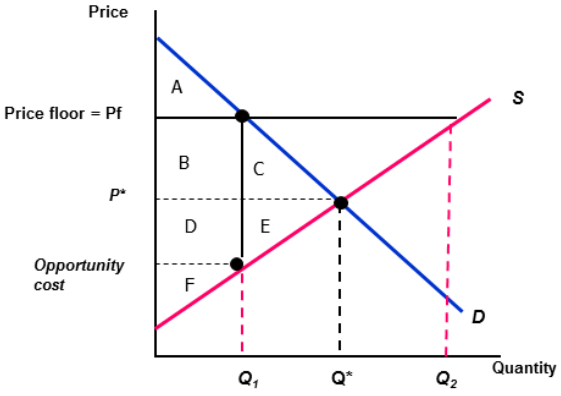



| Surplus | No regulation | With price ceiling | Change (effect on well-being) |
|---|---|---|---|
| CS | A+B+C | A+B+D | D-C |
| PS | D+E+F | F | -D-E |
| TS | A+B+C+D+E+F | A+B+D+F | -C-E (DWL) |

*Price Floor* outcome:

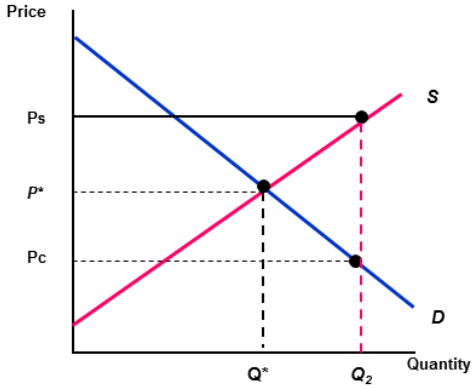


Welfare outcome:

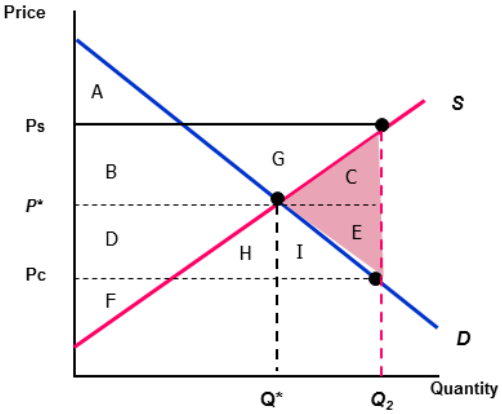



| Surplus | No regulation | With price floor | Change (effect on well-being) |
|---|---|---|---|
| CS | A+B+C | A | -B-C |
| PS | D+E+F | B+D+F | B-E |
| TS | A+B+C+D+E+F | A+B+D+F | -C-E (DWL) |

*Subsidy*: market outcomes:

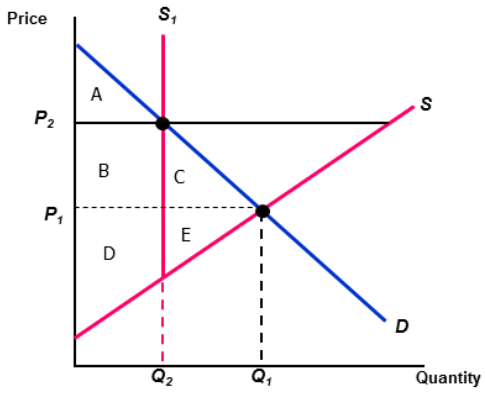



Welfare outcomes:




| Surplus | No regulation | With subsidy | Change (effect on well-being) |
|---|---|---|---|
| CS | A+B | A+B+D+H+I | D+H+I |
| PS | D+F | B+D+F+G | B+G |
| Government expenditure | 0 | -B-D-C-E-G-H-I | -B-D-C-E-G-H-I |
| TS | A+B+D+F | A+B+D+F-C-E | -C-E (DWL) |

*Production Quota:* Government intervention capping the amount of a good to be sold
Welfare outcomes:

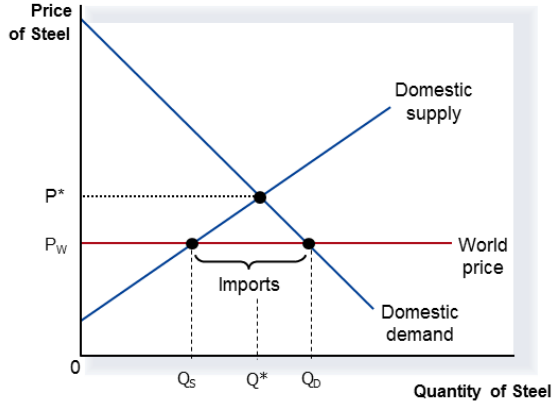



| Surplus | No regulation | With quota | Change (effect on well-being) |
|---|---|---|---|
| CS | A+B+C | A | -B-C |
| PS | D+E | B+D | B-E |
| TS | A+B+C+D+E | A+B+D | -C-E (DWL) |

**Lecture Eight:**

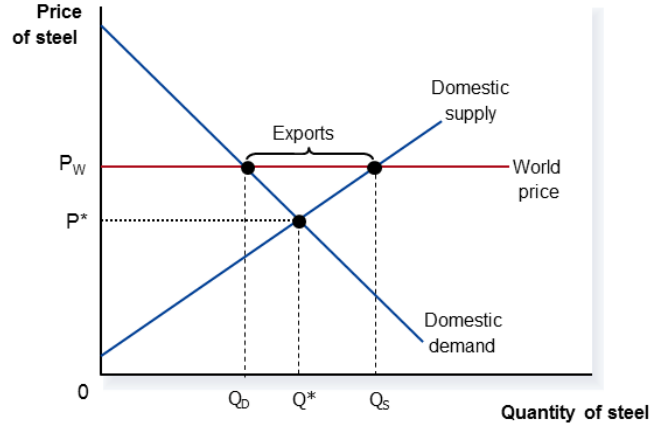
International Trade:

This model compares domestic price of a good without international trade and the price with trade
Without international trade, price would be set at market equilibrium, if Australian price is higher than the international trade price there will be imports.



