

- Because of the 'Law' of demand a demand curve is likely to be negatively sloped. i.e. there is an inverse relationship between changes in price and changes in quantity demanded.
- In the diagram on the left a rise in the price of cookies from P_1 to P_2 ($1 \rightarrow 1.50$ CHF) has resulted in a fall in quantity demanded from Q_1 to Q_2 ($130 \rightarrow 110$). This is shown by a movement along the demand curve from point ① to point ②.
- The demand curve for cookies has been drawn based upon the assumption of ceteris paribus. i.e. nothing else that could affect the demand for cookies (except for the price of cookies) has changed.

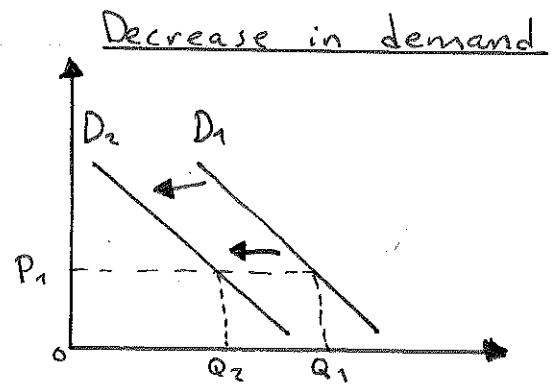
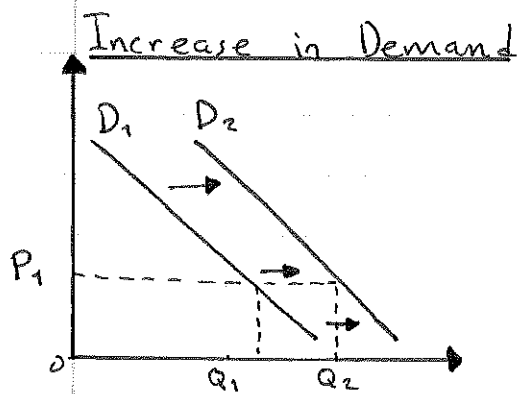
Changes in demand

20/09/12

"A change in quantity demanded occurs when more or less of a product is demanded by consumers as a result of a change in the product's price, assuming ceteris paribus."

"A change in demand occurs due to a change in the conditions of demand. Ideally when something else apart from a change in the price of the product itself changes, leading to more or less of the product being demanded at every price."

A change in demand is shown by a shift of the whole demand curve



Factors Affecting Demand

- Income
 - Inferior goods
 - Normal goods
- Prices of other products
 - Substitutes
 - Complements
- Change in income distribution
- Expected price changes in the future
- Advertising
- Government policy
- Changes in population
 - size
 - structure
- Changes in fashion
- Seasons

The non-price determinants of Supply

03/10/12

Non-price determinants of supply cause a shift of the supply curve, both to the left or to the right, depending on the situation. As always a ceteris paribus assumption is made. The main non-price determinant that affects the supply curve is the change in the cost of factors of production.

1) The cost of factors of production

When there is an increase in the cost of a factor of production this will increase the production costs. This in turn means that less of a product will be supplied shifting the supply curve to the left. High cost of production decreases quantity supplied. Low cost of production increases quantity supplied.

2) Price of alternative products

Producers can choose what to produce. They are drawn to higher selling prices to maximise profits. If skateboards are selling for a higher price, than rollerblades production will decrease as producers shift the use of their resources.

This change in the price of a substitute product will lead to a change in the quantity supplied of another.

3) The state of technology

Improvements in the state of technology in an industry or firm will lead to an increase in quantity supplied. This will shift the supply curve to the right. The opposite will shift the supply curve to the left.

4) Expectations

Producers make decisions on what to supply based on expectations of future prices. If suppliers expect the prices to increase in the future they may decide to store product to sell at a later date. This could decrease the quantity supplied of the product at a specific date. If the opposite happens producers will try to get rid of products which would increase the quantity supplied.

5) Government Intervention

Governments can impose indirect taxes on goods and services which are added to the price of the product. Therefore the supply curve shifts to the left and less products are produced. Governments can also impose subsidies on firms, which is a payment to support a firm or organisation by the government. These subsidies decrease the production cost therefore the supply curve shifts to the right.

Supply

21/09/12

Definition:

"The supply of a product refers to the amount of a product which producers or sellers are prepared to offer for sale at a range of prices over a period of time."

Profit is the sale price minus the production/cost price.

"In general there is a positive relationship between changes in the selling price of a product and the quantity supplied to the market. (i.e. "The Law of Supply")"

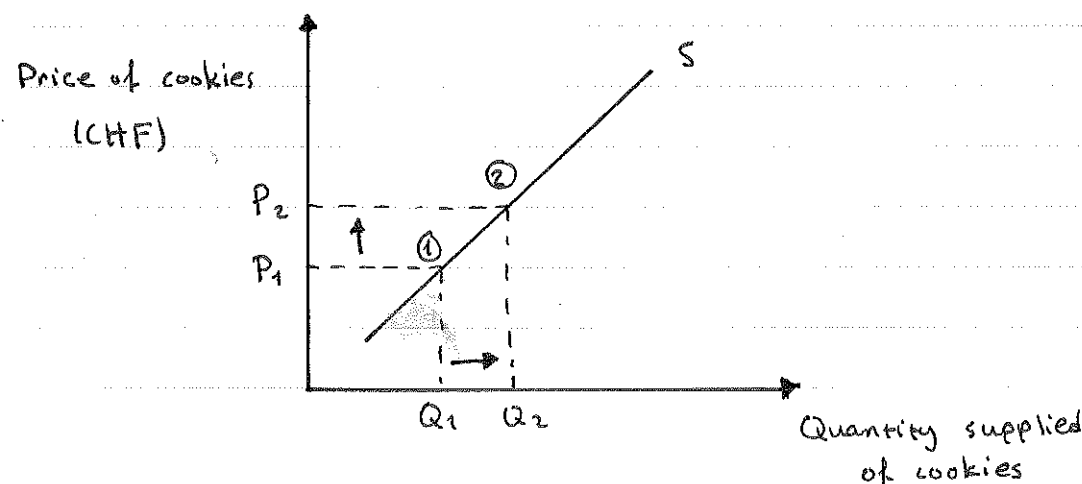
$$\begin{array}{l} \uparrow P \longrightarrow \uparrow QS \\ \downarrow P \longrightarrow \downarrow QS \end{array}$$

A supply schedule simply shows the quantity supplied/ the quantity suppliers are willing and able to supply at different prices.

Supply schedule for cookies

Price/unit	Quantity supplied
2	10
4	20
6	30
8	40

Supply curve for a product will (in general) be positively sloped.



In the previous diagram a rise in selling price from P_1 to P_2 has led to an increase in the quantity supplied of cookies from Q_1 to Q_2 . i.e. there has been a movement along the supply curve from point ① to point ②.

A supply curve is drawn based upon the assumption of *ceteris paribus*. i.e. it is assumed that anything else which can affect the supply of a product apart from its price has remained constant.

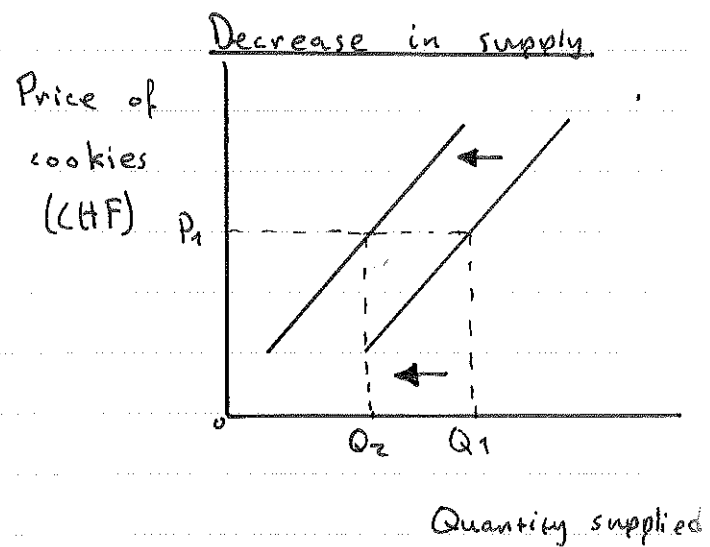
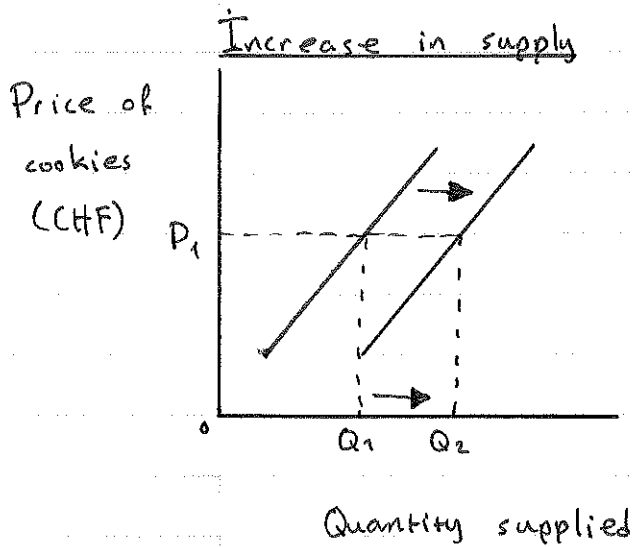
Why is a supply curve positively sloped?

It is assumed that, in a market system, the main motivator for suppliers is profit. Profit can be defined in different ways. At its most basic definition profit equals sale price minus cost price. (profit = total revenue - total cost). Economists use the symbol π to represent profit.

If it is assumed that the cost price (i.e. the costs incurred by suppliers in order to produce and sell the product e.g. raw material costs, labour costs, capital costs...) does not change, then the profit per unit will be higher at a higher selling price. Existing suppliers will wish to increase their quantity supplied and new suppliers will enter the market attracted by the higher potential profits.

Changes in Supply

"A change in supply occurs when more or less of a product is supplied to the market at every price and is shown by a shift of the supply curve



Non-price determinants of Supply

01/10/12

- 1) change in cost of production
 - raw material cost
 - labour costs
 - capital costs
- 2) change in prices of alternative products
 - (changes in the price of a product will lead to a change in the supply of by-products.)
- 3) state of technology
 - better tech. leads to an increase in supply
- 4) expectations
- 5) government intervention
 - taxes (income and sales) (direct vs indirect)
 - subsidies

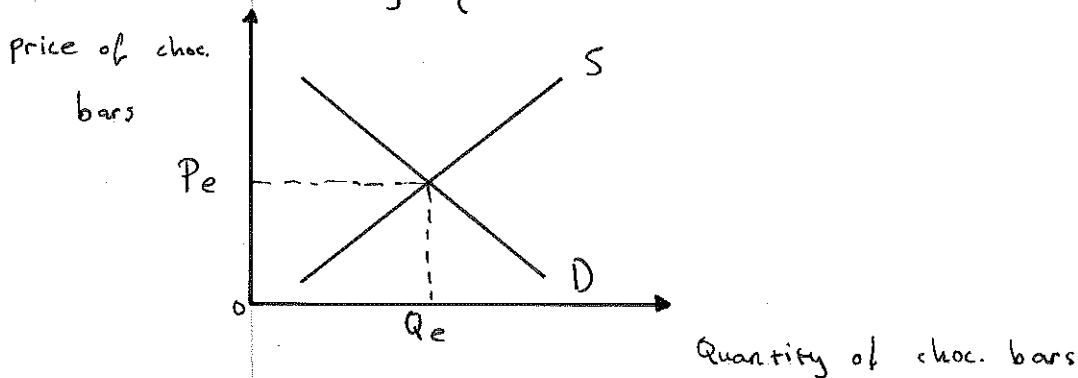
Market Equilibrium

01/10/12

In general demand curves are negatively sloped.

In general supply curves are positively sloped.

There will be one price where the quantity demanded of a product equals the quantity supplied of the product. This is known as the equilibrium price or market clearing price.

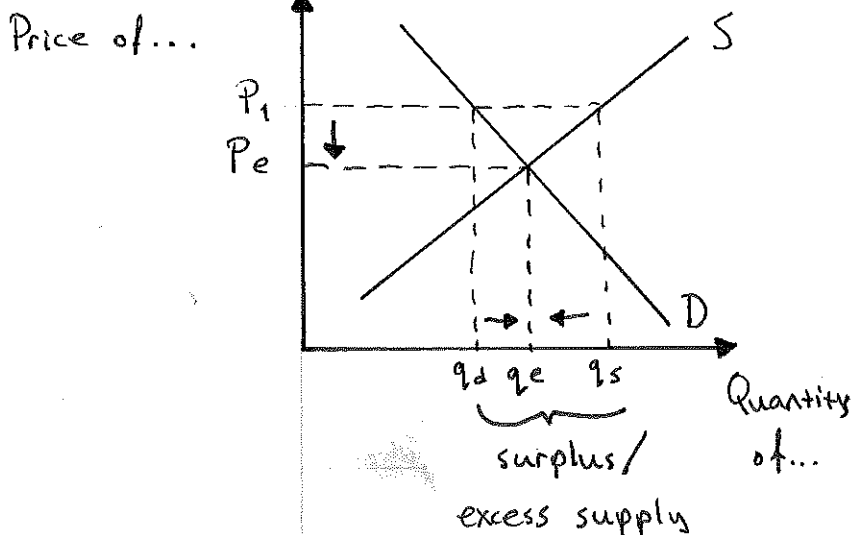


At price P_e the quantity supplied to the market is Q_e and the quantity demanded by consumers is Q_e . At price P_e , therefore, the quantity demanded equals the quantity supplied and the market is in equilibrium.

In a free market (no government intervention) markets will always move to an equilibrium position, where quantity demanded equals quantity supplied at a particular price.

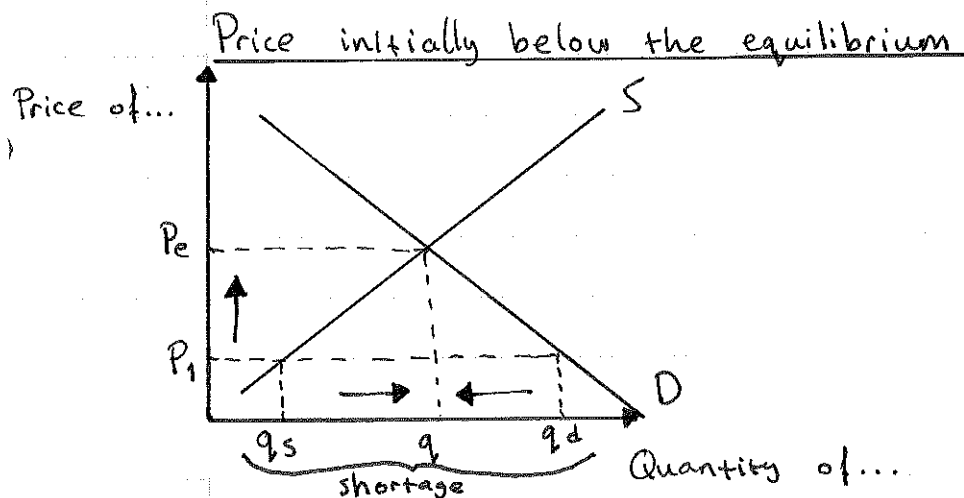
Price initially above the equilibrium

04/10/12



Referring to the diagram on the left;

At P_1 quantity demanded (q_d) is less than quantity supplied (q_s). Therefore there is a surplus of q_d to q_s . Because of the surplus prices will be forced down. As price decreases q_d will increase and q_s will decrease. These trends will continue until equilibrium is reached. Eventually market will be in equilibrium at P_e q_e .



At price P_1 quantity demanded is greater than the quantity supplied ($q_d > q_s$). Therefore there is a shortage or excess demand of q_s to q_d . Because of the shortage prices will be forced up by producers. As prices increase q_d will decrease and q_s will increase. These trends will continue until equilibrium is reached. Eventually market will be in equilibrium at P_e q_e .

Changes in Market Conditions

05/10/12

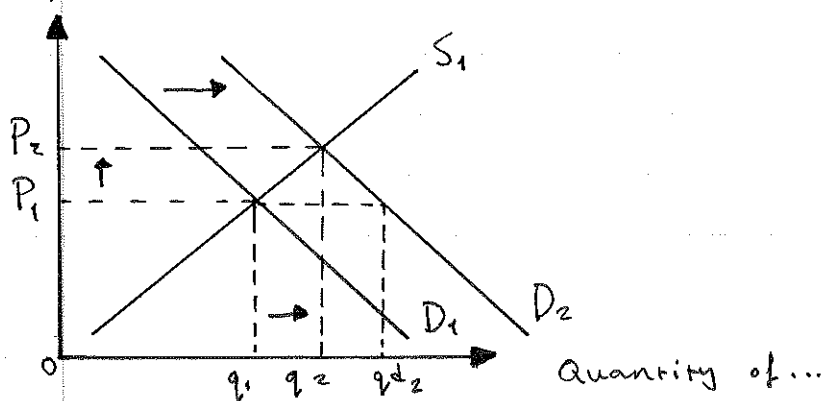
"A change in market conditions is when any of the factors which result in a shift of either the demand curve or the supply curve occur." For demand this change of factor could be because of a change in the price of a complementary goods. For supply the main factor that could affect the supply curve would be a change in the cost of production.

"A change in market conditions is likely to cause an initial surplus or shortage but eventually market forces will cause the price to change until the surplus or shortage is eradicated and a new equilibrium position is reached, where quantity demanded again equals quantity supplied at the new equilibrium price."

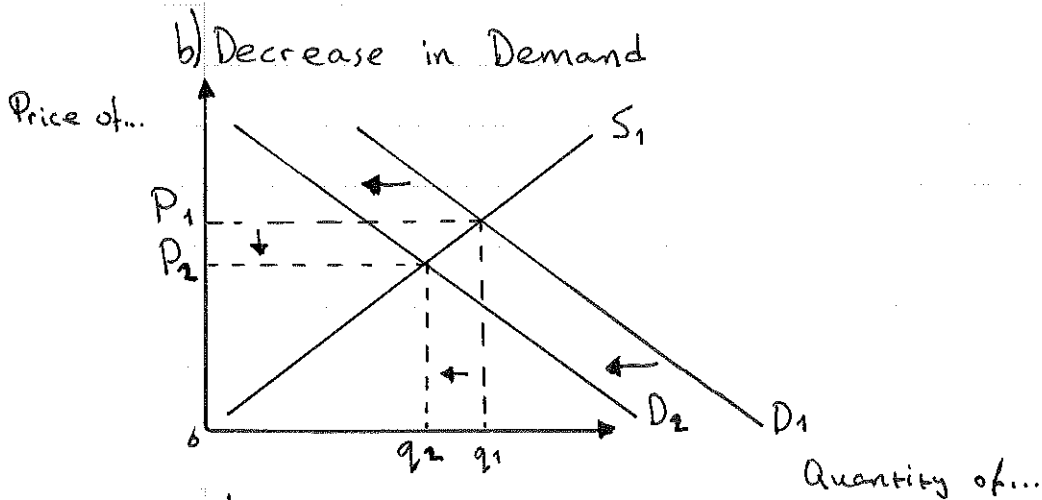
① Changes in Demand

a) Increase in Demand

Price of...



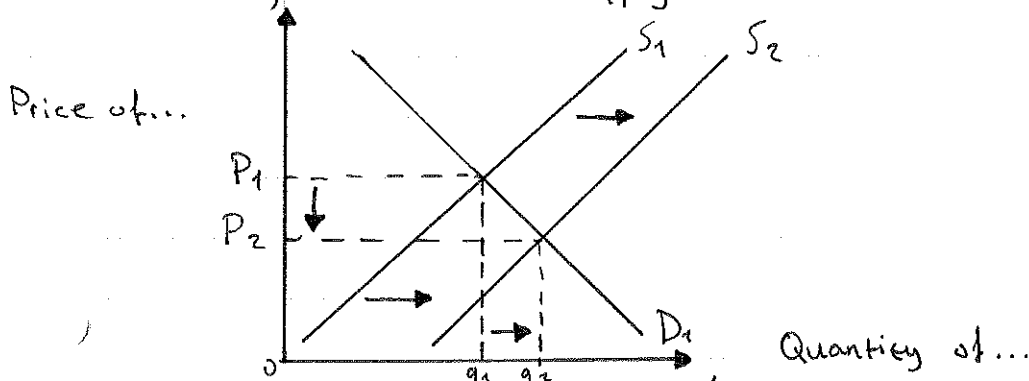
Due to a change in factors affecting demand there has been an increase in demand. This is shown by a shift to the right of the demand curve from D_1 to D_2 . At the original price, P_1 , there will now be a shortage of the product of q_1 to q_{d2} . As a result the price will rise until a new equilibrium is reached at a higher price P_2 and a higher quantity q_2 .



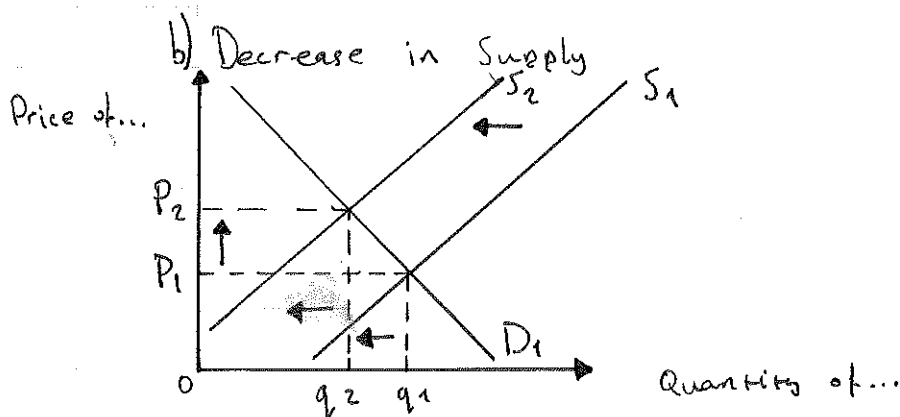
- ↓ Demand (D curve → left - D_1 to D_2)
- @ original Price (P_1) there is now a surplus
- eventually price will fall ($P_1 \rightarrow P_2$) and equilibrium quantity will fall (q_1 to q_2)

② Changes in Supply

a) Increase in Supply



- Increase in Supply (S curve to right - S_1 to S_2)
- @ P_1 now surplus
- eventually new equ. will be reached at a lower price (P_1 to P_2) but a higher quantity (q_1 to q_2)



- Decrease in Supply (S curve to left, S_1 to S_2)
- @ P_1 there is now a shortage
- eventually new equilibrium will be reached at a higher price (P_1 to P_2) but a lower quantity (q_1 to q_2)

Linear Demand and Supply Functions

08/10/12

Linear Demand Functions (Pg 25-26)

$$Q_d = a - bP$$

where;

Q_d = quantity demanded

a = the amount of the product which would be demanded if the price was 0, i.e. it shows the position of the demand curve. (higher the value for a the further to the right is the D curve)

P = price/unit of the product

b = sets the slope of the D curve, i.e. it gives an indication of the price elasticity of demand (P.E.D) for the product

The equation states that

$$Q_d = a - bP$$

ie. reflecting the fact that there is an inverse relationship between changes in P and changes in Q_d .

Linear Supply Functions (Pg 30-32)

$$Q_s = c + dP$$

where;

Q_s = quantity supplied

c = the amount of the product which would be supplied if the price was zero, i.e. it shows the position of the S curve (higher the value for c , the further to the right is the S curve)

P = price/unit of the product

d = sets the slope of the S curve, i.e. it gives an indication of the elasticity of supply (E of S) for the product

The equation states that

$$Q_s = c + dP$$

ie. reflecting the fact that there is a positive relationship between changes in P and changes in Q_s

Intercepts for Demand function

11/10/12

eg. $Q_d = 100 - 4P$

- To find the price intercept for a demand function/curve, set $Q_d = 0$ and solve for P .

eg. $Q_d = 100 - 4P$

$$0 = 100 - 4P$$

$$4P = 100$$

$$P = 100/4$$

$$P = 25$$

- To find the quantity intercept, set $P = 0$ and solve for Q_d .

eg. $Q_d = 100 - 4P$

$$Q_d = 100 - 0$$

$$Q_d = 100$$

- Join the price intercept with the quantity intercept to create a negatively sloping Demand curve.

Intercepts for Supply Function

eg. $Q_s = -80 + 2P$

- To find the price intercept for a supply function/curve, set $Q_s = 0$ and solve for P

eg. $Q_s = -80 + 2P$

$$0 = -80 + 2P$$

$$-2P = -80$$

$$P = -80/-2$$

$$P = 40$$

- To find quantity intercept, set $P = 0$ and solve for Q_s

eg. $Q_s = -80 + 2P$

$$Q_s = -80$$

- Joined together to create a positively sloped supply curve.

The Equilibrium Condition

$$Q_d = a - bP$$

$$Q_s = c + dP$$

∞ For equilibrium;

$$Q_d = Q_s$$

$$a - bP = c + dP$$

and @ equi, $Q_d - Q_s = 0$

How to find equilibrium price and quantity

Let demand be given by the function $Q_d = 200 - 4P$

Let supply " " " " " $Q_s = 4P$

(no c value means the supply curve starts from origin)

Step 1) write out the equilibrium conditions

$$Q_d = Q_s$$

therefore $200 - 4P = 4P$

$$200 = 8P$$

$$\underline{P^* = 25}$$

(P^* = equilibrium price)

Step 2) Substitute P^* into either the demand function or the supply function to find equilibrium quantity.

D function $Q^* = 200 - 4P$

$$Q^* = 200 - 4(25)$$

$$Q^* = 200 - 100$$

$$\underline{Q^* = 100}$$

S function $Q^* = 4P$

$$Q^* = 4(25)$$

$$\underline{Q^* = 100}$$

Step 3) Therefore, equilibrium price is CHF 25 and equilibrium quantity is a 100 units.

Elasticity

15/10/12

The concept of elasticity in Economics refers to the responsiveness of either QD/demand or QS to a change in something else.

- Four different measures of Elasticity will be considered.

- PED
XED
YED
- ① Price Elasticity of Demand
 - ② Cross price Elasticity of Demand
 - ③ Income Elasticity of Demand
- 1) Elasticity of Demand
- 2) Elasticity of supply

Elasticity of Demand

Elasticity of Demand measures the responsiveness of QD or demand to a change in either;

- a) the price of the product itself - Price Elasticity of Demand (PED)
- b) a change in the price of another product - Cross-price Elasticity of D.
- c) a change in consumers' incomes - Income Elasticity of Demand

① Price Elasticity of Demand (PED)

Def: PED measures the responsiveness of the Quantity Demanded of a product to a change in its price. (own-price elasticity of demand)

$$1) \text{ PED} = \frac{\% \text{ change in } Q_d}{\% \text{ change in } P} \quad \text{PED} = \frac{\text{change in } q.}{\text{original } q.} \times \frac{\text{original } P}{\text{change in } P}$$

$$2) \text{ PED} = \frac{-20}{15} = -1.33 \text{ (inelastic)}$$

$$3) \text{ PED} = \frac{5}{-30} = -0.16 \text{ (inelastic)}$$

$$4) \text{ PED} = \frac{-45}{32} = -1.41 \text{ (inelastic)}$$

$$5) \text{ PED} = \frac{9}{10} = 0.9 \text{ (inelastic)}$$

$$6) \text{ PED} = \frac{5}{20} \times \frac{16}{-4} = \frac{80}{-80} = -1 \text{ (unitary)}$$

$$7) PED = \frac{31}{87} \times \frac{76}{13} = -2.08 \quad (\text{elastic})$$

$$8) PED = 0 \quad (\text{perfectly inelastic})$$

$$9) PED = 0 \quad (\text{perfectly ~~in~~ elastic})$$

$$10) PED = \frac{15}{-90} = -0.16 \quad (\text{elastic})$$

Price Elasticity of Demand

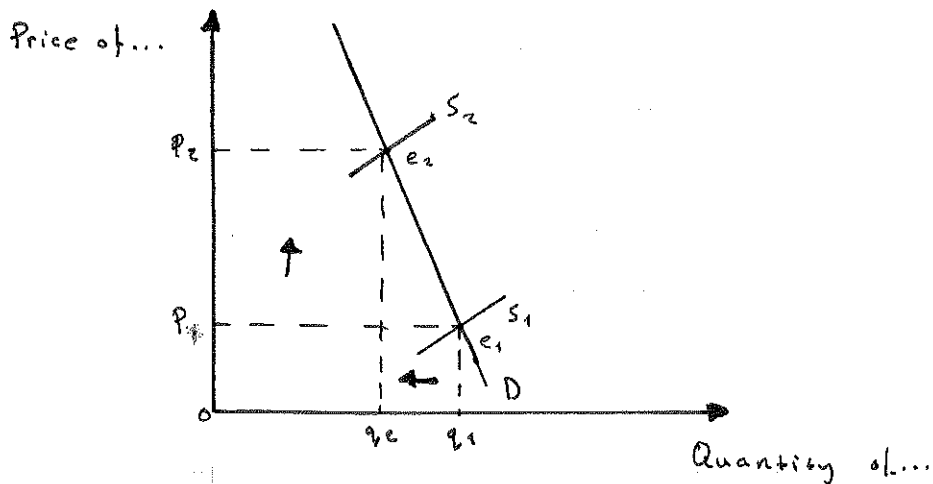
23/10/12

PED Explained Diagrammatically

The slope of a demand curve gives an indication of the PED for a product. However, the PED for a product's demand curve will vary along its length (see later notes).

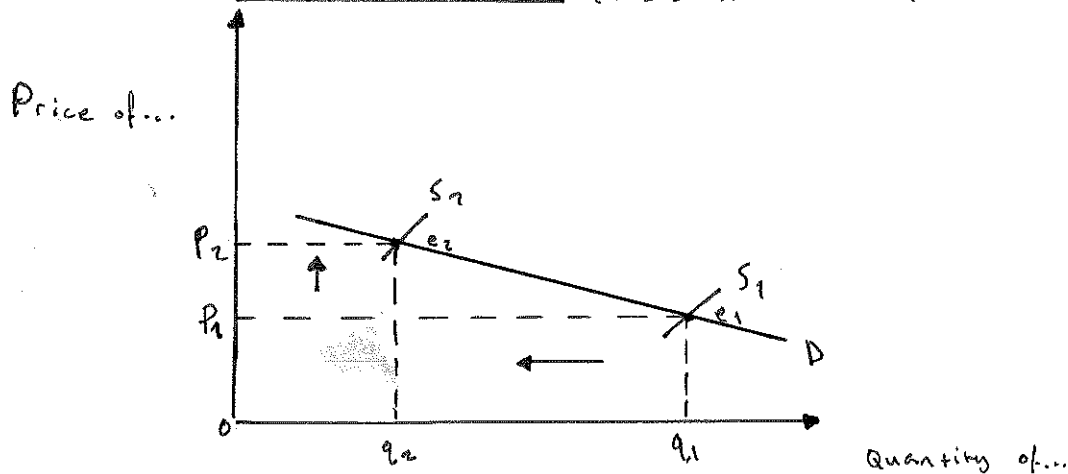
In general the steeper the slope of a demand curve the more inelastic demand is. In general the less steep a slope of a demand curve is the more elastic demand is. But... (see later)

Inelastic Demand (PED is between -1 and 0)



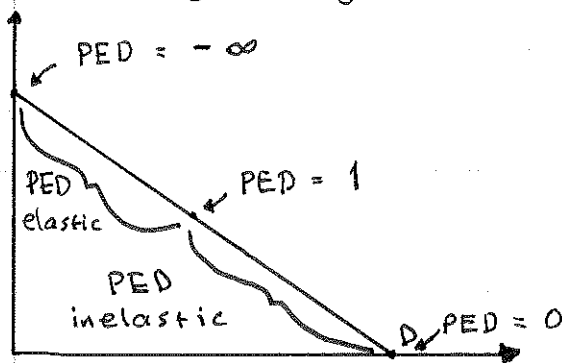
- Originally at P_1, q_1 , $TR = \text{area } OP_1e_1q_1$
- A significant $\uparrow P$ ($P_1 \rightarrow P_2$) \rightarrow less than proportionate $\downarrow QD$ ($q_1 \rightarrow q_2$)
- New $TR = \text{area } OP_2e_2q_2$
- Therefore a price rise has led to a rise in total revenue
 $\therefore P \uparrow \rightarrow TR \uparrow$ ($OP_2e_2q_2 > OP_1e_1q_1$)

Elastic Demand (PED is between -1 and $-\infty$)



- Rise in price from P_1 to P_2 has led to a greater proportionate fall in quantity demanded from q_1 to q_2 (demand is elastic)
- Because Demand is elastic, the rise in price has led to a fall in total revenue.
- area $Op_2e_2q_2$ is less than area $Op_1e_1q_1$.

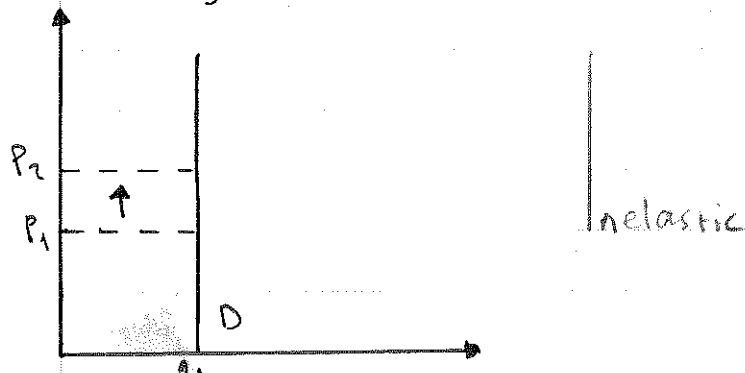
(important) N.B As mentioned above, although the slope of a demand curve can give an indication of the P. elasticity of demand for a product, any linear downward sloping demand curve will have varying elasticity along its length as shown below.



Demand curves with constant Elasticity

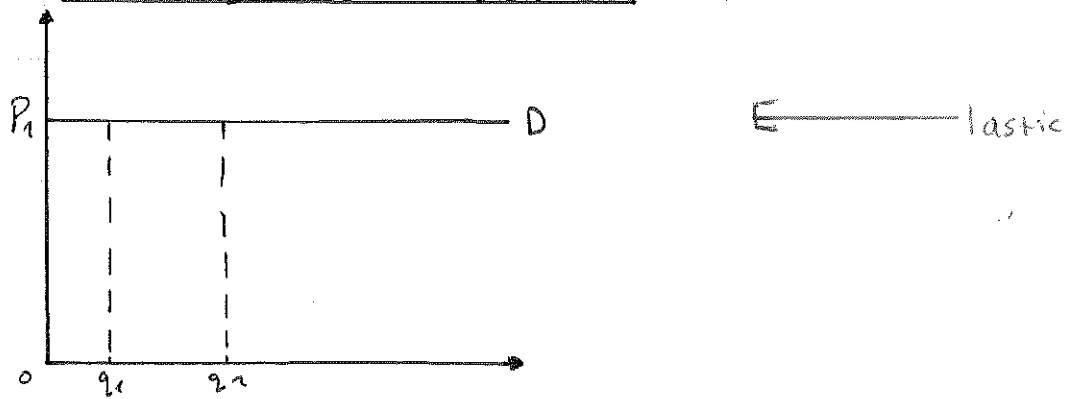
Although most demand curves have varying PED along their length there are three demand curves where PED will be constant.

Perfectly Inelastic Demand (PED = 0)



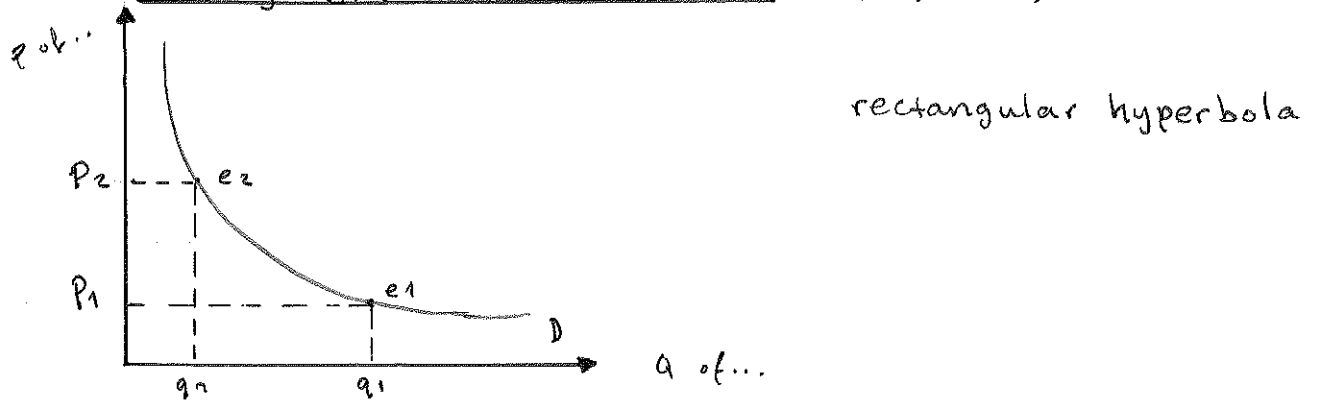
Q_d will not at all change in response to price change.

Perfectly Elastic Demand (PED = -∞)



There is only one possible and (in theory) any quantity may be demanded at this price (eg. perfectly competitive markets - see later notes)

Unitary Elastic Demand Curve (PED = -1)



$P \times Q = \text{maximum TR @ any point on a rectangular hyperbola } D \text{ curve (where PED is always -1)}$

1) The number and closeness of substitutes.

- The availability of close substitutes is the most important factor affecting PED. The more substitutes a product has the more elastic demand it has. Also, the closer the substitutes the more elastic demand it will have.

2) The necessity of the product and how widely the product is defined.

- Necessary products such as food have inelastic demand when defined in general terms. As the product becomes more specific such as meat the PED becomes relatively more elastic because there are many competing products such as other meats or vegetables. Wide definitions will usually have in elastic demand (food) and more specified definition will have increasingly elastic PED. It is important to remember that necessity is subjective and can depend on tastes and culture. Habit-forming goods may have very inelastic demand for certain people.

3) The time period considered

- As the price of a product changes it takes time for consumers to change their buying and consumption habits. In general, PED tends to be more inelastic in the short term and then becomes more elastic over time.

Cross elasticity of demand (XED)

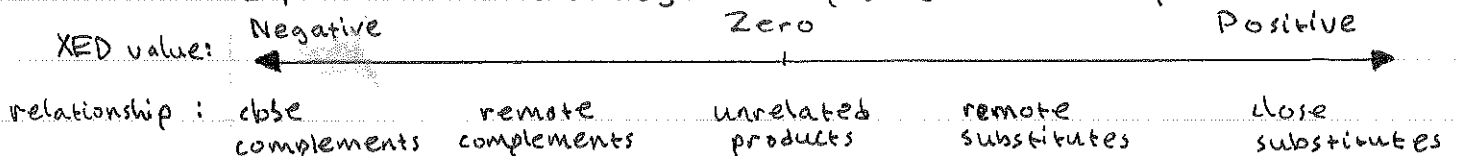
• XED is a measure of how much the demand for a product changes when there is a change in the price of another product.

$$\text{XED} = \frac{\% \text{ change in QD of product X}}{\% \text{ change in P of product Y}}$$

• XED explains the relationship between products.

• If XED value is positive = products are substitutes.

• If XED value is negative = products are complements.