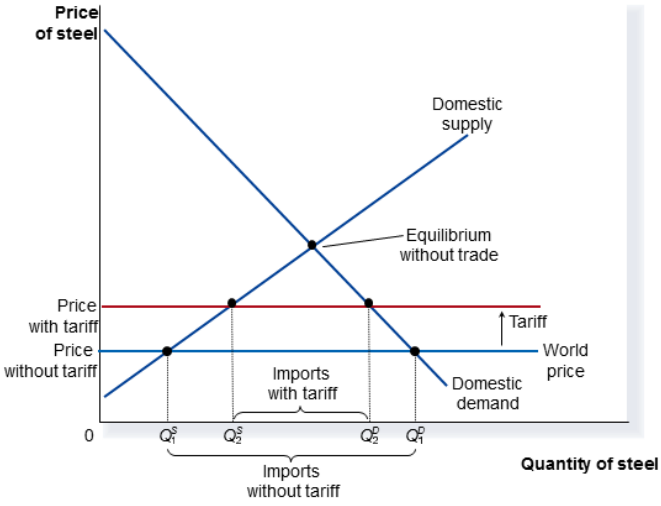

This creates a gain from Q* to $Q_D$

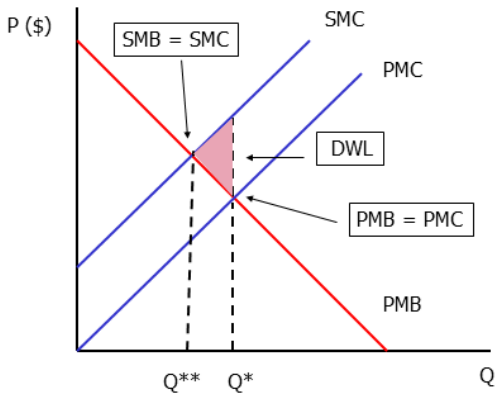
If the Australian price is lower than world price, Australians would lower their consumption because domestic price would move to the higher world price, producers would also increase output.



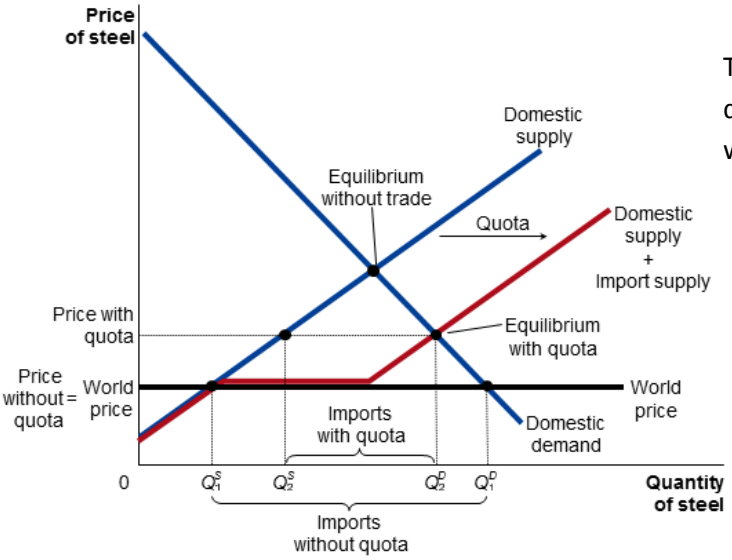

This causes a decrease in consumer surplus but an increase in producer surplus with an overall increase in welfare from the extra quantity supplied Q* to $Q_S$

To protect suppliers, the government can impose a tax called a *tariff*:




The government can also impost an *import quota* which limits the quantity of a good produced overseas which can be sold domestically




This increases quantity supplied by domestic suppliers causing a dead weight loss in the triangles

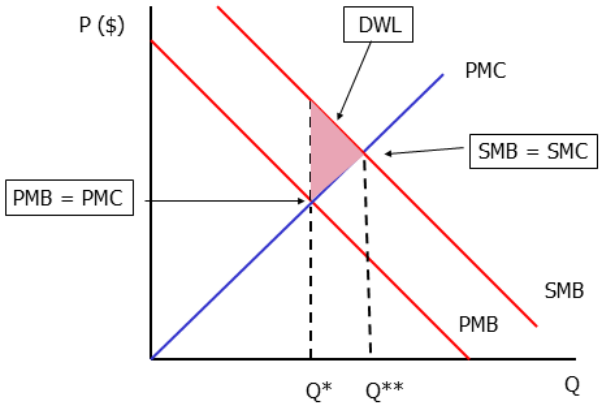
**Lecture Nine:**

Market failure can also be a failure to take account of all costs/benefits of a market transaction one such failure is an *externality.*

*Externalities* are the 'un-priced' costs or benefits of an economic transaction. They arise when economic agents engage in an activity that influences the wellbeing of a bystander who neither pays for nor receives any compensation for the effect.

These effects may be positive or negative.

Markets which do not take into account these *externalities* are considered socially inefficient




<u>Negative externality:</u>

Cost to society is higher than opportunity cost for producers due to an adverse effect on bystanders

eg. pollution. This makes the social cost curve above the supply curve, reflecting the social marginal cost.

Q* is the competitive equilibrium however due to the effect of the negative externality, Q** is the efficient quantity to be produced from the standpoint of society, this is the socially desirable level of production, where SMC=SMB.
Due to the externality being negative, Q**<Q*

Positive externality:
Positive externalities give more benefits to society, making Q*<Q**
When individuals make decisions about how much of a product to buy, they ignore the external benefits, considering only the private ones resulting in too few being bought. This means competitive equilibrium is below the socially efficient level, creating a dead weight loss (market failure).