Student Workpoint 4.5

- 1) LB: \$5 → 4.60 \$, 600 → 630 cans
SS: 400 → 340 sandwiches

% Δ QD of product X

$$\begin{aligned} XED &= \frac{\% \Delta P \text{ of product X}}{\% \Delta QD \text{ of product X}} \\ &= \frac{-15\%}{-8\%} \\ &= 1.88 \end{aligned}$$

- 2) LB's and SS's products are remote substitutes. The value for XED is a positive value but still relatively close to 0.

$$\begin{aligned} 3) XED &= \frac{5\%}{-8\%} \\ &= -0.625 \end{aligned}$$

- 4) LB's sandwiches and soft drink cans are remote complements. XED value is a negative number close to 0.

Income elasticity of demand (YED)

YED is a measure of how much the demand for a product changes when there is a change in the consumer's income.

$$YED = \frac{\% \Delta \text{ in QD of the product}}{\% \Delta \text{ in income of the cons.}}$$

- The neg. or pos. sign of the YED indicates if the product is a normal good or inferior good.
- If YED value is pos. = product is a normal good.
- If YED value is neg = product is an inferior good.
- An YED value between 0 and +1 is income-inelastic.
- An YED value greater than +1 is income-elastic.
- Necessity goods like food have low income elasticity which means the demand for them will change very little as income increases.
- Superior goods like foreign holidays have high income elasticity. Their demand changes significantly as income increases.

The foundations of Economics

07/09/12

Adam Smith

- Father of modern economics
- Wrote the first economics book, "An inquiry into the Nature and causes of the Wealth of Nations" in 1776.
- Book was written at the beginning of the Industrial Revolution.
- Following the Industrial Revolution use of machinery increased, banks for investing emerged and the stock exchange was born.
- Smith believed in a "free market" with no interference from governments (laissez-faire policy). This would leave producers and consumers to make their own decisions and maximise benefit from the market system.
- He believed that the "invisible hand" of competition would result in the most efficient outcome.
- However, he foresaw some problems such as firms working together to exploit customers and certain firms growing large enough to dominate the market (elimination of competition)
- His theories are now considered "classical economics"
- The orthodox view of his time was that the power of the free market would successfully allocate resources.

Economics / Social Science

- Study of people in a society and how they interacted with each other
- Human needs and wants are infinite whereas resources are finite.
- Economics is the study of rationing systems. It is the study of how scarce resources are allocated to fulfill the infinite wants of consumers
- People cannot have everything they desire so economics is necessary to distribute finite resources.

Numerical Elasticity Calculations Test Review

12/11/12

Price elasticity of demand (PED)

Def. - A measure of how much the quantity demanded of a product changes when there is a change in the price of a product.

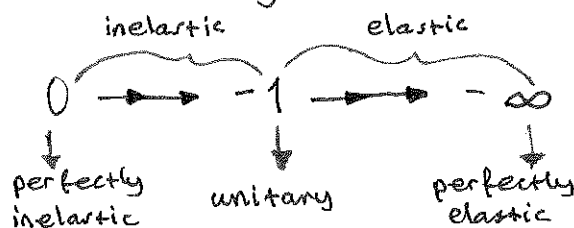
Equa. -
$$\text{PED} = \frac{\% \Delta Q_d}{\% \Delta P}$$

(or)
$$\text{PED} = \frac{\Delta Q_d}{\text{orig. } Q_d} \times \frac{\text{orig. } P}{\Delta P}$$

Tech. Def. - Responsiveness of Q_d to a change in the P of the product itself.

Answer 0 and -1 = inelastic demand
 -1 and ∞ = elastic demand
0 = perfectly inelastic demand
 $-\infty$ = perfectly elastic demand
 -1 = unitary elastic demand

Outline



Graphs refer to notes from 29/10/12, "Price Elasticity of Demand"

Cross elasticity of demand (XED)

Def. - A measure of how much the demand for a product changes when there is a change in the price of another product

Equa.
$$\text{XED} = \frac{\% \Delta Q_d \text{ of product } X}{\% \Delta P \text{ of product } Y}$$

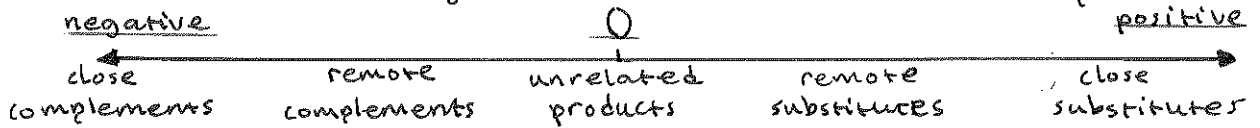
(or)
$$\text{XED} = \frac{\Delta Q_d \text{ of } X}{\text{orig. } Q_d \text{ of } X} \times \frac{\text{orig. } P \text{ of } Y}{\Delta P \text{ of } Y}$$

Tech. Def. - Responsiveness of the Q_d of one product to a change in the price of another product.

Answ. With XED the dividing value is 0.

- If answer is positive the two products are substitutes
- " " " negative " " " " complements

Outline:



Income elasticity of demand (YED)

Def. - A measure of how much the demand for a product changes when there is a change in the consumer's income.

Equa.

$$YED = \frac{\% \Delta Q_d \text{ of a product}}{\% \Delta \text{ in income of consu.}}$$

(or)

$$YED = \frac{\Delta Q_d}{\text{orig. } Q_d} \times \frac{\text{orig. income}}{\Delta \text{ income}}$$

Tech Def. - Responsiveness of the Qd of a product to a change in consumers' income.

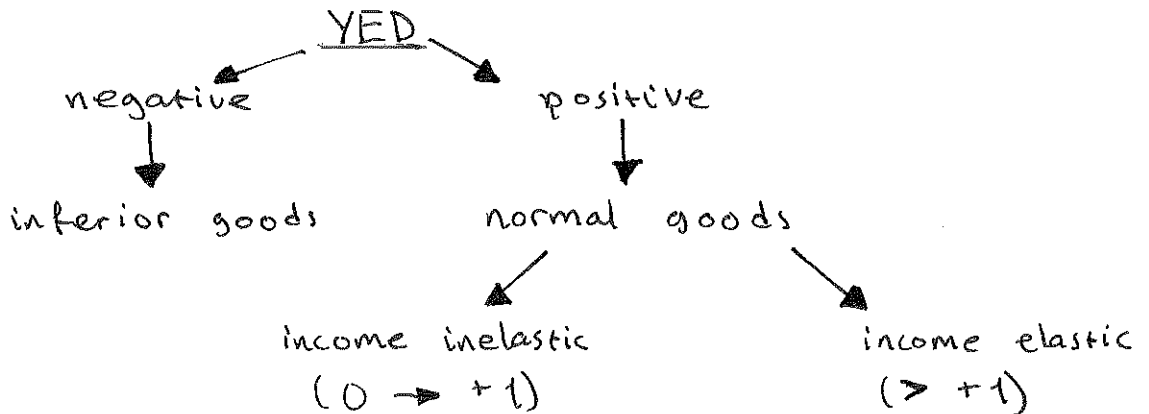
Answ. With YED the dividing value is 0.

- If the answer is positive the product is a normal good.
- " " " " negative " " " " inferior good

With normal goods there is a further division

- between 0 and +1, income inelastic (necessities)
- greater than +1, income elastic (luxuries)

Outline:



Determinants of Price Elasticity of Supply

08/11/12

1) How much costs rise as output is increased

- If cost of production rises significantly as producers attempt to increase supply the producers will not raise the supply. So, the elasticity of supply for the product will be relatively inelastic. It would take a large price increase to make it worthwhile for producers to increase supply. If, however, cost of production doesn't increase significantly, the producers will raise quantity supplied to take advantage of higher income. There are two factors that prevent a significant rise in costs.

a) The existence of unused capacity

- if unused capacity is present the elasticity of supply will be relatively high for the product.

b) The mobility of factors of production

- if factors of production are easily moved

★ 2) The time period considered

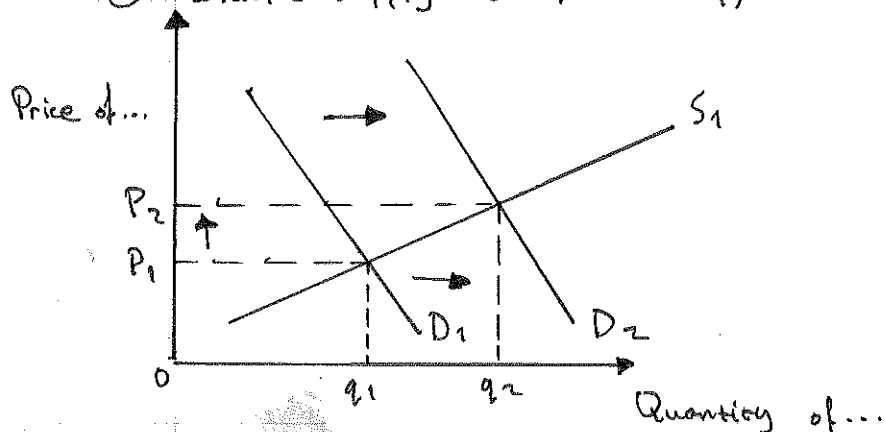
- The longer the time period considered the ^{more} elastic the supply will be. Time allows producers to increase their capacities

3) The ability to store stock

- If a firm is able to store high levels of stock of their products they will be able to react to an increase in prices. The PES for the product will be relatively elastic.

Elasticity of Supply Diagrams

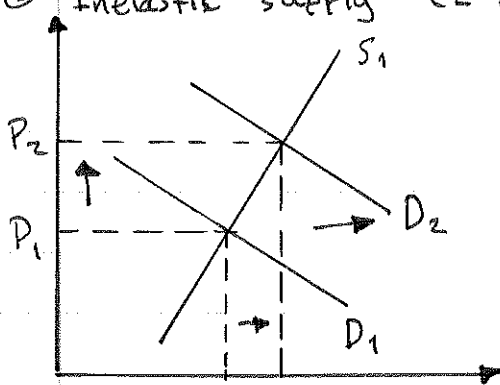
① Elastic supply ($E \text{ of } S > +1$)



↑ P → greater % ↑ QS

② Inelastic supply (E of S $0 \rightarrow +1$)

Price of...

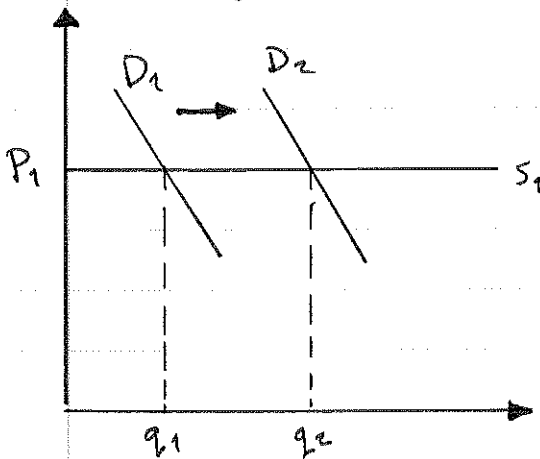


Quantity of...

$\uparrow P \rightarrow$ smaller % $\uparrow QS$

③ Perfectly Elastic supply (E of $S = \infty$)

Price of...

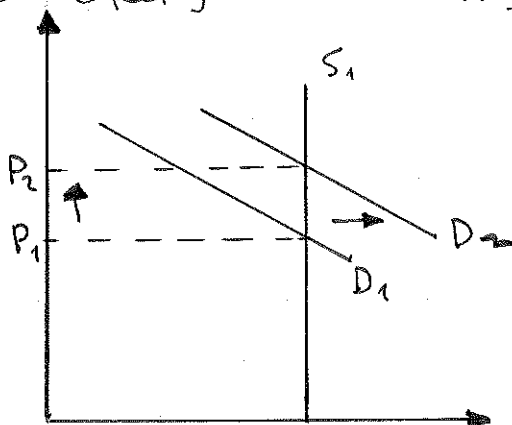


Quantity of...

ΔD (or ΔQ) will have no effect on the price of the product (e.g. where the market concerned is a tiny part of the overall market - see international economics for further information.)

④ Perfectly Inelastic supply (E of $S = 0$)

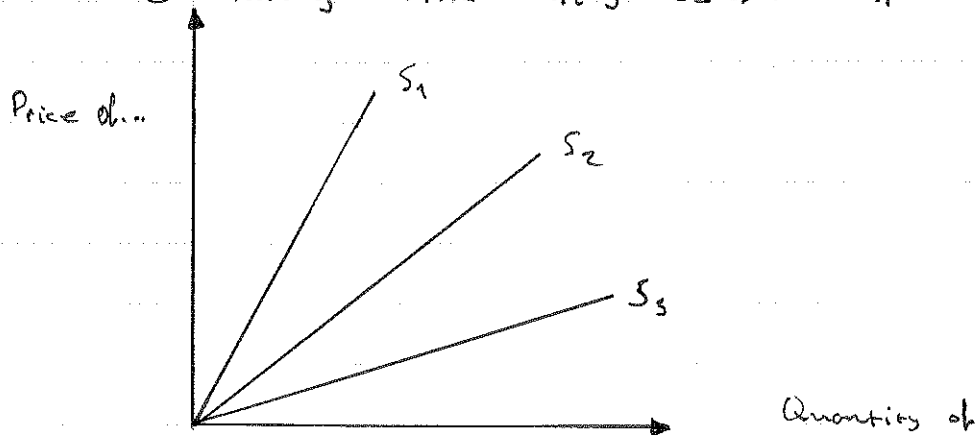
Price of...



Quantity of...

Qs cannot/will not change in response to a change in D /change in P . (e.g. fixed capacity theater, sports stadia.)

⑤ Unitary Elastic Supply ($E \text{ of } S = +1$)



Any linear/straight line S curve which passes through the origin will have unitary elasticity of supply. % rise in P equals % rise in quantity supplied

* End of elasticity unit

09/11/19

Government Intervention in Markets

(Chapter 5 of Textbook)

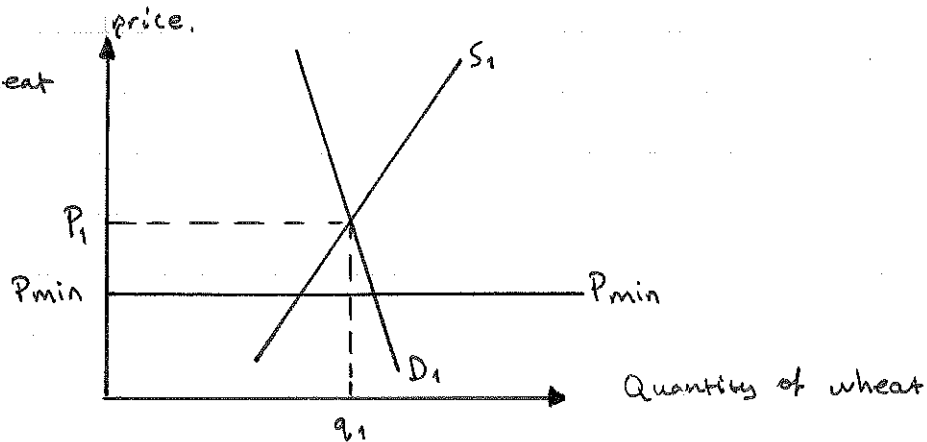
- In economies which are fundamentally free market economies, governments will still intervene in certain markets. Reasons for this intervention will vary but include raising tax revenue for government spending, supporting certain groups of producers or consumers and correcting what may be regarded as market failure.
- Three main methods which governments may use to intervene in markets are;
 - ① Price controls (minimum and maximum prices)
 - ② Indirect taxes
 - ③ Subsidies

1) Price controls

- In a free market resources are allocated and prices are determined through the forces of supply and demand. A change in market conditions (a change in the factors affecting the demand or supply of a product shown by shifts of the D or S curve) will lead to a change in equilibrium price. It is argued that the market system leads to an allocation of resources which reflects the wishes of consumers and suppliers.
- However, governments may feel that the free market system may result in prices being too low (so that producers supply too little) or too high (so that consumers consume too little) or that markets conditions change so frequently that prices fluctuate continually causing uncertainty amongst suppliers and consumers. Government may therefore intervene to prevent prices falling too low or rising too high or to try to stabilise prices.

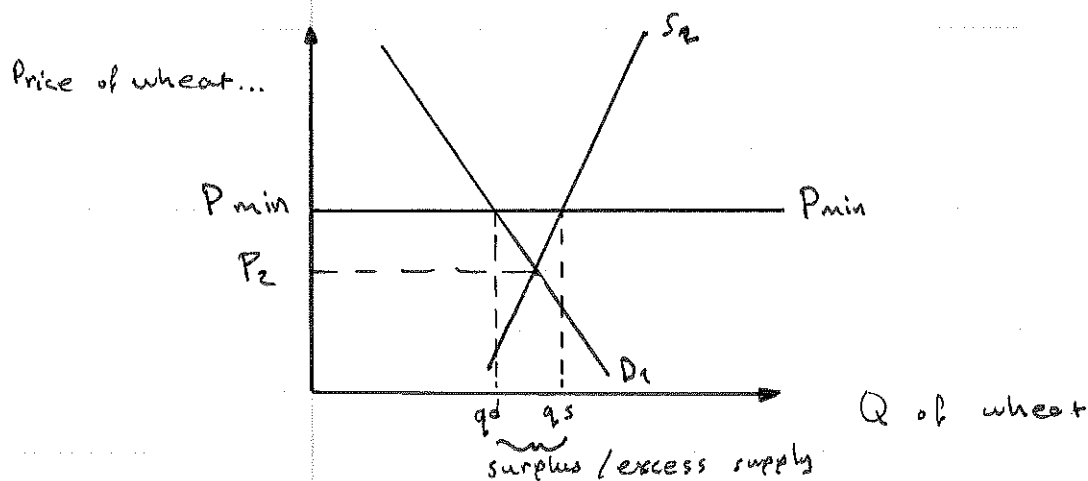
(a) Minimum prices ('Price Floors')

- A minimum price exists when a government does not allow the price for a product to fall below a certain level. Minimum prices are introduced primarily to support producers or suppliers, so that they are willing to produce and supply their product to the market, e.g. many countries use minimum prices for agricultural products. Also, many governments have introduced minimum wages, i.e. a minimum price for labour.
- As with any form of government intervention in a market there will be different impacts on different stakeholders (a stakeholder is any person or a group of people which is affected by a change, e.g. producers, suppliers, owners of firms, consumers, workers, government, local residents and others)
- Minimum prices (or minimum wages) will only have an impact if the free market equilibrium price falls below the minimum price.



The diagram above shows the market for wheat in a country. The equilibrium price for wheat, P_1 , is above the government imposed minimum price, P_{min} . Currently, therefore, price P_1 is the price which prevails and quantity q_1 is bought and sold. The minimum price does not impact the market

A change in market conditions now occurs which results in an increase in supply to S_2 as shown on the other side.



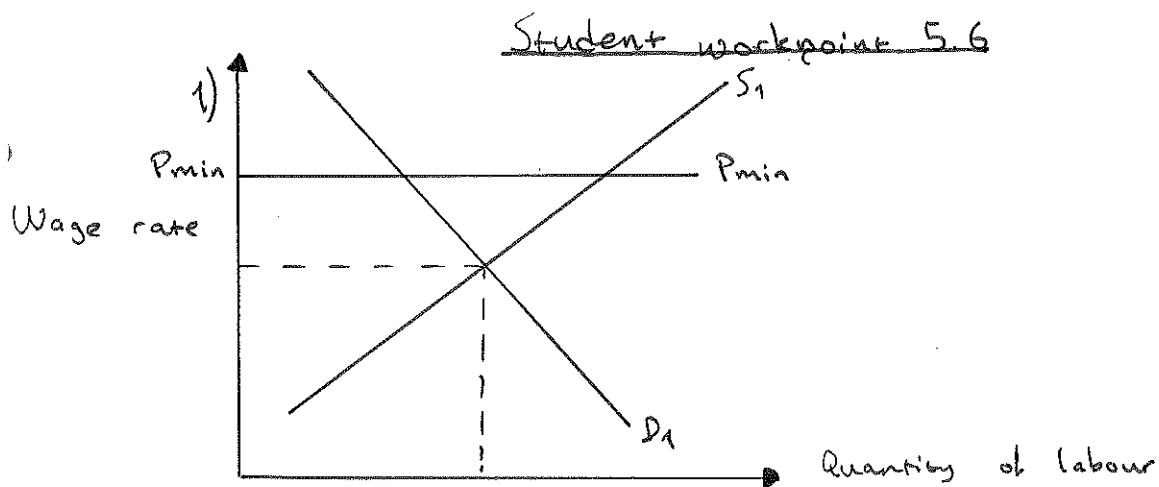
The diagram above shows that in a free market the equilibrium price would now fall to P_2 . However, the government does not allow the price to fall below P_{min} . At P_{min} , however, the market does not clear. The Q_s is greater than Q_d and there is a surplus or excess supply of wheat in the market.