How to achieve social efficiency:
*Internalising the externality* is an approach to have private decision makers take into account the social costs/benefits of their decisions i.e. having these decisions affect them and hence they include the cost/benefit in their decision-making process.
*Government regulation* can be used to give incentives, or have direct regulation to aid or limit production.
*Coase Theorem:* trade between economic agents can achieve efficient solution (where negotiations do not add too much extra cost)

Solutions for negative externalities:
For externalities that affect a certain group of people, negotiations can be had to come to an agreement between parties (*Coase Theorem*)
The government can implement a *production tax* that equates PMC to SMC
The government can restrict production/emission levels by creating tradeable permits (e.g. pollution permits, also creating a new market for pollution)

Solutions for positive externalities:
The government can create subsidies to encourage higher production/demand.

**Lecture Ten:**
*Excludability:* the property of a good whereby a person can be prevented from using it
*Rivalry:* the property of a good whereby one person's use diminishes other people's use
*Free riders:* a person who receives the benefit of a good but avoids paying for it
*Private goods* are *excludable* and *rival*.

Public goods:
Public goods are *non-excludable* and *non-rival* meaning there is no incentive for anyone to pay for the good, thus these would be undersupplied if left to the private market compared to the socially efficient outcome which would be a market failure e.g. national defence, police services, courts and judges, storm water disposal etc.

For a public good, SMB>PMB as there is a positive externality however PMB<PMC therefore there is no incentive to provide the good by any individual.

Solutions:
*Government intervention*:

- tax – the government can calculate SMB and SMC and decide upon the efficient quantity, then they can finance the good's provision through taxation
- assigning property rights

*Lindahl tax:* a tax in which each customer pays a different amount based on their WTP, it is the consumer's share of the total valuation multiplied by the cost of the good

**Lecture 11:**
Theory of the Firm:

- A *firm* is a collection of resources that is transformed into products demanded by consumers
- The costs at which a firm produces are governed by the available technology and cost of resources
- The amount it produces and the prices at which it sells are influenced by the structure of the markets in which it operates
- The difference between revenue received and costs incurred is profit
- The aim of a firm to maximise profit

Production function:
A firm incurs costs in the production of goods, the cost of producing a given quantity depends on the production function and the price of inputs.
The *production function* is the relationship between the quantity of inputs used to make a good and the quantity of the good produced.

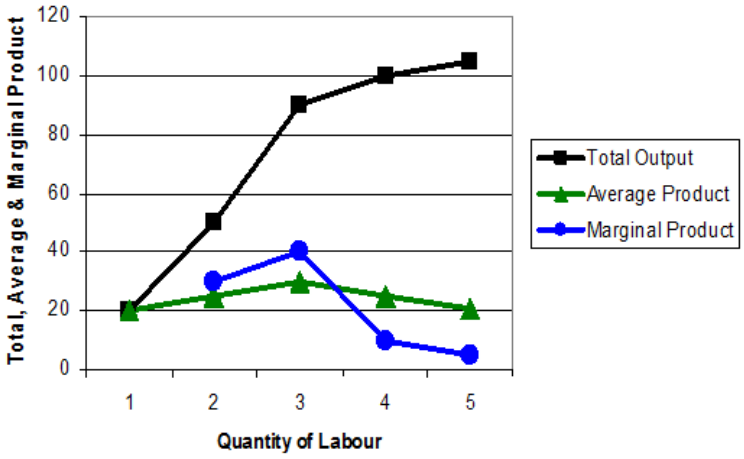
A firm's production function indicates the maximum level of output it can produce for any combination of inputs this function can be expressed as Q = F(K, L), Q=output, K=Capital, L=Labour

The analysis of a production function can be looked at in the short-run or the long-run.

- *Short-run*: amount of inputs is fixed
- *Long-run*: the firm can vary all inputs

Short-run Production Function:

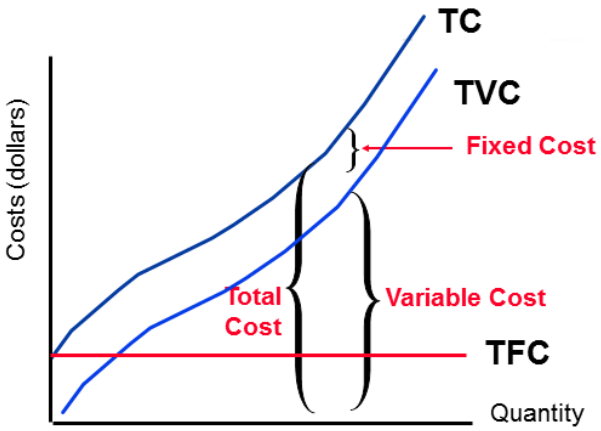
1. Average product of variable input: the output per unit of input at each level of production
2. Marginal product of variable input: the output each additional unit of input produces



When change in output declines, this is *diminishing marginal product* this is a property whereby the marginal product of an input declines as the quantity of the input increases (e.g. workers contributing less as more as hired)

To link production to cost, we convert the unit of measurement from quantity produced to the cost of producing each unit.

- *Fixed Costs (FC):* costs which do not vary with quantity produced
- *Variable Costs (VC):* costs which vary with the quantity of output produced
- *Total Costs (TC):* Total cost of production: TFC+TVC