The government's involvement in the market has created the surplus. Unless the government intervenes further producers with surplus products will attempt to sell their surpluses unofficially at a price below P_{min} but above the equilibrium price P_2 . This may undermine the government's economic authority and lead to the creation of a 'black market', 'unofficial market', 'parallel market' or a 'shadow market'.

Ways in which the government can intervene include;

- (1) buying up the surplus $q_s - q_d$ from suppliers at P_{min} and storing it to provide food security for possible release in future times of shortage. ('buffer stocks'). BUT \rightarrow problems of storage (cost, perishable items), high prices for consumers
- (2) government can pay producers to "set aside" productive land but still pay for the predicted harvest. This way the producers still receive minimum price but now there is no surplus. Therefore tax money is not used for storage and so forth...

- (3) producers can be limited by quotas which restrict supply. This would mean that at price min. only a limited number of producers would stay in business.
- (4) the government could attempt to increase demand for the product by advertising.
- (5) governments can restrict imports through protectionist policies to increase demand for domestic producers.

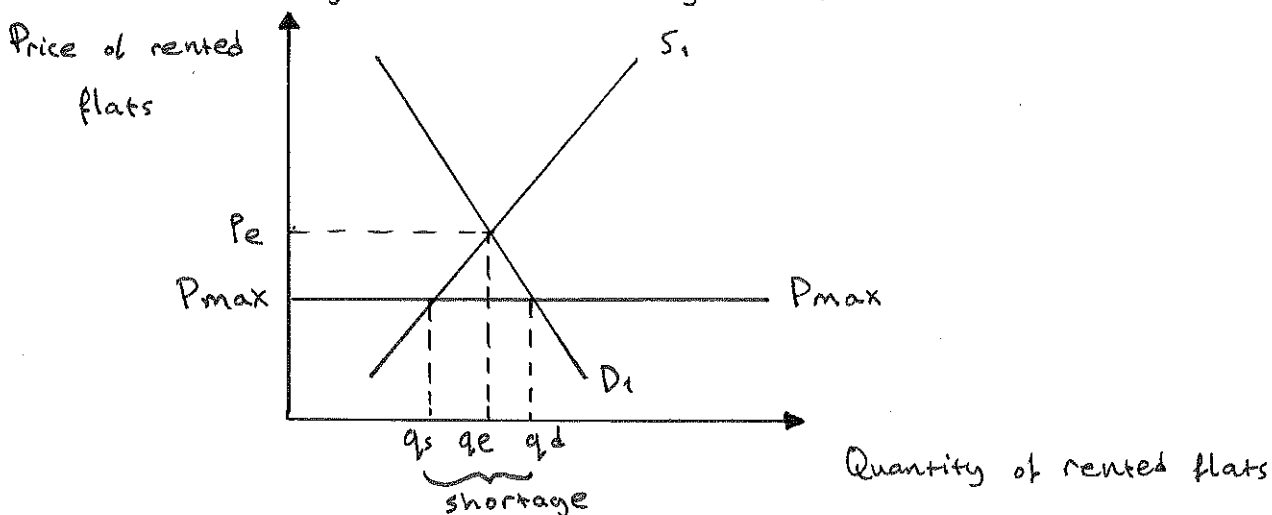


- 2) Minimum wage ensures the protection of the lower working class and encourages them to supply their labour. Unemployment present.
- 3) Employers have to pay higher than the P_e to their workforce which increases their cost of production. They may choose to employ fewer workers to keep down cost of production.
- 4) Subsidise employers

16/11/12

(b) Maximum prices ('Price ceilings')

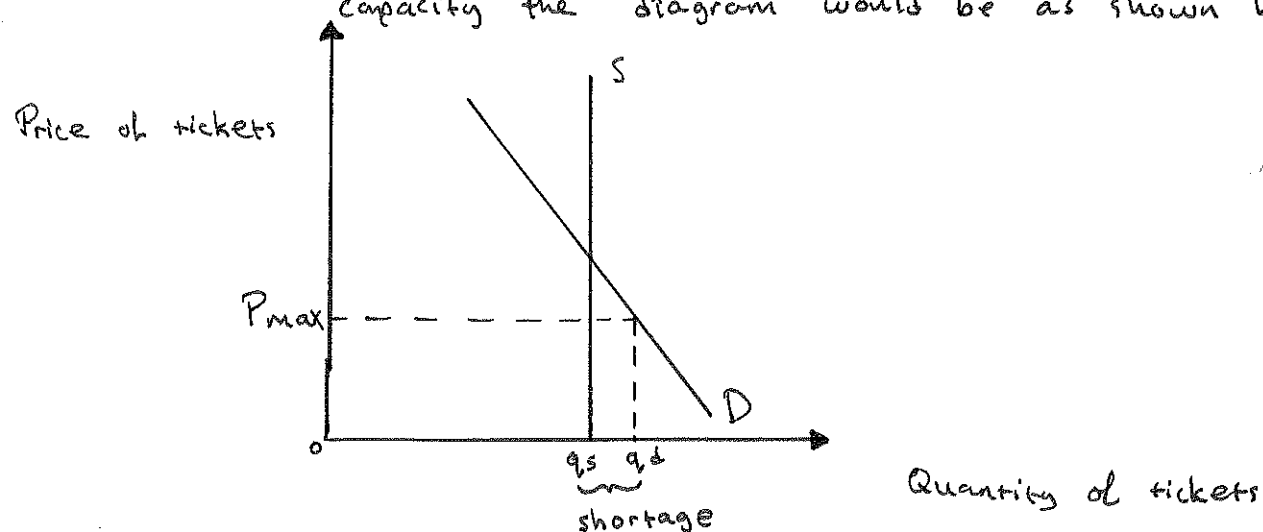
- The aim of maximum prices is to protect consumers. In some countries max. prices are introduced for products which governments feel are so important that they want to keep their price within the reach of "ordinary consumers" e.g. staple food (especially during a time of shortage due to natural disasters, war, etc...), rented accommodation.
- Maximum prices will only have an impact if the equilibrium price is above the maximum price. i.e. if the government feels that the free market price is too high to be "socially acceptable".



Because, in the government's view the equilibrium rent for flats is too high at P_e , it imposes a legally enforceable price ceiling of P_{max} . This results in a shortage of $q_d - q_s$.

Suppliers of products may also decide to sell their products at below the equilibrium price, e.g. promoters of concerts, theatre entertainment and sporting events. This may be because they want to ensure that the venue is full and that they avoid criticism of exploiting consumers by charging higher prices, e.g. tickets for the Olympics and World Cup.

In such a situation where a venue has a fixed capacity the diagram would be as shown below.



As a result of the imposition of maximum prices, shortages are created. This may result in the creation of a black market whereby products (or tickets) are sold illegally above the maximum price.

To try to reduce the likelihood of a black market situation arising and/or to deal with the impact of the shortage there are several options available to a government.

There are some ways through which governments can deal with shortages;

- (1) decrease demand until equilibrium is reached at maximum price, limiting the consumption of the product. Demand can be decreased through advertising and PSA.
- (2) increase supply until equilibrium is reached at P_{max} . Supply can be increased through government subsidies to producers to encourage increased production, governments could start to produce the product themselves or release stored goods into the market if there have been buffer stocks. As perishable goods cannot be stored the last solution would not work for all goods such as bread and fresh fish.

2) Indirect Taxes

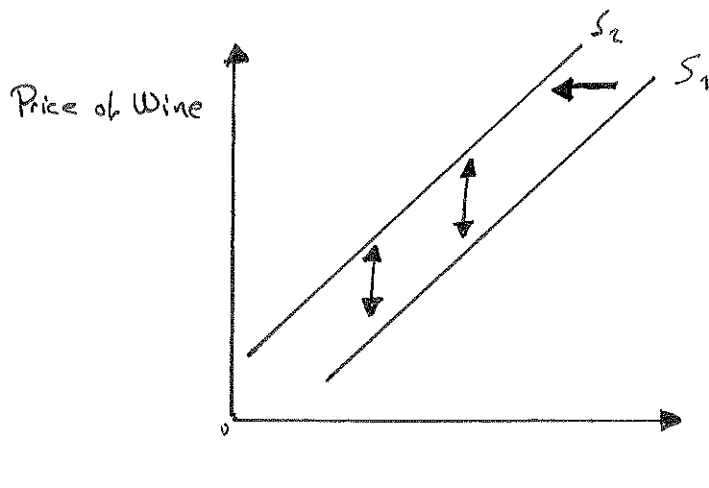
A tax is a compulsory transfer of funds from the private sector to the public sector (ie government).

Taxes can be divided into two main categories;

- Direct taxes (eg. income taxes, wealth tax, taxes on firm's profits, etc...). They are "direct" because the burden or incidence of the tax cannot be transferred to someone else. If income tax rates in an economy are increased then households' disposable income (income after tax and other compulsory deductions) will fall leading to a fall in the demand for most goods and services (normal goods), see later...
- Indirect taxes (e.g. expenditure taxes, sales taxes, V.A.T [value added tax], T.V.A [taxe de valeur ajoutée], K.D.V [katma deger vergisi], excise taxes/duties, import taxes/tariffs). Indirect taxes are "indirect" because, although it is the responsibility of the seller of the product to pay the tax to the government, the seller may transfer some of the burden/incidence to the consumer in the form of a higher selling price.

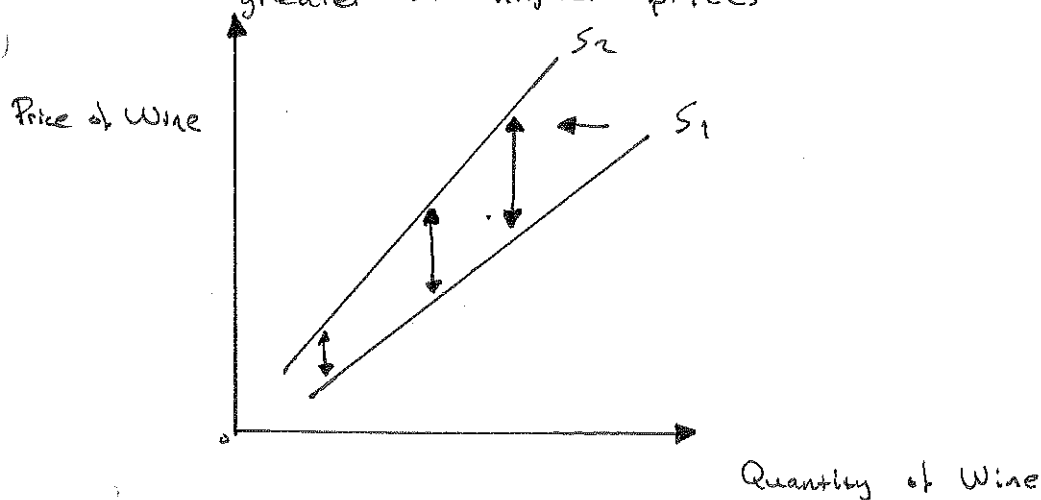
There are two main forms of indirect tax.

- Specific / Unit tax ie. where a fixed monetary amount of tax is levied or imposed on the sale of a product, regardless of its original selling price. eg a one franc tax on the sale of a bottle wine. Excise taxes (ie. additional taxes on products that the government wants to discourage the consumption of such as alcohol, cigarettes etc are often specific taxes. A specific tax is shown by a shift of the product's supply curve to the left. (because cost of production of the seller increases) as a parallel shift.



(b) Percentage % / 'Ad Valorem' Tax

This is when a percentage of the selling price of a product is levied as tax, e.g. V.A.T or KDV and most sales and import taxes. For example, a 20% sales tax imposed on a bottle of wine would be a tax of 1 franc on a 5 franc bottle but 10 francs on a 50 franc bottle. Because the monetary amount of tax paid with an 'ad valorem' tax increases as the selling price increases the tax would be shown by an "angled" shift of the supply curve to the left where the vertical distance between the supply curves (which represents the money value of the tax) becomes greater at higher prices



The impact of indirect taxes on different stakeholders

A stakeholder is any individual or group which is affected by an (economic) decision. In this case three stakeholders will be considered; consumers, producers and the government.

Impact of a specific tax

As referred to previously, the responsibility of paying a tax to the government lies with the supplier/retailer. This can be viewed as being similar to a rise in the suppliers' cost of production and will therefore be shown by a shift to the left of the supply curve.

The vertical distance between the old and new supply curves at every quantity will equal the monetary amount of tax paid per unit at that quantity.

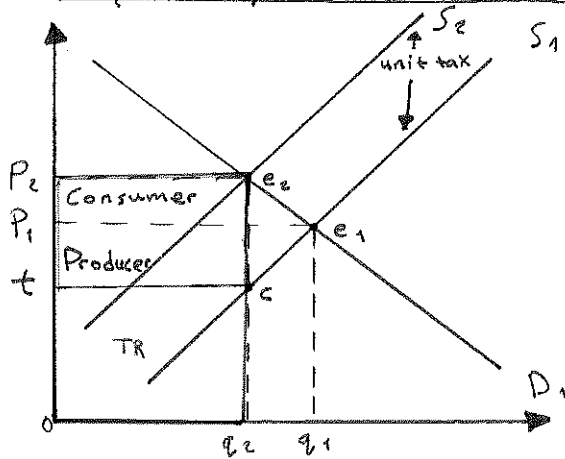
With a specific/unit tax the same monetary value is imposed per unit sold whatever the original selling price (e.g. 2 CHF/unit) and so the vertical distance between the two supply curves will be the same at every price and quantity. (e.g. in the exercise the after tax supply curve was parallel to the before tax supply curve and the vertical distance between the two curves equaled 2 CHF)

Before the tax the supplier was willing to supply 6 units at a price of 6 CHF/unit. After the 2 CHF/unit tax the supplier would only supply 6 units if she is left with 6 CHF after the government receives its tax. Therefore to supply 6 units now the supplier would want to charge 8 CHF

Impact of a Specific Tax

29/11/12

Price of ...



Quantity of ...

Before tax

$$TR = 0 p_1 e_1 q_1$$

$$\text{Total consumers' expenditure} = 0 p_1 e_1 q_1$$

} the same

After tax

$$\text{Total consumer expenditure} = 0 p_2 e_2 q_2$$

of this;

$$\text{Gov. tax revenue} = t p_2 e_2 c$$

$$\text{Sellers' TR} = 0 t c q_2$$

$$\therefore 0 p_2 e_2 q_2 = t p_2 e_2 c + 0 t c q_2$$

The incidence or burden of the tax, $t p_2 e_2 c$, is divided between the seller and the consumer. The part of the tax revenue box which lies above the old equilibrium price P_1 represents the part of the tax that the seller has been able to pass on to the consumer in the form of a higher price. This is referred to as the incidence on the consumer.

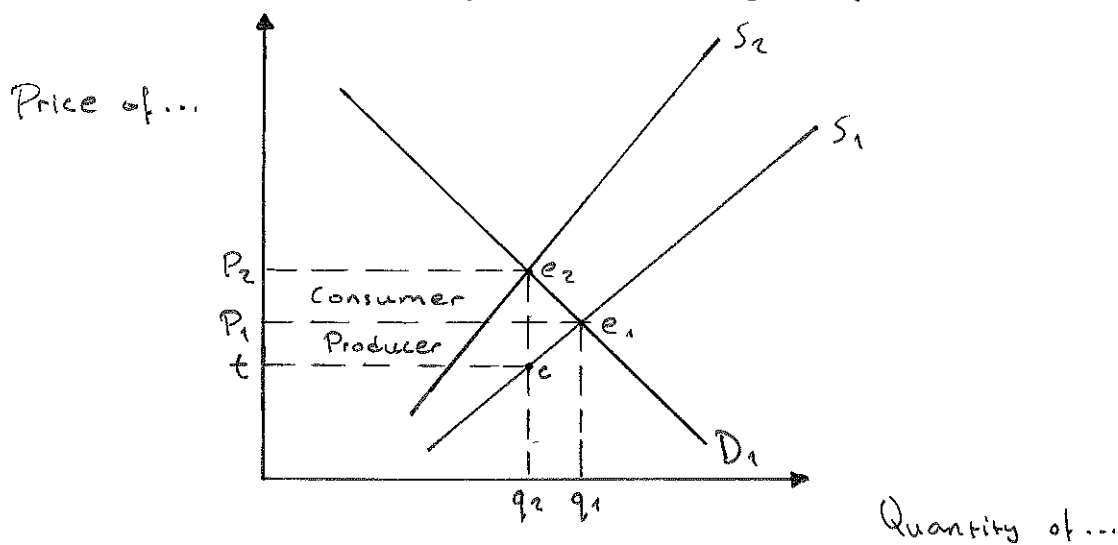
The part of the tax revenue box which lies below the original equilibrium price P_1 represents the part of the tax that the producer has been unable to pass onto the consumer and represents the reduction in revenue per unit received by the producer after tax.

The impact of an Ad Valorem tax

29/11/12

An ad valorem / percentage tax is when the amount of tax levied is a percentage of the selling price of the product. Because the same percentage tax is a higher monetary value at higher prices than at lower prices, the imposition of an ad valorem tax will result in an angled shift of the supply curve.

The vertical distance between the two supply curves represents the monetary value of the tax paid at each quantity, and will be greater at higher prices and higher quantities.

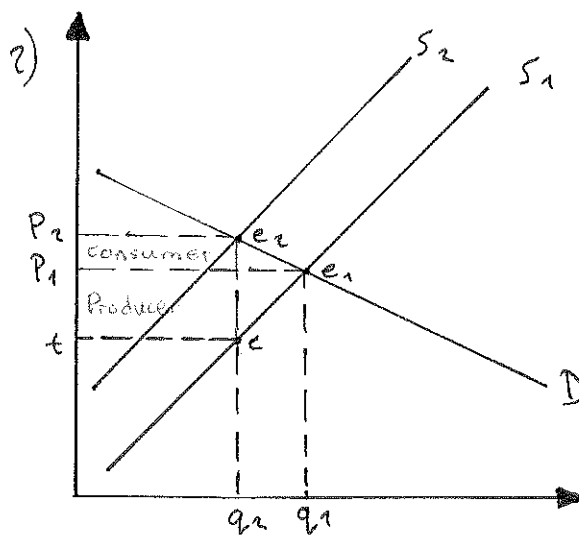
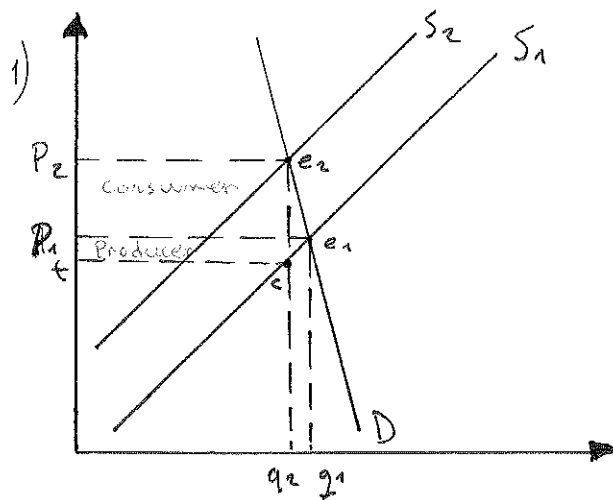


Notes same as graph on the other side.

Specific Tax (Elasticity and Graphs)

29/11/12

- ① D is more inelastic than Supply
- ② D is more elastic than Supply



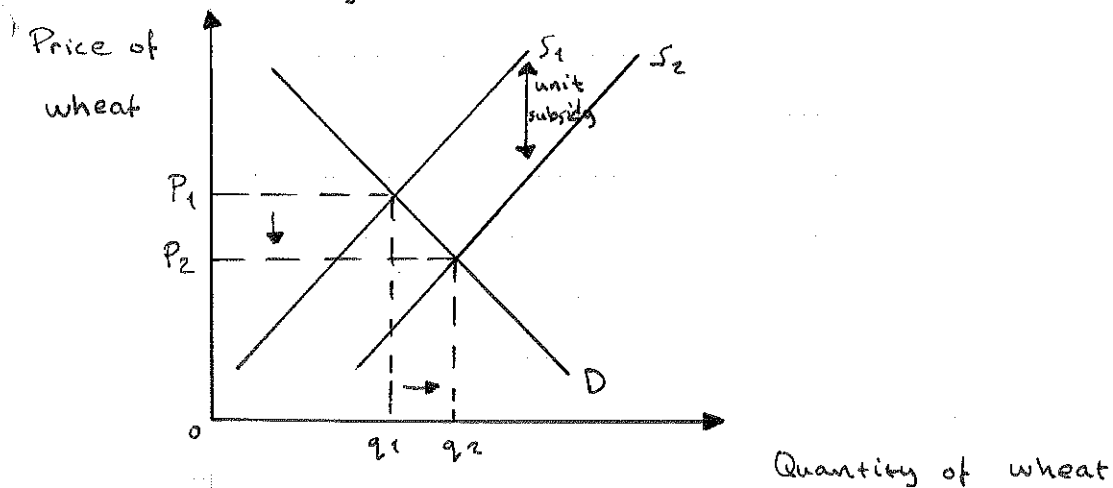
- 1- In general the more inelastic the demand relative to supply (or the more elastic the supply relative to demand) the greater the incidence of an indirect tax on the consumer i.e. the seller can pass more of the indirect tax to the consumer in the form of a higher selling price.
- 2- The more elastic the demand relative to supply (more inelastic supply relative to demand) the greater the incidence of the tax on the producer i.e. the seller will have to absorb more of the tax in the form of reduced revenue per unit because consumers are relatively price sensitive and will not be willing to pay significantly more for the product.

Therefore, if the government wishes to raise revenue for itself, an indirect tax on a product with relatively inelastic demand will be more effective. If the main aim is to reduce production and/or consumption of the product the tax will be more effective on products with relatively elastic demand

3) Subsidies

A subsidy is like a negative indirect tax. The government will pay producers or sellers a certain amount per unit produced. The impact of this is that the cost of supplying the product to the market for firms is reduced.

The granting of a subsidy to producers will be shown by a shift to the right of the supply curve for the product, showing that more will now be supplied at every selling price and that producers will be willing to supply each quantity at a lower price to consumers than previously.



The vertical distance between the supply curves at the new equilibrium quantity, q_2 , represents the amount paid as subsidy per unit produced.

Reasons why governments will subsidise certain products include;

- To lower the price for consumers so that the prices of basic essential products eg. staple foods are affordable to all consumers.
- To lower the price for consumers of products which the government wants to increase the consumption of which it views as merit goods, ie products which generate positive externalities, and or where the long term benefits of consumption may not always be significant in consumers' decision making. eg healthcare, public transport, cultural services, higher education
- To guarantee the supply of products which the government

- regards as being essential for the economy, e.g. basic foods, energy supplies, major employer industries, etc.
- To protect domestic industries from foreign competition e.g. sugar in the EU.

As mentioned above a subsidy will mean that a producer is willing to supply a given quantity of the product for a lower selling price than before the subsidy is granted.

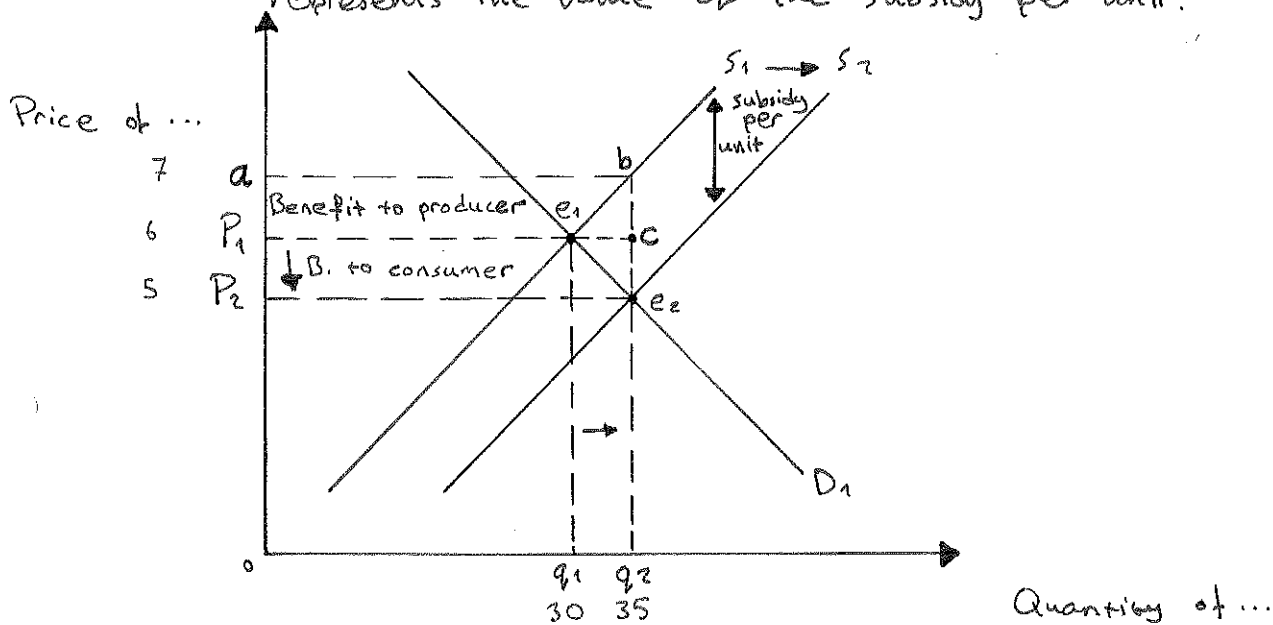
The table below shows a situation when the government introduces a 2 CHF/unit subsidy for a product.

Price (CHF)	Q_d	Q_{s1}	Q_{s2}
2	50	10	20
4	40	20	30
6	30	30	40
8	20	40	50
10	10	50	60

Originally equilibrium price and quantity was 6 CHF and 30 units. Following the 2 CHF/unit subsidy producers will be willing to supply a certain quantity for 2 CHF less than previously because the government now pays them 2 CHF/unit. e.g. before the subsidy to supply 50 units suppliers needed to charge 10 CHF/unit. After the subsidy they are willing to supply 50 units for a price of 8 CHF as the government will pay an additional 2 CHF so that 10 CHF overall is received per unit. Following the subsidy, the new equilibrium price will be 5 CHF per unit with 35 units bought and sold.

06/12/12

As mentioned on the previous page, a subsidy will shift the supply curve to the right and the vertical distance between the supply curves at the new level of output represents the value of the subsidy per unit.



Before Subsidy

Total expenditure by consumers } $Op_1e_1q_1$
 Total revenue by sellers

After Subsidy

Total expenditure by consumers = $Op_2e_2q_2$
 Revenue received by sellers from cons. = $Op_2e_2q_2$
 Subsidy paid by the gov. to the sellers = p_2abe_2
 \therefore Total revenue from cons. + gov (subsidy) = $Oabq_2$

The total subsidy paid is equal to area p_2abe_2 (70 CHF).
 The benefit of the subsidy is split between the seller and the consumer. The seller receives an extra P_1a (1 CHF) per unit and sells Oq_2 (35 units). Therefore, the share of the subsidy received by producers is area p_1abc (35 CHF). The consumer pays p_1p_2 (1 CHF) less per unit than before, and consumes Oq_2 (35) units. The share of the subsidy received by consumers is therefore area $p_2p_1ce_2$ (35 CHF).

Both producers and consumers of the product have benefited from the subsidy. However, the government (and therefore the tax payers) are bearing the burden

Market Failure

10/12/12

- In a free market the resources are allocated to the production of goods and services according to the principles of supply and demand.
- The law of demand assumes that consumers will make their consumption decisions based upon the relationship between the price of the product and the expected utility or benefit from the consumption of the product i.e. according to the relationship between the private costs of consumption to them as consumers and the private benefits of consumption.
- Similarly the law of supply assumes that producers and suppliers will make their production decisions based upon the relationship between the private costs of production to them and the private benefit of production.

However, the production and consumption process may result in a negative or positive impact on people not directly involved in the production/consumption process. i.e. An impact on third parties (not you/not me)

In such a situation the operations of a free market may fail to allocate resources in an optimal way and so the market is set to 'fail' to allocate resources efficiently.

There may be other situations where the free market may fail to produce or under produce products in society's best interest or where the operation of a free market may result in an imbalance of market power between different groups.

Different types of market failures will be considered:

- ① Existence of externalities
- ② Merit goods
- ③ Demerit goods
- ④ Public goods
- ⑤ Common access resources
- ⑥ Asymmetric information
- ⑦ Abuse of monopoly power

① The existence of Externalities

externalities - the impact of economic activity on third parties i.e. on individuals and groups not directly involved in the production/consumption process.

private costs - the costs/negative impact of production/consumption which are borne directly by the producers and/or consumers of a product.

external costs - (a.k.a. negative externalities) costs/negative impact of economic activity borne by third parties

* $\text{social costs} = \text{private costs} + \text{external costs}$

i.e. social costs are the overall cost/negative impact to society of production or consumption.

private benefits - the benefits/utility/positive impact of the production/consumption process which accrue to (given to benefit) those directly involved in the production/consumption process.

external benefits - the utility/positive impact on third parties of the production/consumption process (a.k.a. positive externalities)

* $\text{social benefits} = \text{private benefits} + \text{external benefits}$

i.e. the overall benefit to society from the production of a product

Costs of production

As mentioned before, producers will base their production decisions according to their private costs of production i.e. the costs of acquiring and using the resources needed to produce their product. e.g. cigarette production requires raw tobacco (land), machinery (capital), factory workers (labour).

The supply curve for a product is based upon the firm's private costs of production. Therefore a firm's supply curve is sometimes referred to as its marginal private cost (MPC) curve.

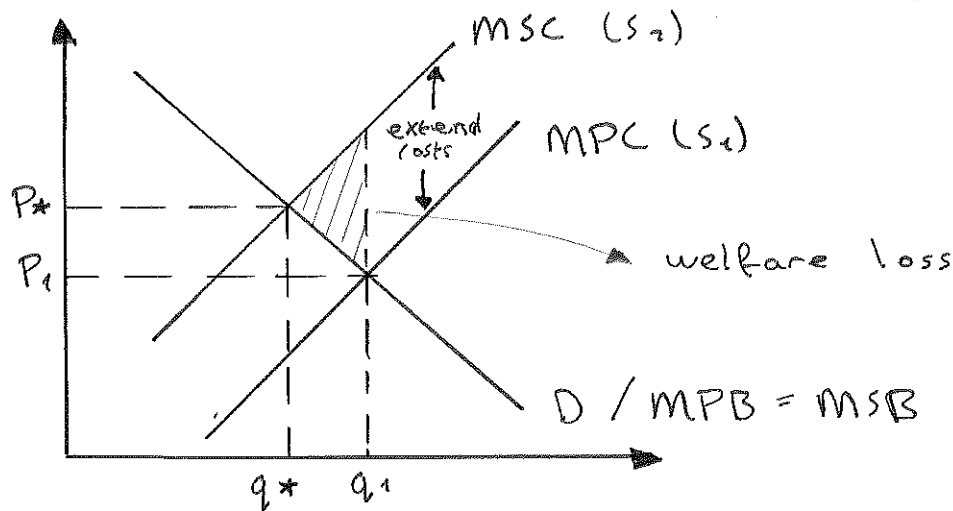
Supply curve = Marginal Private Cost (MPC) curve
 However, the production process may have a negative impact or cause costs to people or groups not directly involved in the production process e.g. pollution by the cigarette producing country, extra congestion on the roads caused by trucks transporting raw materials and finished products, etc. These negative impacts or costs are called negative externalities or external costs of production.

Therefore, the overall cost of production to society are the private (internal) costs and the external costs.

$$\star \text{ Social cost of production} = \begin{matrix} \text{Private cost} \\ \text{of} \\ \text{production} \end{matrix} + \begin{matrix} \text{External costs} \\ \text{of} \\ \text{production} \end{matrix}$$

In terms of diagram analysis, firms will base their production decisions according to a supply curve derived from its marginal private costs. However, the true cost to society of production is equal to private costs plus external costs. Therefore, the supply curve which represents social costs will be to the left of / above

the marginal private cost curve, and the vertical distance between the marginal private cost and the marginal social cost curve will represent the external costs of production.



KEY

MPC = marginal private costs

MSC = marginal social costs

MPB = marginal private benefit

MSB = marginal social benefit

P^*q^* = social optimum equilibrium where $MSC = MSB$

The diagram above shows a situation where the private costs of production (MPC) are less than the social costs of production (MSC). Therefore, the production process is causing external costs of production/negative externalities.

The producers will base their production decisions according to their private / internal costs and will produce at a price and quantity where the supply curve derived from these private costs intersects the demand curve for the product, i.e. at $P_1 q_1$. The private costs are therefore passed on to the consumer in the form of the selling price P_1 .

13/12/12

However, because of the existence of external costs of production a supply curve derived from the overall social costs of production (MSC) will be to the left of the MPC curve. The socially optimum level of output and price will be where $MSC = MSB$, i.e. at price and output $P^* q^*$.

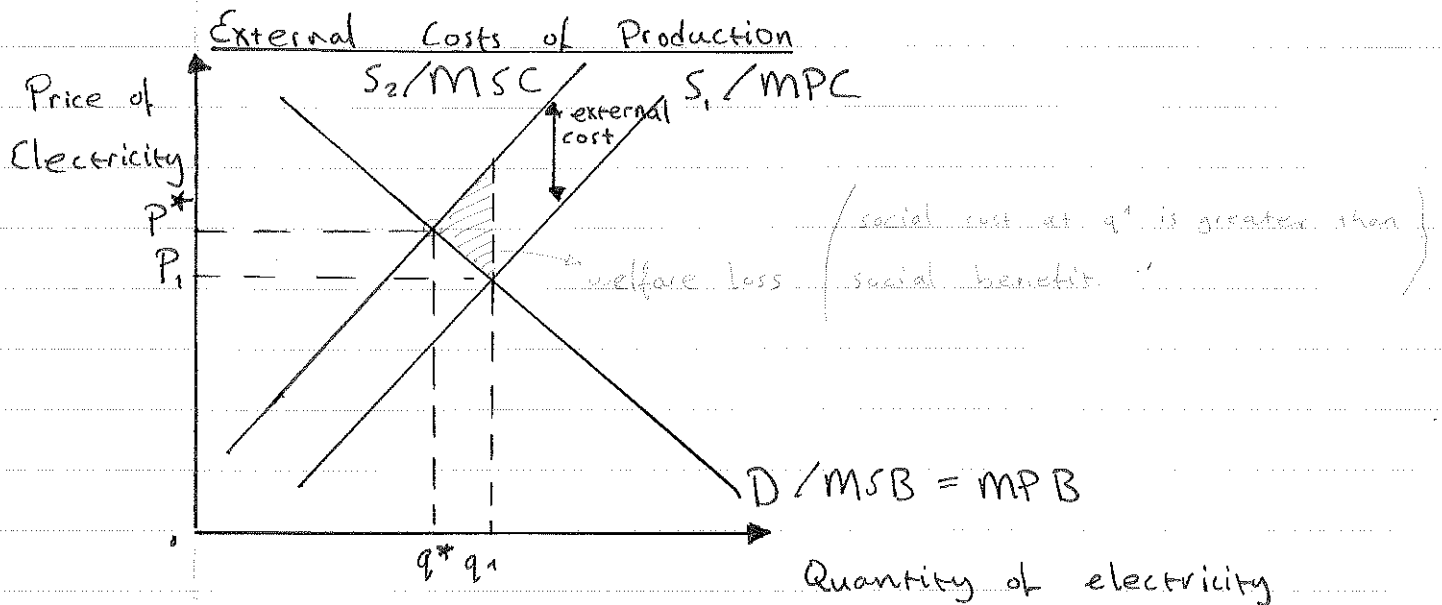
At q_1 (and for every unit produced between q_1 and q^*) marginal social cost is greater than marginal social benefit, i.e. external costs are being created by the production process which are not being paid for by the producer or the consumer, i.e. too much is being produced (q_1 instead of q^*) and too little is charged for it (p_1 instead of p^*).

There is, therefore, a misallocation of resources. The shaded triangle represents the welfare loss to society.

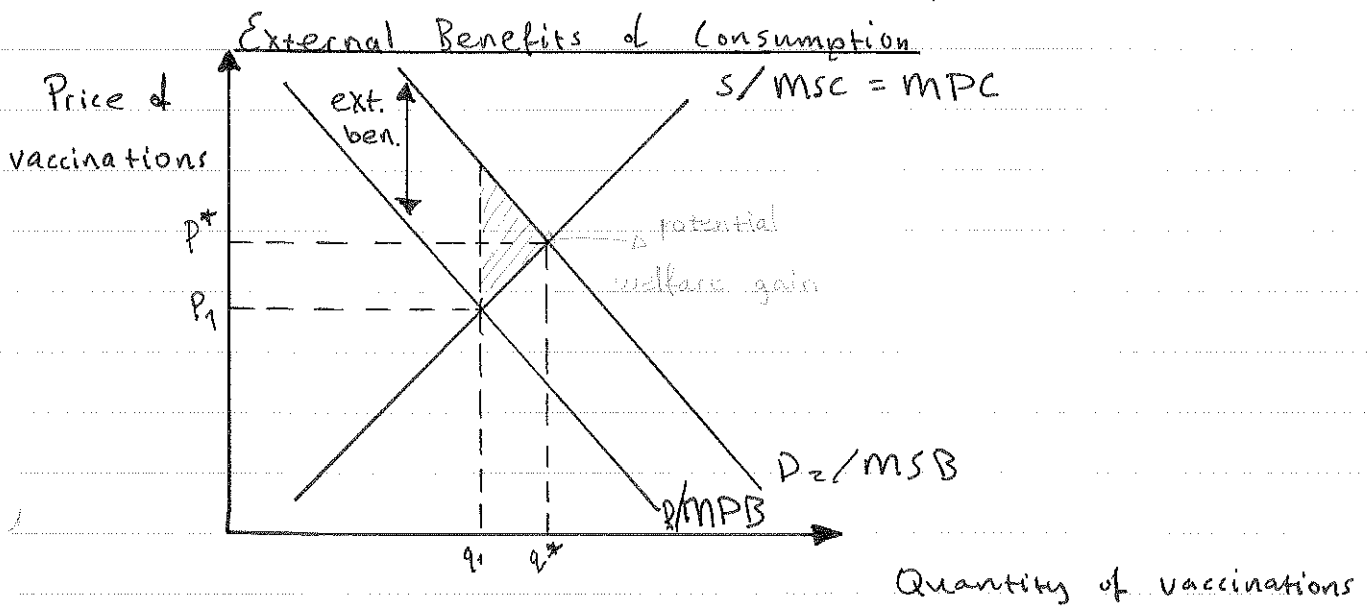
Positive / Negative

'External' Externalities Diagrams

07/01/13



Social optimum $\Rightarrow MSC = MSB$



In the market for vaccinations there is a divergence between private benefits and social benefits. i.e. external benefits / positive externalities of consumption exist. Private benefits - the benefits of being vaccinated to the consumer in the reduction of his/her chances of getting a disease, which he/she would be willing to pay for. External benefits - the benefit to everyone else of this person being vaccinated in that everyone else is now less likely to get the disease.