**Lecture Twelve/Thirteen:**

Measuring unit costs:

$$AFC = \frac{Total\ Fixed\ Costs}{Quantity} = \frac{TFC}{Q}$$

$$AVC = \frac{Total\ Variable\ Costs}{Quantity} = \frac{TVC}{Q}$$

$$ATC = \frac{Total\ Costs}{Quantity} = \frac{TC}{Q}$$

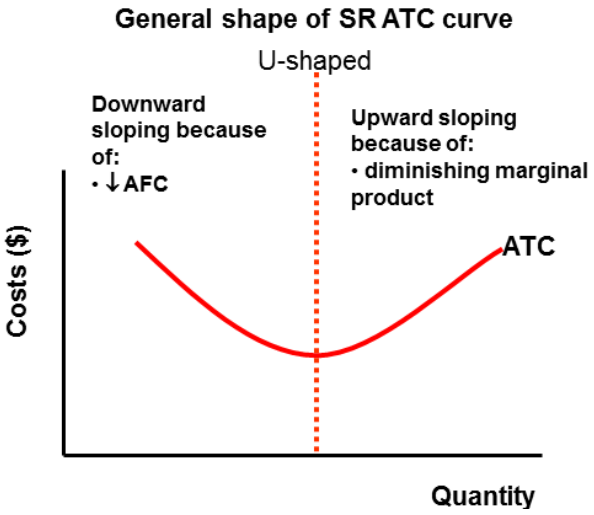
$$MC\ (per\ unit) = \frac{Change\ in\ Total\ Cost}{Change\ in\ Quantity} = \frac{\Delta TC}{\Delta Q}$$

Relationship between MP and MC:

If marginal product of a variable input is diminishing, then each extra input adds a smaller additional amount to total output therefore needing more labour to produce each extra unit of output as total quantity increases

*Marginal Costs:* usually increasing with increased quantity, or constant, if each additional unit of variable input adds the same amount to total output

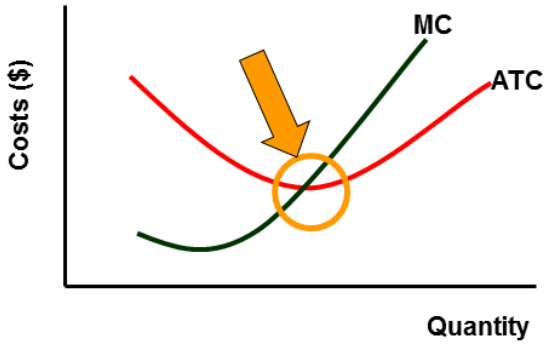
*Average total costs:* usually u-shaped because with lower output, FC is the larger share of TC however AFC decreases with increased output hence at higher levels of output VC is the larger share or TC, or decreases with quantity of output if FC is a very large share of TC at any quantity of output



Relationship between MC and ATC:

MC intersects ATC at minimum of ATC because

- MC<ATC then ATC is decreasing
- MC>ATC then ATC is increasing



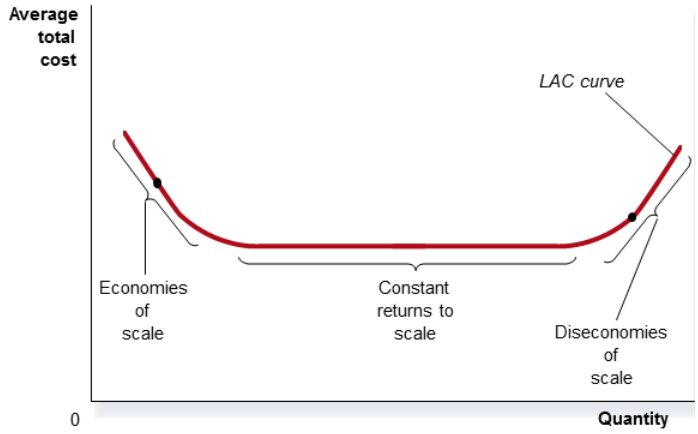

When MC=ATC the firm is efficient, it has achieved productive efficiency

Long-run cost:

*Long-run Average Cost Curve (LAC):* defined as the minimum average unit cost of producing at any level of output when all inputs are variable. It is derived from a series of short run cost curves that represent different factory sizes or amounts of fixed input.

The LAC is the lower section of all the combined SR ATC curves

The shape of the LAC is determined by the *economies of scale*




**Lecture Fourteen:**

*Economic profit:* $\pi$ = Total Revenue – Total Costs (implicit and explicit costs)

When there is a negative level of *economic profit* resources will leave the market as they would get a better return in the next best use

If there is a zero level of *economic profit* there is no impact on resources as suppliers are no better off by leaving or entering the market – this is the long-term outcome in a competitive market

If there is a positive level of *economic profit* resources will enter where possible as the rate of return is higher than in current use

*Profit Maximising decisions* largely depend on the type or structure of the market. These features include;

- Number and size distribution of firms
- Extent of product differentiation

- Barriers to entry/exit
- Price elasticity of demand
- Extent of information available to buyers and sellers

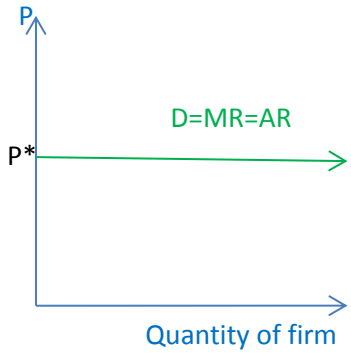
*Market Structure* (mature of the market) → *Market Conduct* (decisions of firms made in respect to price, output, advertising etc.) → *Market performance* (Evaluation of decisions with respect to factors such as profitability, efficiency, equity etc.)

Types of Markets:

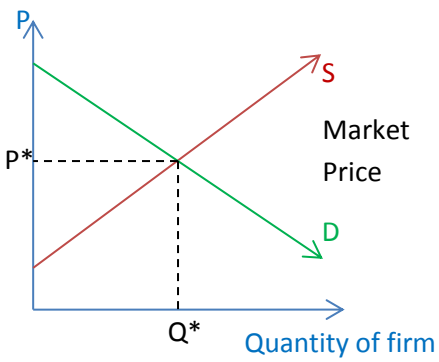
| Type of market: | # of firms | Entry | Product | Demand Curve |
|---|---|---|---|---|
| *Perfect Competition:* | Lots | Unrestricted | Homogeneous | Perfectly elastic, price taker |
| *Monopolistic Competition:* | Many/Several | Unrestricted | Differentiated | Relatively elastic, some price control |
| *Oligopoly:* | Few | Restricted | Undifferentiated or differentiated | Relatively inelastic, depends on rivals' actions |
| *Monopoly:* | One | Restricted/ Completely Blocked | Unique | More inelastic than oligopoly, price maker |

*Perfectly competitive markets:* No single buyer or seller has a negligible impact on the market price, each buyer and seller takes the market price as given

Firm:




Market:




Price setting decision is based off the cost-benefit principle by comparing marginal benefits with marginal costs of supplying an additional unit of output, to maximise profits, MR=MC

*Short-run economic profits:* maximised at MR=MC, has positive economic profits at P>ATC, zero economic profits at P=ATC and negative economic profits when P<ATC

**Lecture Fifteen:**

In a competitive market, profit maximisation occurs where P=MC

The two decisions, of what is the profit maximising quantity and at what prices should operations cease, will determine a firm's short-run supply curve.