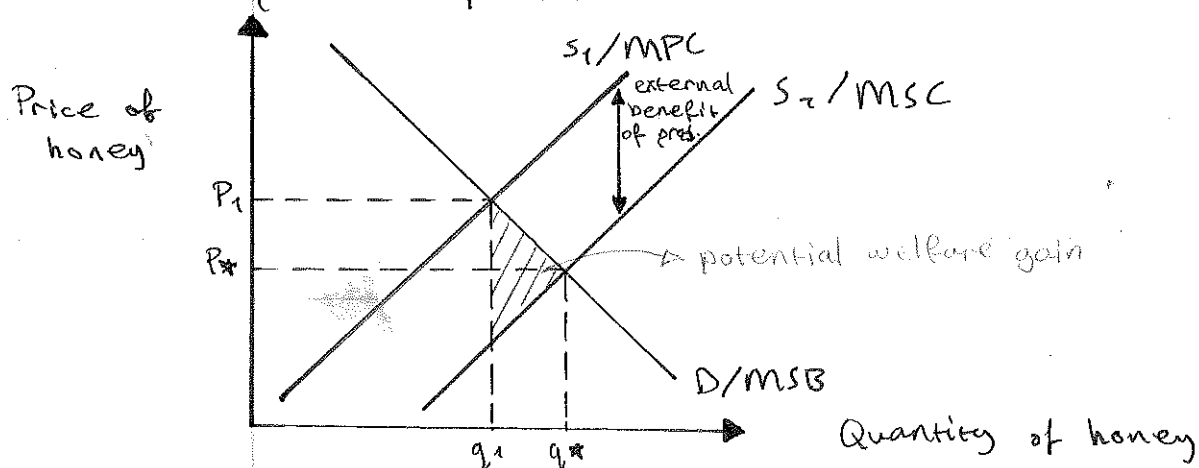
* Social benefits = Private benefits + External benefits

In the diagram on the other side, the free market level of consumption is at q_1 , where marginal private benefits (MPB) equal marginal costs (MSC). The socially optimum level of consumption is where MSB (marginal social benefit) equals MSC, i.e. at $q^* P^*$. The private/free market level of consumption (q_1) is less than the socially optimum level of consumption (q^*). For every unit consumed up to q^* marginal social benefit (MSB) is greater than the marginal social cost (MSC) and the potential welfare gain from increased consumption up to q^* is shown by the red triangle.

External Benefits of Production

10/10/13

The production process may result in positive externalities, i.e. a positive impact of the production process on third parties. e.g. the production of honey requires bees which, as well as producing honey, may also pollinate crops and orchards in the area resulting in greater output of crops. Therefore, a farmer may benefit from a nearby honey producer. This increased productivity for the farmers will reduce the average costs of production of crops. Overall, therefore, the total cost to society of producing honey has been counteracted by the benefits to farmers. This would be shown by a divergence between MPC and MSC equal to the external benefits of the production process.

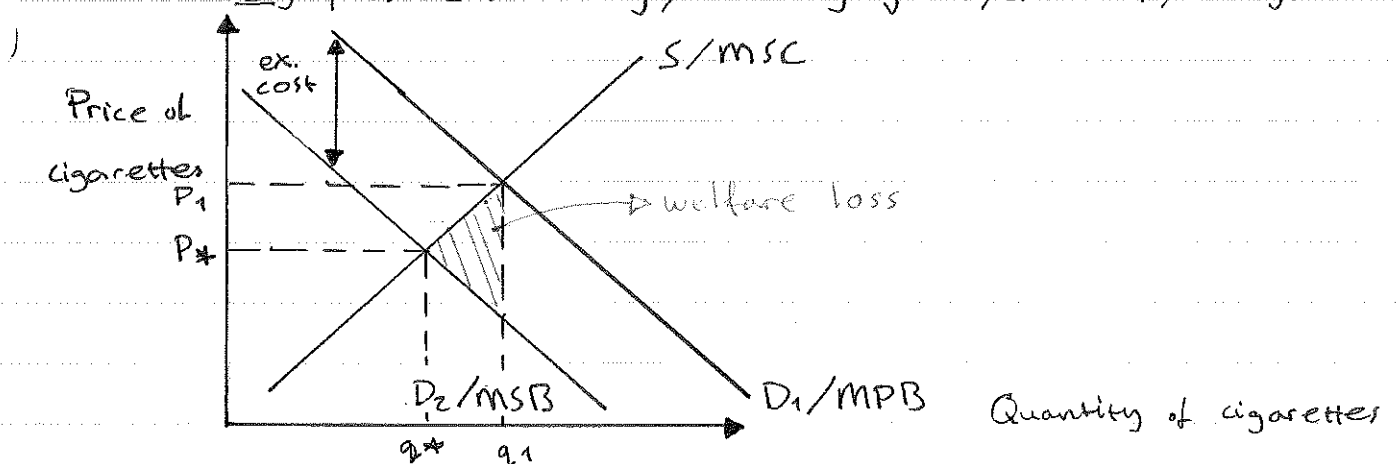


Producers of honey will make their production decisions according to their private costs of production. This will result in a market equilibrium price and quantity of P_1, q_1 . If the production of honey is providing external benefits to third parties (e.g. to local farmers) then there will be a divergence MPC and MSC, equal to the external benefits of honey production. The socially optimum level of output will therefore be higher at q^* .^{For} Every unit up to q^* marginal social benefit is greater than marginal social cost, ($MSB > MSC$) and therefore society as a whole would benefit if production was increased from the free market level of q_1 to the socially optimum level of q^* . The shaded triangle, therefore, represents potential welfare gain i.e. the extra benefit to society which could result from increased production and consumption levels.

External Costs of Consumption

11/01/13

e.g. passive smoking, chewing gum, alcohol, drugs



Consumers of cigarettes will make their consumption decisions based upon the relationship between the private costs of smoking to them and the private benefits to them. They will consume on the MPB curve and consumption levels

will be at q_1 . However, the effects of passive smoking on third parties creates an external cost of consumption and therefore the demand curve derived from the cost and benefits of smoking to society (MSB) will lie to the left of the MPB curve. As always the socially optimum level of consumption and production is where $MSB = MSC$, i.e. at q^* . Consumption based upon private benefits would be at q_1 and therefore there is over production and consumption compared to the level thought to be in society's best interest. The shaded triangle represents the excess of MSC over MSB for each unit consumed above quantity q^* ; i.e. the welfare loss which arises due to the existence of the negative externalities of consumption.

②

Merit Goods

14/01/13

Merit goods are products which can be provided by the market mechanism (i.e. they provide private benefits, are excludable and are rival in consumption - see notes on 'public goods') but which if left to the free market would be underprovided and/or underconsumed compared to the level which is regarded as being in society's best interest. e.g. most obvious examples of merit goods would include education, healthcare, public transport. The main reasons for the underprovision of merit goods by the free market are;

- the existence of positive externalities (see previous notes)
- where there is a divergence between long-term benefits and short-term benefits.
- where there is a lack of perfect information to consumers about the benefits, e.g. pension funds, preventative healthcare etc...

Therefore, what determines whether a product is or isn't a merit good will be normative, i.e. it will be based upon the dominant view of society at that point in time. Also, it would depend upon whether the government feels it has the resources to be able to provide these merit goods.

e.g., different levels of provision of medical and social services in higher income compared to lower income countries, in times of economic difficulty governments cutting spending on support for the arts, etc...

Governments may seek to deal with underprovision of merit goods in different ways - e.g. complete provision by the government, government provision to top-up private sector provision, subsidies for private firms, etc... (see later notes)

(Diagram showing merit goods are the same as those for positive externalities of consumption and production.)

17/01/13

③ Demerit Goods

Demerit goods are products which can be provided by the free market but are likely to be overproduced and/or overconsumed compared to what is thought to be in society's best interest. e.g. alcohol, cigarettes, drugs and guns. The main reasons for overprovision of demerit goods include:

- The existence of negative externalities of consumption and/or production.
- The longterm costs may not be obvious due to lack of information or lack of acceptance, e.g. cigarettes

Governments may seek to deal with demerit goods in different ways, ranging from banning completely, (e.g. alcohol in Kuwait) regulating the market (e.g. age restrictions on the sale of alcohol) taxation, information campaigns and etc...

(For diagram analysis see negative externalities)

17/01/13

④ Public Goods

Note: Private goods are products which can be provided by the free market because they have two key characteristics;

- excludability - it is possible to prevent someone from consuming the product. e.g. by charging a price for it.
- rivalry in consumption - there is an opportunity cost in consumption. The consumption of the product by one person reduces the amount available for consumption by everybody else. e.g. a cake

Note: Public goods cannot be provided by the free market because they have the opposite characteristics;

- non-excludable - once they are provided it is impossible to prevent somebody from consuming the product.
- non-rival in consumption - there is no opportunity cost of consumption. The consumption of one extra unit does not diminish the amount of the product available for consumption by others. e.g. national defence systems, flood control measures, etc...

An example of a public good would be flood defences such as the Thames Barrier in London. This was built to prevent London from flooding. It is non-excludable because it is impossible to prevent anyone living in the protected area from being protected. This characteristic of non-excludability results in the 'free rider' problem. With public goods once they are provided anybody can benefit without paying. therefore no rational consumer would be willing to pay for the product and no private sector producer would be willing to supply it without government intervention. The Thames Barrier is also non-rival in consumption i.e. the "consumption" of flood defences by one extra person

does not add to the cost of provision, i.e. there is no opportunity cost of additional consumption (the marginal cost of consumption is 0). A third characteristic of pure public goods is that they are non-rejectable i.e. once provided everyone "benefits" whether or not they want to e.g. it is impossible for someone living in the flood protected area of London to opt out of the barrier's protection.

Public goods are the most extreme example of market failure, because they are non-excludable and non-rival in consumption. If left to the free market they would not be provided. Therefore, the government will need to provide them directly itself or pay private sector firms to provide them on its behalf (paid for out of taxation).

Quasi Public Goods may have one or more of the ~~categories~~ characteristics of public goods but are really a form of merit good in that they could be provided by the private sector e.g. a national park may be non-rival but can be excludable through a price charged for entry. Television / radio broadcasts used to be non-excludable but technology has made it possible to prevent people from consuming them unless they pay for the software necessary. Such broadcasts are, however, still non-rival.

28/01/13

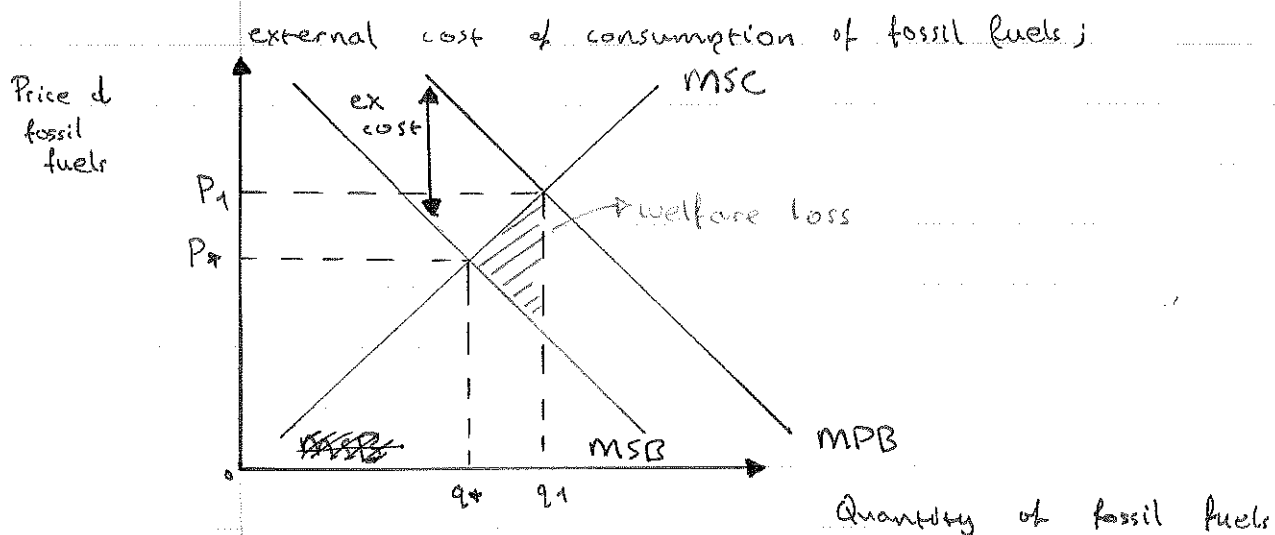
(Pg 147-153) - section on Diploma Course Guide used as an outline for notes from the textbook parts mentioned.

(Pg 153) - Asymmetric Info / Imperfect Info

Common access resources and further threats to sustainability.

Common access resources aka. common-pool resources or common property resources.

- Common access resources are typically natural resources, e.g. fishing grounds, forests and pastures, or human-made systems for the management of natural resources e.g. irrigation systems. The main characteristic of such resources is that they are non-excludable meaning that it is very difficult or expensive to exclude people from using them. An example would be the presence of fishing grounds near a village where every villager aims to fish as much as possible to maximise their utility. In this case the benefits to the individual outweigh the external cost and provide the individual the incentive to over consume. A market failure will take place because of over-consumption of common access resources.
- Sustainability exists where the consumption needs of the present generation are met without reducing the ability to meet the needs of future generations. With common access resources due to overconsumption in the present future resources are depleted. The lack of a price for common access goods means that they are almost bound to be over-consumed and so they will eventually run out.
- The use and production of fossil fuels creates negative externalities of production and consumption. The fact that producers and consumers are not able to account for the external costs to future generations means that fossil fuels are both over-produced and over-consumed and represents a significant market failure.



- In economically less developed countries negative externalities can be created through over exploitation of land for agriculture and this poses a threat to sustainability. For example, in communities where the main source of fuel is wood, forests will be cut down. When existing trees are cut down people must travel greater distances to access the woods, flooding or landslides may ensue due to lack of vegetation and the land may become infertile. This creates a vicious cycle of poverty for the local communities and depletes the local resources for future generations.

Government responses to threats to sustainability

Cap and trade systems;

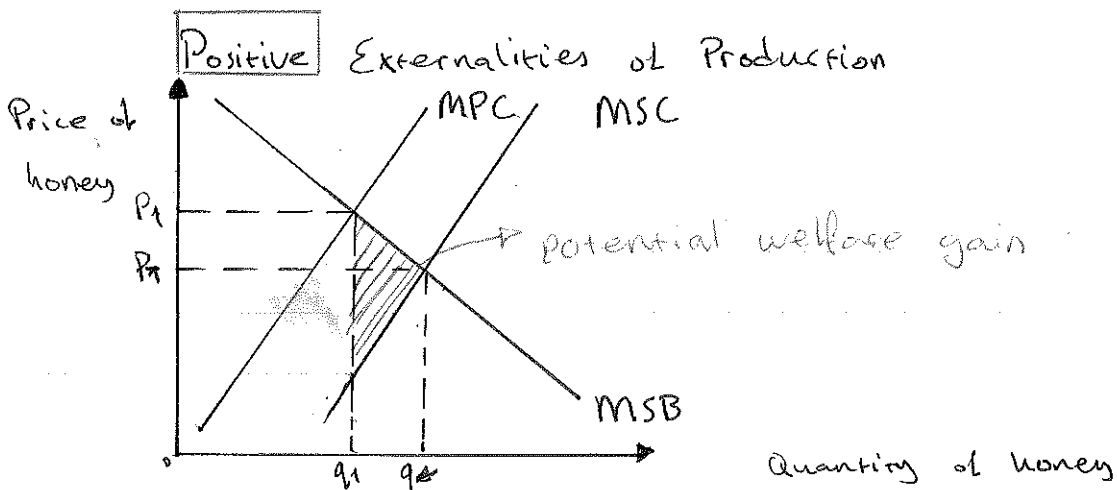
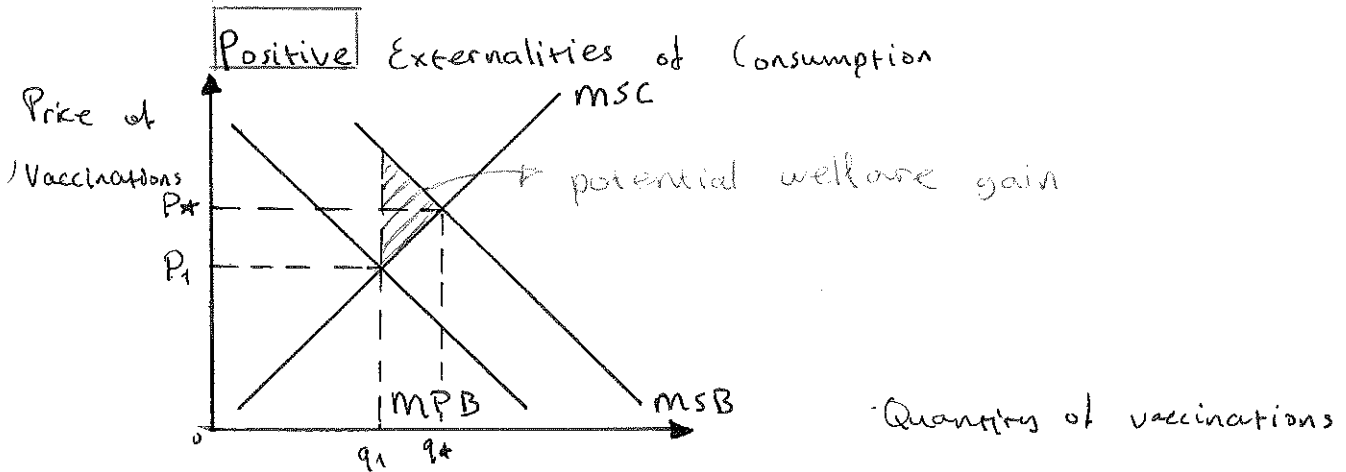
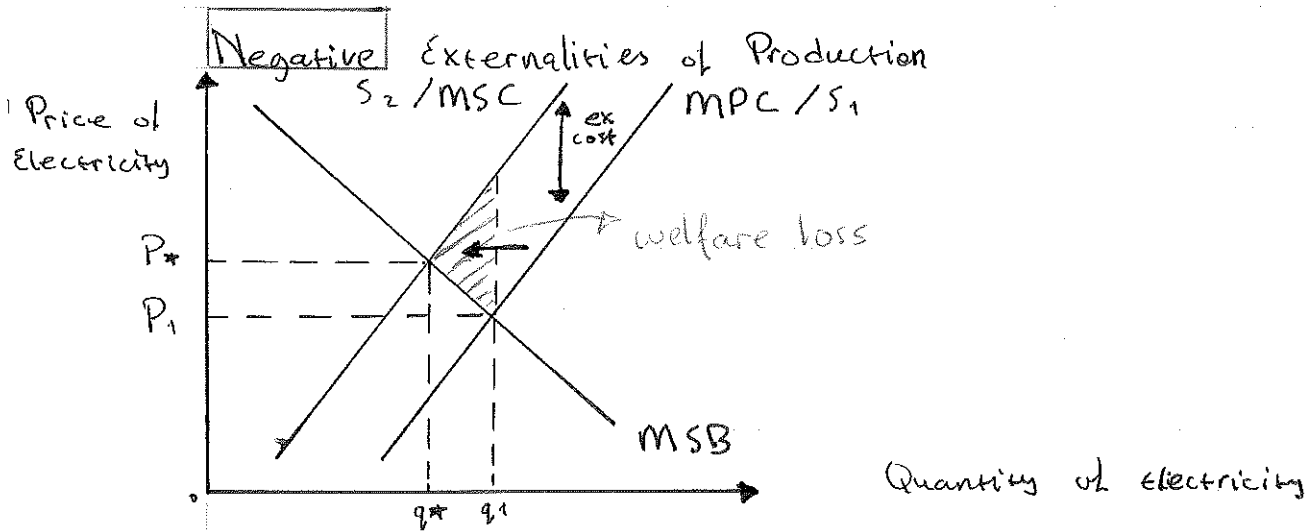
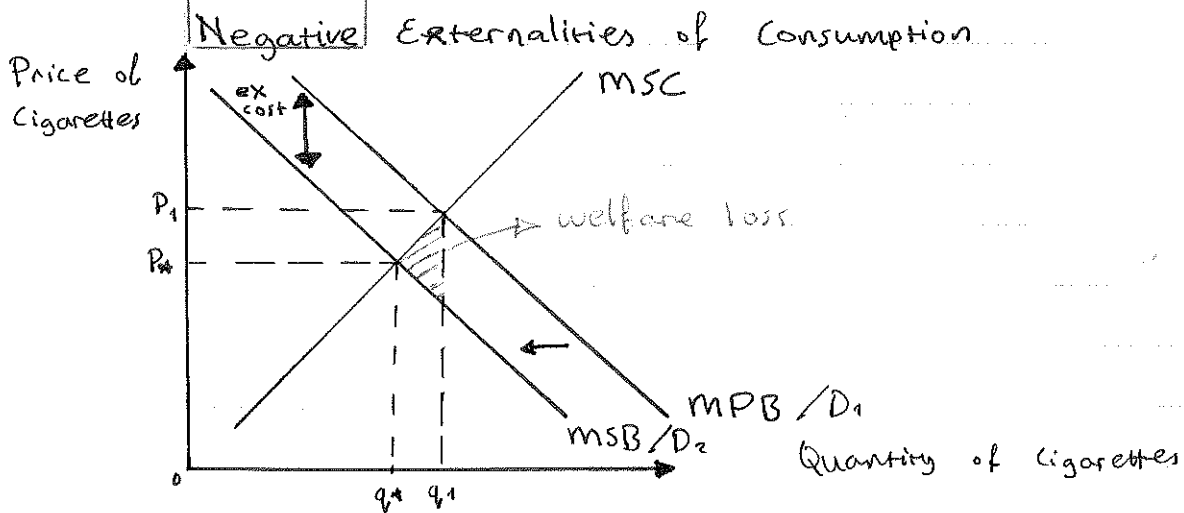
Since threats to sustainability crosses national borders and extends to future generations solutions require international agreements and forward thinking. Targets are set and incentives are created to encourage governments/firms to reach them.