Cease of operations:

- *Shutdown*: short run decision not to produce during a specific period of time because of current market conditions

- *Exit*: long run decision to leave the market

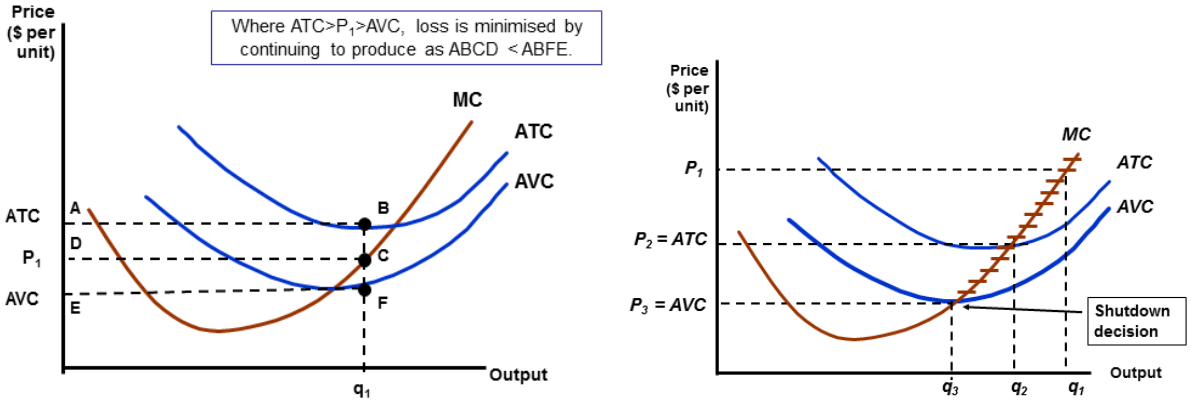
The shutdown decision:

In the short run, the firm cannot avoid fixed costs, so these are treated as sunk costs, hence opportunity cost of production is the firm's variable cost

This means the shutdown decision would be made when revenue from production is less than variable cost. –TR<TVC or P<AVC

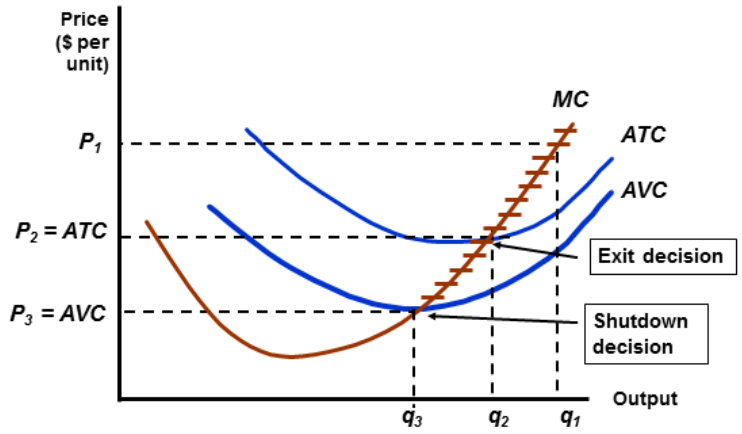
Therefore the firm's short run supply curve is the part of MC above minimum AVC

While the firm will make a loss when P<ATC, loss minimising would still exist by producing goods when AVC<P<ATC.




The exit decision:

In the long run, all of a firm's costs are variable; therefore the firm's opportunity cost of production is their total costs. Therefore the exit decision of a firm would be when revenue is less that total costs –TR<TC or P<ATC



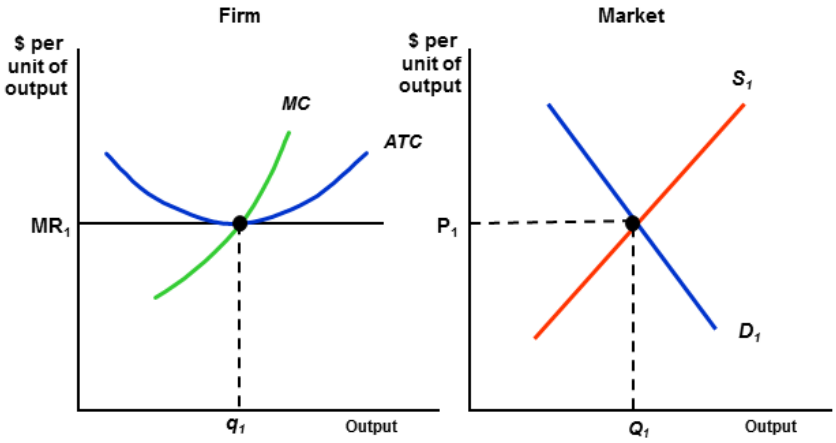

The short run market supply curve shows the amount of output the industry will produce in the short run for each possible price. It is the horizontal summation of all the firms' supply curves

For the long run, there is the assumption that there are no barriers to entry/exit and all firms have access to the same technology meaning the decision to enter is based on profit incentive. If existing firms are profitable, more firms will enter and increased supply will drive down price and profit. If existing firms are making losses, firms will exit, decreasing supply and driving prices and profits up.