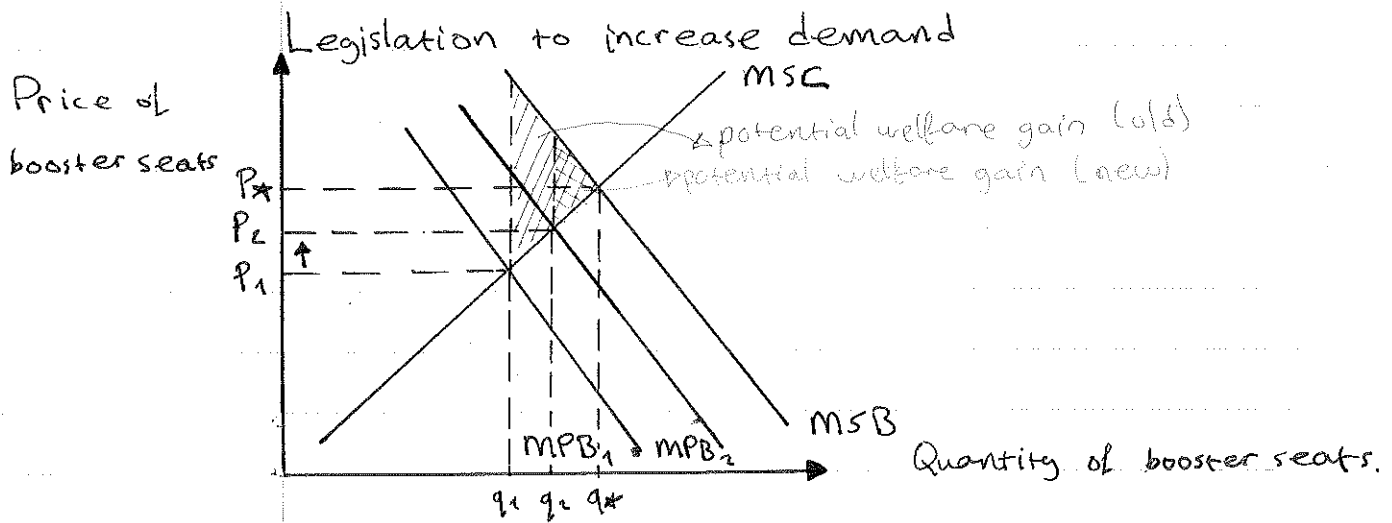
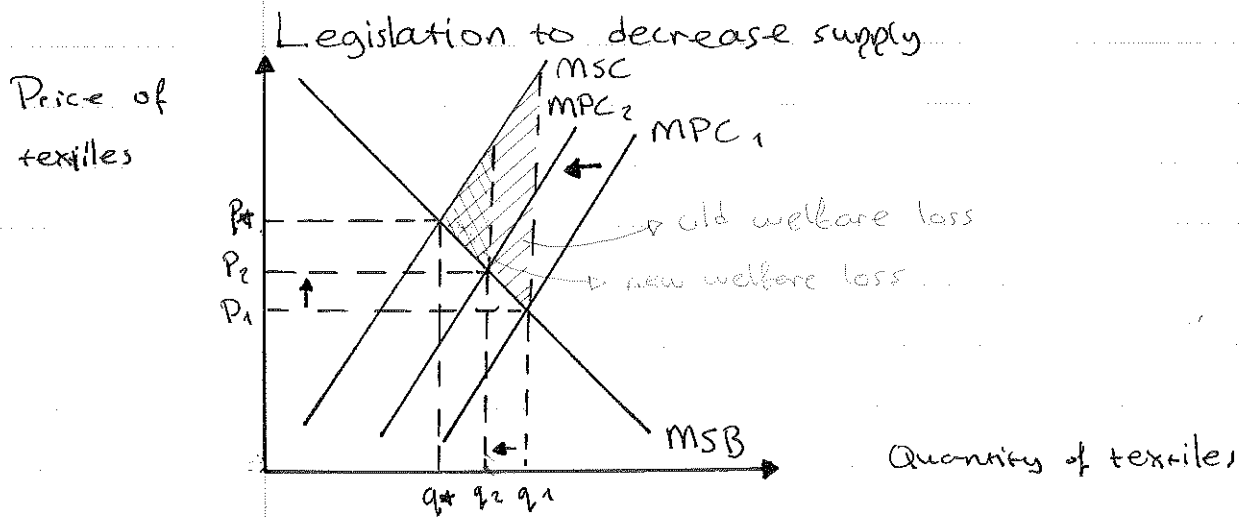
Clean technologies;

Since the use of fossil fuels creates so many negative externalities much attention has been given to the development of clean technologies, such as renewable sources of energy. Government can subsidise the innovations by offering tax credits to firms that invest in clean technologies.

Graph Test Review

07/02/13





31/January/2013

Government Response to Market Failure due to Externalities, Merit/Demerit Goods & Public Goods

There are many different approaches which governments could use to address issues arising from the failure of the market system to allocate resources efficiently. These will include direct government provision, legislation, taxation, subsidies, government advertising/information and tradeable permits.

The different methods discussed will be considered not in the order of relative importance but in the order of degree of government involvement, in the provision of the product.

(a) Direct government provision

Def: "This is when the government provides products itself completely or where it enters the market to "top up" private sector provision."

This approach usually involves products being provided either free of charge to the consumer (paid for out of taxation) or at a heavily subsidised price (paid for out of taxation).

Public goods provision is usually undertaken in this way. Unless governments provide public goods they will not be provided, due to the characteristics of non-excludability and non-rivalry in consumption. Governments will usually provide the product itself directly (out of taxation) e.g. national defence, or (more rarely) employ private firms to provide the public good with the government paying all of the costs, e.g. some flood defences.

Merit goods may also be directly provided by governments.

Depending upon the view of society government provision may account for the majority of the provision (e.g. healthcare, education) or government provision may be used to make up for the shortfall in private sector provision or to coordinate the provision between private and public sectors (e.g. public transport).

Demerit goods may be provided directly by governments in order to control their provision with an aim to reducing the impact of negative externalities e.g. sales of alcohol in Finland and Canada are only allowed through government outlets. In addition, especially in the 20th century, when the role of the government in the economy was often greater, the process of nationalisation (transfer of ownership of economic activity from the private sector to the public sector) meant that in theory negative externalities could be addressed because of the lack of the profit motive and so cleaner methods of production could be used. In practice however, the desire for economic growth has often meant that centrally planned economies are at least as likely to suffer from pollution, etc... as more free market economies.

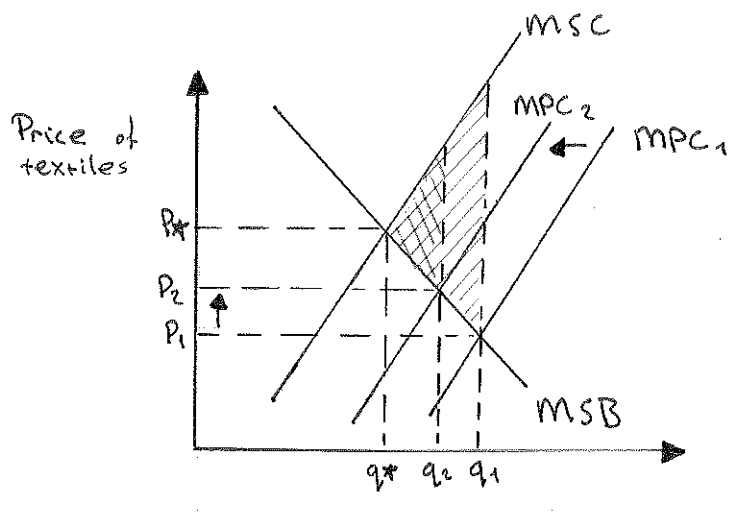
(b) Legislation

Governments may introduce laws or rules designed to either limit the production and consumption of demerit goods or products causing negative externalities or to increase the production and consumption of merit goods or products causing positive externalities.

E.g. government rules on levels of pollution that firms are allowed to cause (Clean Air Act, London), age limits on purchase of alcohol and cigarettes, purchase of fireworks, etc..

Government rules which impact on the production process would increase firms' cost of production, resulting in a shift to the left of firms' supply curves (MPC) and so reducing the welfare loss.

The diagram to the right shows the impact on the textile industry of new regulations designed to reduce the potential harm to workers' health, by enforcing the use of technology designed to remove textile particles from the air of the factory.

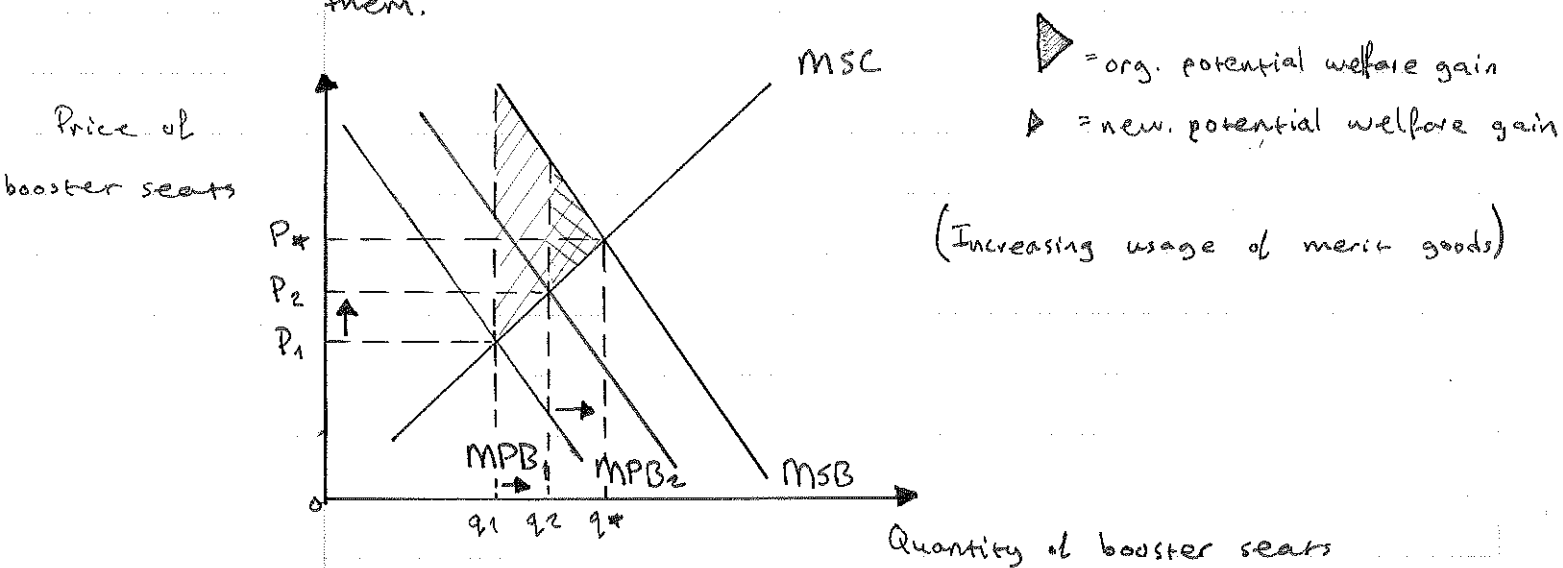


Quantity of textiles.

Originally firms produced quantity q_1 (where their MPC curve, MPC_1 , cuts the demand curve, MSB). At q_1 there is a divergence private costs and social costs i.e. negative externalities of production exist. The socially optimum level of output is at q^* . For every unit produced above q^* MSC are greater than MSB . Therefore, at output q_1 the total welfare loss is shown by the 'large' triangle. Laws on improving working conditions which require firms to use extra machinery will increase the firm's cost of production. This will be shown by a shift to the left of the firm's MPC curve to MPC_2 . Output levels fall from q_1 to q_2 and the level of welfare loss is reduced to the 'small' triangle. However, the impact of the change in the law may not be wholly beneficial to all stakeholders. Conditions of work for textile employees will improve and there are likely to be improvements to air quality. However reduced output may mean that less workers are employed. Also, firms are likely to make less profits. In addition the higher selling price of p_2 may make the country's textile industry less competitive compared to foreign firms.

Government rules which impact on the consumption process will aim at influencing the demand for a product so that the divergence between the MPB and the MSB is reduced. In the diagram on the other side, the introduction of laws requiring

the use of child booster seats will increase the demand for them.

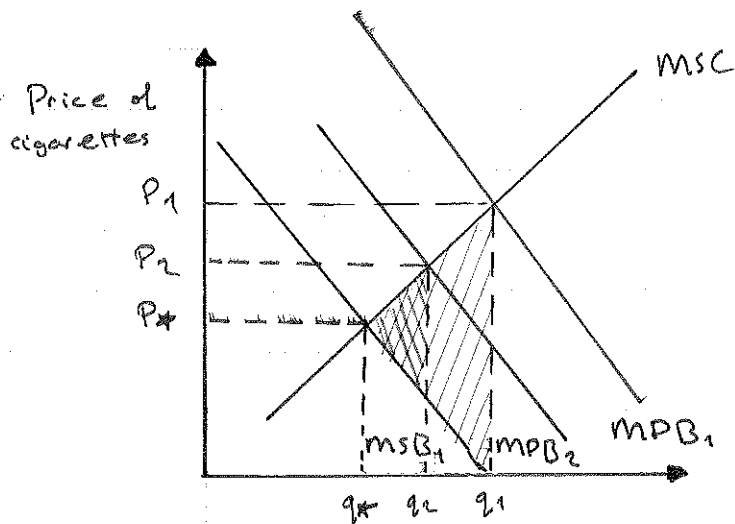


Before the change in the law demand curve for booster seats is shown by curve MPB_1 and q_1 are consumed. This is below the socially optimum level of consumption q^* (where $MSB = MSC$). The large shaded triangle shows the extra benefit to society which could be gained if demand increased to the socially optimum level.

Following the introduction of the law the demand/ MPB curve shifts to the right increasing consumption levels to q_2 . The blue shaded section of the original triangle represents the increased welfare gained by society as a result of a change in the law. (Also, a change in the law would make demand for booster seats much more inelastic.)

Legislation may also be used to reduce demand for a product which generates negative externalities of consumption e.g. in the market for cigarettes raising the minimum age required for purchase.

The diagram on the right shows the impact of a legislation aimed at reducing the consumption of cigarettes which are considered to be demerit goods and have negative externalities of consumption.



= org. welfare loss
 = new welfare loss

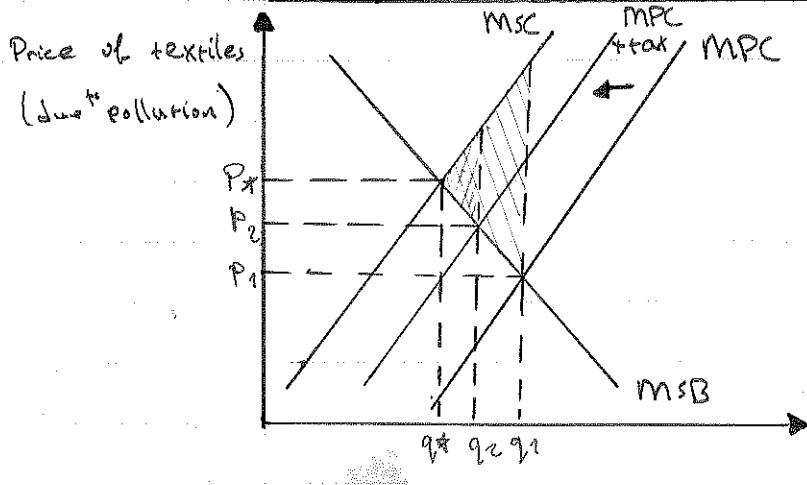
Before the change in law the demand curve for cigarettes was above the socially optimum level. Following an increase in the minimum age of consumption demand falls to q_2 , which is closer to q_* . (For more detail look at previous notes)

(c) Taxation

Indirect taxes (e.g. sales taxes) can be used to reduce production and/or consumption of products generating external costs of production and/or consumption.

Indirect taxes are shown by a shift to the left of a firm's supply curve, MPC curve. Placing a tax on the production of demerit goods/goods which generate negative externalities of production will reduce levels of output and consumption and reduce welfare loss as shown below.