Market equilibrium in a competitive market:

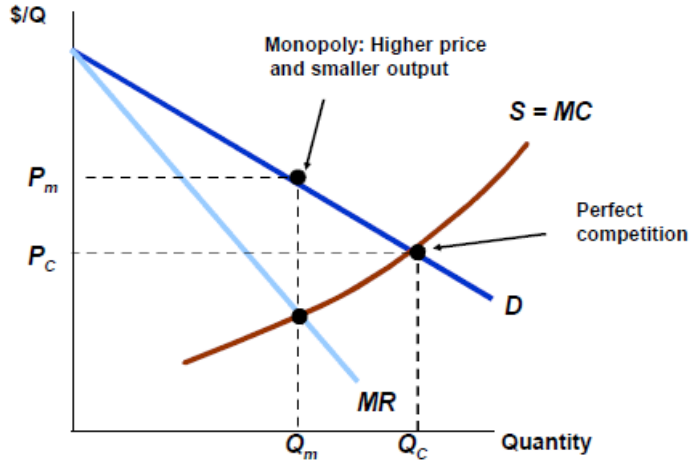
Short run: # of firms is fixed, firms make economic profit at P>ATC, 0 at P=ATC or losses at P<ATC

Long run: # of firms may vary with no barriers to entry or exit, firms can only earn 0 profit P=ATC

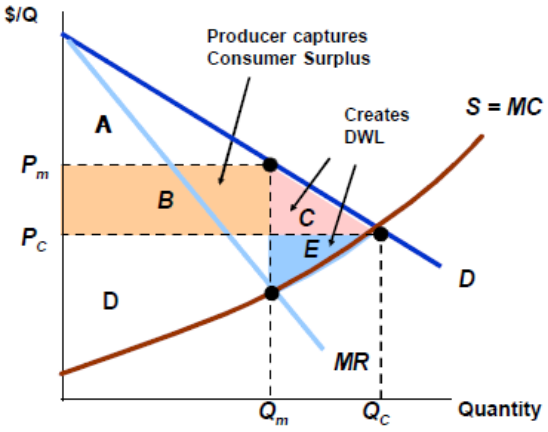



**Lecture Sixteen:**

Monopoly:

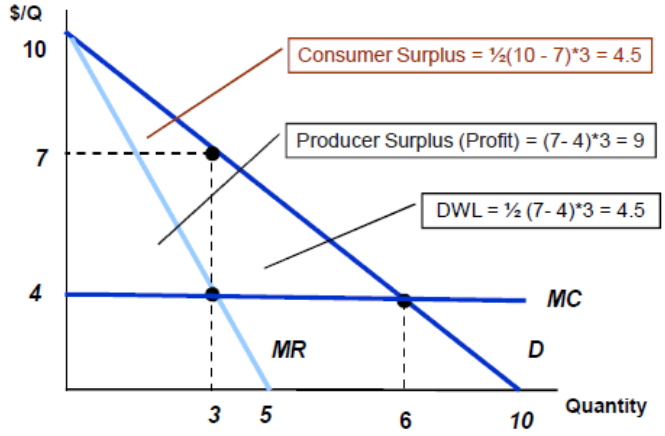



Welfare implications of a monopoly:




| Surplus | Perfect competition | Monopoly | Change in surplus |
|---|---|---|---|
| Consumer surplus | A+B+C | A | -B-C |
| Producer surplus | D+E | B+D | B-E |
| Total surplus | A+B+C+D+E | A+B+D | -C-E (DWL) |

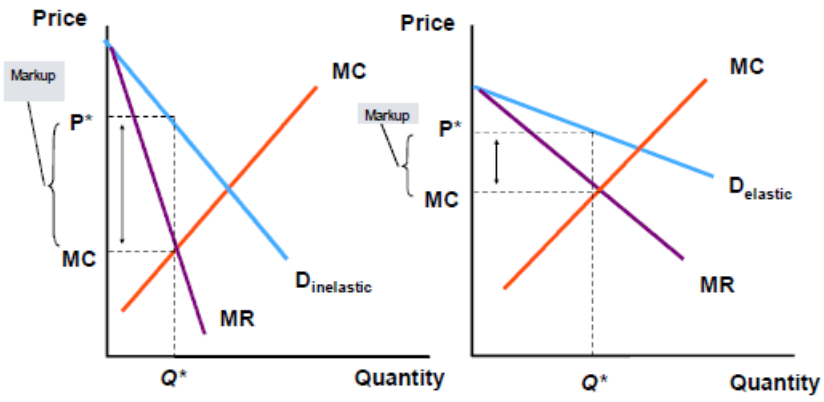
To find the profit maximising price and quantity for a monopoly, use the demand curve, make P the subject, double the gradient to find the marginal revenue curve and equated MR=MC.




Monopolies have *market power*, because they can charge a higher price and produce a lower output than if the conditions were of perfect competition, this means they are producing an *inefficient* level of output.
The inefficiency is measure by *dead weight loss*, which is a loss of both consumer and producer surplus creating the *social cost of market power*

Some companies win market power by being innovative and adaptable/more efficient than others or meeting consumers' needs better, in this case consumers are the net beneficiaries in situations where a firm succeeds in becoming the dominant player through lower prices and better products. These firms may be efficient in the long run, but trade off short run allocative efficiency.

Market power is measured by the extent to which the profit maximising price exceeds marginal cost i.e. mark-up over marginal cost
The extent to which a firm can price its product above marginal cost depends largely on the price elasticity of demand for the product.

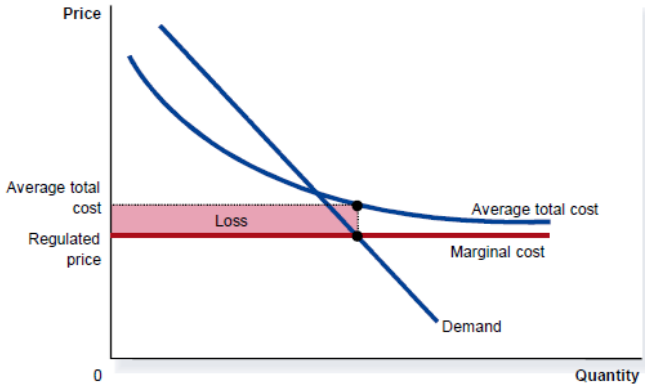



In reality, studies have indicated that manages determine prices based on a reliance of cost approach or demand, however most managers appear to use some type of inverse price elasticity rule which involves both demand and cost in calculating mark-up.

<u>Government policy towards monopolies:</u>

- Competition laws
- Price regulation
- Government ownership

Natural monopolies can achieve very low costs when producing large quantities and have the potential to charge high prices to earn large economic profits. E.g. natural gas, electricity
In Australia, state regulatory commissions often set prices for natural monopolies, this can be at P=ATC or by using two part pricing where consumers are charged a fixes component to cover AFC and a variable component to cover MC.




**Lecture Seventeen: notes not on LMS**

**Lecture Eighteen:**
Firms with market power can set one price for all customers by applying the profit maximising rule, however by setting a high price, they only sell goods to customers with a high willingness to pay (WTP), and these customers retain consumer surplus.
Additionally, the firm loses sales to other customers, resulting in dead weight loss (DWL)
Therefore the price chosen is a trade-off between charging a higher price to customers with a high WTP and charging a lower price and selling more of the good.

<u>Non-uniform Pricing/Price Discrimination:</u>
Firms can use information about individual customers' WTP to increase prices by charging different prices based off the WTP.

*Price Discrimination:* is the main form of non-uniform pricing in which the same product is sold at different prices to different customers, where prices do not relate to cost of production.
The objective of this is to target different WTP of customers so as to capture their consumer surplus and increase profit. There are three main types of price discrimination; first, second and third degree price discrimination.

*First degree price discrimination:* is charging each customer their maximum WTP for each unit of the product bought, thus causing the entire consumer surplus to turn into profit.
This is also known as *perfect price discrimination*; the firm's *marginal revenue curve* will be the *demand curve*.

*(Second degree price discrimination:* is charging different prices for different quantities of a good. )

*Third degree price discrimination:* segmenting buyers into groups on the basis of WTP and charging different prices for each group, also known as *multi-market price discrimination*.
To calculate the *optimal* third degree price discrimination, we find the profit maximising price for each segment of the market separately, then compare with a uniform price over the whole market to see if there is incentive for price discrimination.

*Two-part pricing:* charging buyers a fixed fee as well as an additional usage fee for each unit of the product consumed.

To calculate the *optimal* two-part pricing, we set *usage price* to *marginal cost* (MC) with a *fixed fee* of the *consumer surplus*.

*Bundling:* charging buyers one price for two or more products sold as a package, rather than charging a separate price for each one individually.
To calculate WTP for bundles, we add the value the consumer places on each product together, then find the profit maximising price and compare to profit if each were sold separately.

For price discrimination to work, three conditions must be met:

1. The firm must have market power to charge above competitive price
2. Customers must differ in their price sensitivity – different WTP levels
3. Firms must be able to prevent or limit resale

**Lecture Nineteen:**
Pricing decisions:
*Competitive market*: P=MC, zero profits in long run, P=ATC
*Monopoly*: MR=MC and set price at what consumers are willing to pay, possible to earn profit in long-run but produces at an inefficient level, causing DWL

Characteristics of monopolistic competition:

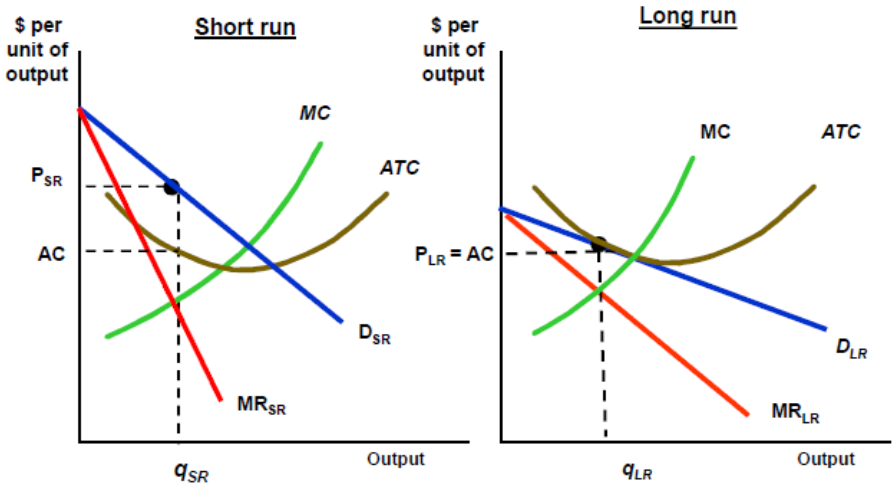
- Many buyers and sellers
- Product differentiation but products are close substitutes
- Relatively elastic demand curve
- No barriers to entry
- Market structure lies between perfect competition and a monopoly

The main source of market power in with monopolistic competition is product differentiation which aims to change the consumers' view that all products are perfect substitutes by creating differences in quality, features, brands etc. This means consumers cannot simply switch to another supply and receive the exact same product.

Pricing decisions:
In the short run, firms can make economic profits where P>ATC, demand is relatively elastic where there are many good substitutes and profit is maximised when MR=MC

In the long run, as new firms are attracted to the industry by profit opportunities, the existing firms' demand will decrease and become more elastic, resulting in less market power. The firms' outputs and prices will fall and industry output will rise. There is no economic profit due to no barriers of entry so P=ATC, however there is still some monopoly power so P>MC.

This means there are two long run equilibrium characteristics for monopolistic competition, either as with a monopoly where P>MC with profit maximisation at MR=MC or as with a competitive market where P=ATC, due to free entry driving economic profit to zero.

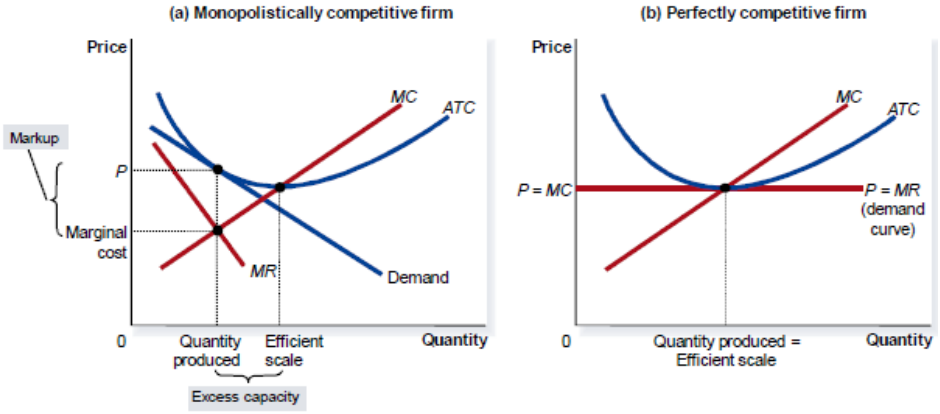



The result of new firms entering a market will be that demand for existing suppliers will be reduced as well as an increase in elasticity because of the availability of more substitutes.

Monopolistic vs Perfect competition:

Perfect competition: No excess capacity in the long run as p=ATC causing everyone to produce at the efficient level. P=MC

Monopolistic competition: Higher average cost due to inefficient output. P>MC due to market power, creating higher profits but also resulting in DWL




Effects of competition:

Due to firms needing to differentiate their products, there is more incentive for imitation or innovation. There is a greater degree of competition, making it harder for firms to earn positive profits in the long run.

Firms can differentiate products by creating something with the fewest number of close substitutes, by developing the product, advertising or creating a brand name and image etc.

**Lecture Twenty:**

*Perfect competition*: P=MC, free entry/exit, 0 long run profit

*Monopoly*: P>MC, barriers to entry, positive long run profit

*Monopolistic competition*: M>MC, product differentiation, some market power, free entry/exit, 0 long run profits

*Oligopoly*: P>MC, high barriers to entry, substantial market power, limited by firm rivalry, positive profits in long run

Oligopoly:

- A few firms account for most/total industry production
- Products may or may not be differentiated
- Concentrated markets because of substantial barriers to entry e.g. economies of scale, patents, funding, market reputation etc.

*Market Concentration:* concentration ratio: measure the size of the top firms in an industry as a proportion of the total industry size e.g. four firm concentration ratio is the % of industry sales accounted for by the top four firms. The higher the ratio, the more concentrated the industry.

*Strategic consideration*: Decision-making in an oligopolistic firm is complicated because of strategic considerations. Each firm must carefully consider how its actions will affect rival firms and how they are likely to react.

A key feature of oligopoly is the tension between cooperation and self-interest – a group of oligopolists are best off cooperating and acting as a monopolist by producing a smaller quantity and charging P>MC however because each firm cares only about their own profit, there is incentives to increase output.

*Duopoly:* an oligopoly with only two sellers

*Nash Equilibrium:* a situation in which economic actors interacting with one another choose their best strategy given the strategies that all the others have chosen. With a NE, there is no incentive for a firm to increase/decrease production.

Game Theory:
*Game Theory* is a study of strategic situations in which decision-makers need to anticipate other players' decisions before best knowing how to behave themselves.

Rules:

- Set of platers
- Set of strategic options available to each player
- Payoffs of each player for all possible combinations of strategies pursued by all the players
- Assumption that all players are rational (wish to make profit)

*Strategy:* a strategy for a player is a complete plan for the actions they will take at each stage of the game

Key Elements:

- *Payoffs:* a payoff is the number which represents the well-being outcome for that player
- *Equilibrium:* the predicted outcome for the game subject to the requirement that each player chooses a strategy that is the 'best response' to the strategies of the other players

- *Strategic decisions:* those in which each player must decide how the other will respond in deciding what actions to take

*Game table:* simultaneous games
*Game tree:* sequential games

*Dominant strategy:* a strategy which, regardless of the actions of the other players, always gives a player a higher payoff than the other available strategies

**Lecture Twenty-One:**
*Nash Equilibrium:* choice of strategy for each player such that their strategy achieves the highest possible payoff given all other players and choosing their 'best response' strategies

Rules:

1. If you have a dominant strategy, use it
2. Never play a dominated strategy
3. If your opponent has a dominant strategy or dominated strategy, this may reveal your own best strategy

**Lecture Twenty-Two:**
*Sequential move games* are games in which one player moves first, and the second mover observes the action taken by the first mover before it decides what action to take
To determine the moves made by players in a *sequential game*, we use a process called *backward induction*
The equilibrium found through a *sequential game* is known as a *rollback equilibrium*
*Rollback equilibrium* is the actions that rational players would take – the choice of strategy for each player such that each player chooses at each decision node the action that is payoff maximising given all other players choose optimal actions at all subsequent decision nodes in the game tree

1. Look ahead and reason back, using the principle of backward induction to think about what other players will do and hence decide one's own best choice of action
2. Order matters, being in a sequential game can alter payoff compared to simultaneous game

Strategic moves:
A move that influences the other person's choice in a manner favourable to one's self, by affecting the other person's expectations of how one's self will behave, i.e. constraining the other players choice by constraining one's own behaviour.

**Lecture Twenty-Three:**
Barriers to entry are an important source of monopoly power and profits, these can arise natural – economies of scale, patents etc. or firms can deter entry by making strategic moves. They can do so by convincing any potential competitor that entry will be unprofitable, but this involves a commitment.

For a strategy to be effective, it must be credible, and must change the payoffs so your rival changes their behaviour in a way which benefits you