Use of indirect taxation on demerit goods (ext. costs of production)



= org. welfare loss
 = new welfare loss

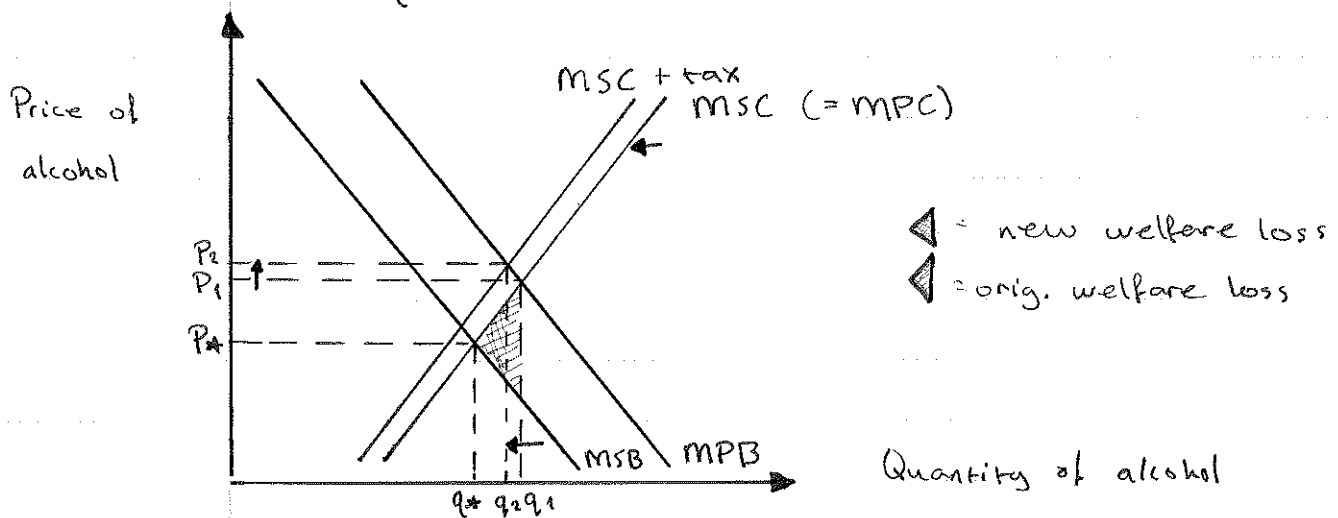
(Refer back to legislation diagrams for detailed notes)

Use of indirect taxation on demerit goods (ext. costs of consumption)

"internalise the externality" - make the causer of neg. ext. pay.

The use of indirect taxes may be effective in reducing levels of consumption caused by demerit goods or other products generating negative externalities of consumption.

An indirect tax increases the costs of supply and will therefore shift the supply curve/MSC curve to the left. This will reduce the quantity demanded of the product due to a rise in price. The level of welfare loss will reduce.

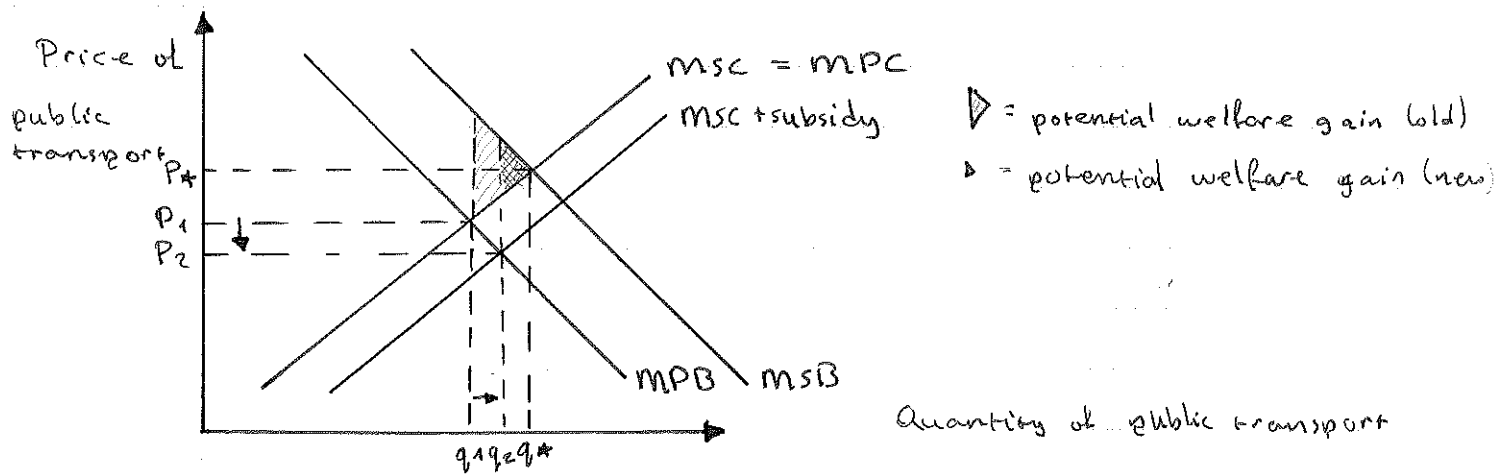


Evaluation: However, due to the inelastic demand for many demerit goods, such as alcohol, the impact of taxes may not significantly reduce levels of consumption. Also, high taxation may mean increased likelihood of unofficial markets (black markets), etc...

In theory, the tax revenue received by the government can be used to address the impact of demerit goods e.g. pay for greater clean-up of public areas.

d) Subsidies

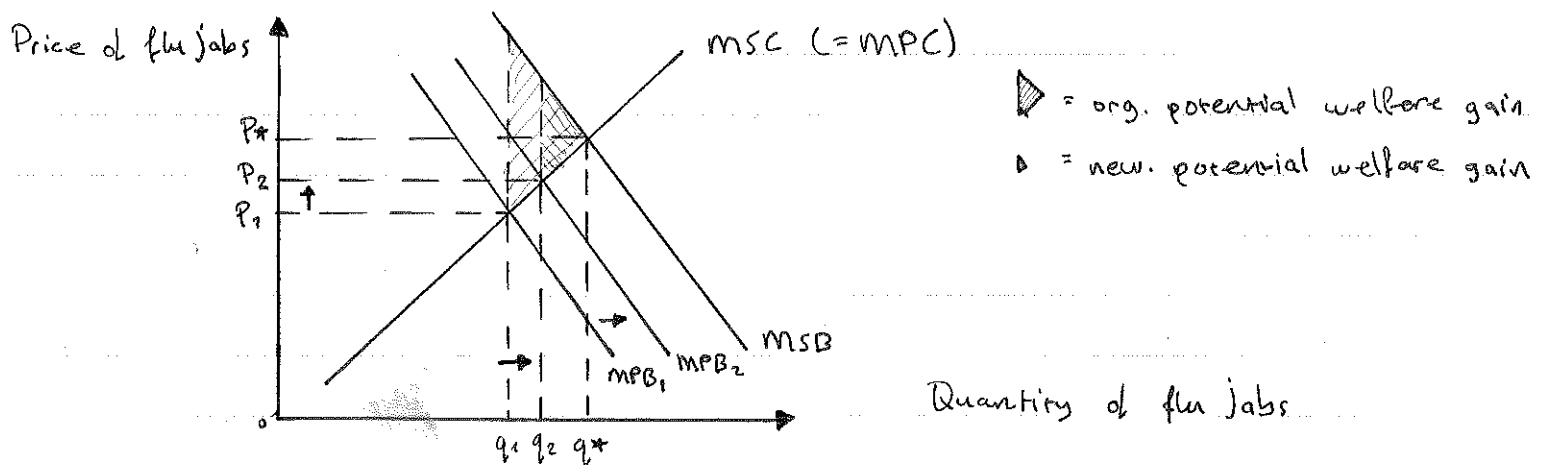
A subsidy is like a negative indirect tax where producers or sellers are paid funds by the government so that the price will drop resulting in an increase in the quantity demanded, towards the socially optimum level of consumption.



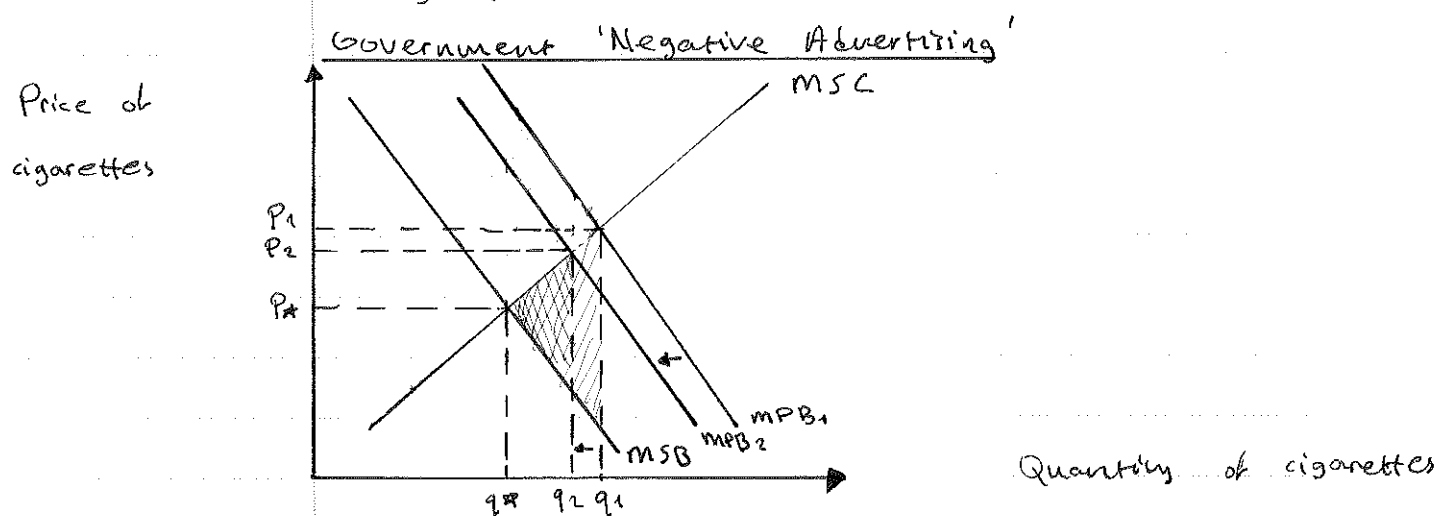
The subsidy lowers the market price from P_1 to P_2 , increases the level of consumption from q_1 to q_2 so that more of the potential welfare gain is achieved. However, subsidies are a financial burden for governments and for taxpayers. Many governments, especially if faced with a rising population or budget deficits, may find it difficult to pay for subsidies and so are unable to benefit from the positive externalities associated with merit goods.

e) Government Advertising / Public Information

Governments may try to increase or decrease demand (MPB) when there is an externality of consumption. In the case of merit goods or products which generate positive externalities of consumption, government information, etc... will aim to shift the MPB curve to the right, so that consumption levels increase towards the socially optimum level.



Following a government information campaign, the demand for flu jabs has increased from MPB_1 to MPB_2 . After this change quantity has increased from q_1 to q_2 and the value placed on this product has increased from P_1 to P_2 . Due to the info. campaign there has been an increase in welfare. The market situation is now closer to the socially optimum level.



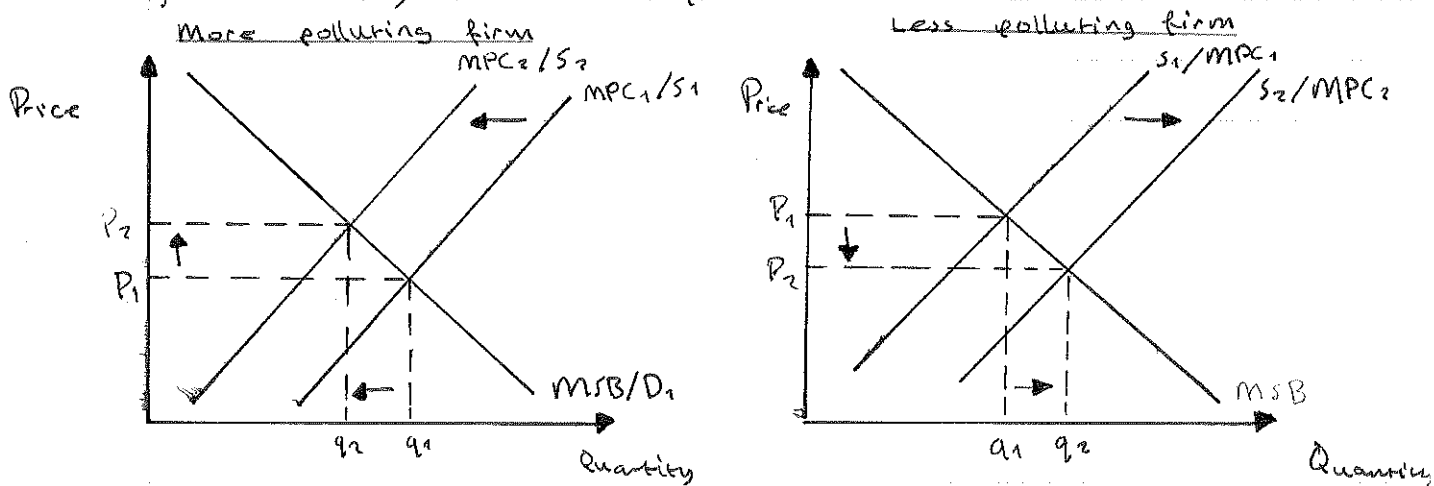
Through negative advertising welfare loss ~~has~~ has been reduced from the blue triangle to the red triangle. Ceteris paribus, price would decrease but the government would likely intervene using other methods to bring the price down.

NB Governments are likely to use a combination of methods to address market failure. They may combine methods which will affect supplier's costs which will shift firms' ~~MPC~~ MPC curves (e.g. legislation, taxes, subsidies) with methods designed to affect consumers' demand and so shift the MPB curve (e.g. legislation, gov. public info, etc...). The above analyses isolate the impact of a single policy, assuming ceteris paribus. However, usually more than one policy will be used e.g. to reduce consumption of cigarettes governments are likely to combine public info. campaign with taxation.

④ Tradeable Permits (Pg 143)

Governments may grant permits to firms allowing each of them to cause a certain level of pollution. Once issued, the firms can trade the permits between themselves. The "cleaner" producers can sell part of their "pollution quota" to the more polluting firms. The impact of this is that the less polluting firms gain additional revenue which can offset some of their private costs of production. They are able to sell at a lower price and the quantity demanded for their product will increase. The more polluting firm will have to buy pollution quotas from other firms which will raise their private costs of production, making them less price competitive. This is a market based approach as price competition will encourage firms to pollute less.

However, one criticism of such methods is that the overall level of pollution may not fall unless pollution quotas in general are gradually reduced overtime. (see pg 143 for more evaluation especially concerning Kyoto Protocols between governments, in an attempt to reduce CO₂)



Theory of the Firm (Micro)

03/09/13

A firm is a unit of production and an employer of resources / factors of production.

The theory of the firm studies how firms combine ^{scarce} resources to provide goods and services to satisfy consumers' wants. A firm is any producer or provider of goods and services, and ranges from sole traders to the largest multi-national corporations (MNCs) and may also include governments.

The neo-classical theory of the firm considers the decision making of firms in four theoretical market structures.

- Perfect Competition
- Monopolistic Competition
- Oligopoly
- Monopoly

It is assumed that the decision making by firms will be primarily determined by the relationship between firms' cost of production and revenue (which will determine profit or loss)

'Short Run' and 'Long Run'

In economics, production is assumed to require factors of production, (land, labour, capital, enterprise). A distinction is made between the short-run and the long-run.

Short-run = period of time in which ^{at least one} all factors of production is fixed. All production takes place in the short-run. e.g. a restaurant may easily be able to vary the quantity of raw food, fuel and maybe labour which it uses in the production process in order to produce more or less meals. These are known as variable factors. However, it may be less easy or impossible at any point in time to increase or

decrease the size of its premises, its equipment (e.g. ovens) or other forms of capital. There are known as fixed factors. The existence of fixed factors therefore restricts the scale of production, e.g. max 50 meal/day can be served.

Long-run = period of time in which all factors of production are variable, but the state of technology is fixed. All planning takes place in the long-run. e.g. if it's assumed that the restaurant can now increase the size of its premises, acquire extra equipment, etc..., then it is assumed to be a long-run situation. The long-run is therefore composed of a series of short-run situations.

In the short-run firms cannot enter or leave an industry (e.g. new restaurant opening/closing). The number of firms in an industry may only vary in the long-run.

The very long-run - as for long run, except that new technology/increases in human knowledge can occur. e.g. the introduction of microwave technology in the 1970s.

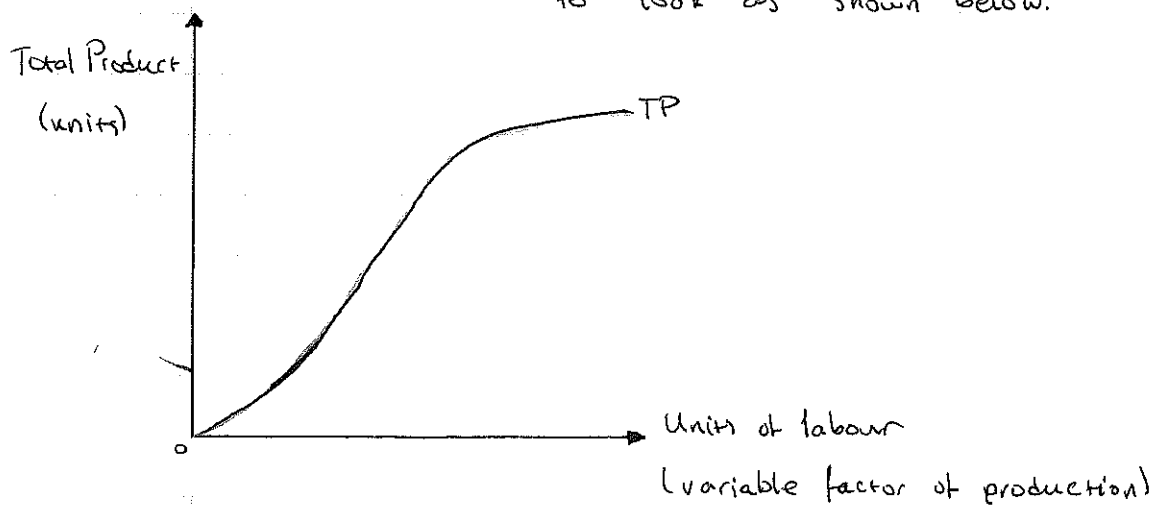
In the short-run, firms' cost of production can be divided into fixed costs and variable costs. In the long-run all costs are variable.

N.B The chronological length of the short-run will vary from industry to industry according to how easily the fixed factors of production can be acquired and increased, e.g. compare the ease of increasing fixed capital for a restaurant to the electricity supply industry (building a power station).

Average Product, Marginal Product and Total product

Product - refers to the output of a good or service that a firm produces using its fixed and variable factors of production.

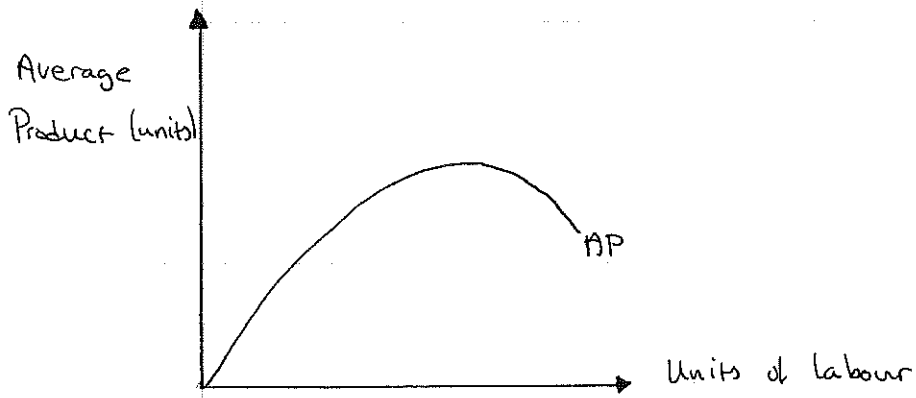
Total Product (TP) - the total output of goods and services produced by a firm, with a given amount of factors of production, over a period of time. e.g. with a certain amount of capital, labour, raw food, etc... a restaurant can produce and serve 40 meals a day. An increase in resources used is likely to lead to an increase in TP. e.g. assuming a SR situation where capital is fixed and labour is variable, a TP curve is likely to look as shown below.



As more units of labour are employed, output will increase, but not at a constant rate. Initially, additional labour may add more to TP than further units of labour. This is due to the concepts of increasing returns and diminishing returns.

Average Product (AP) - this is the amount produced on average per unit of the variable factor employed.

$AP = \frac{TP}{V}$ where $V = \#$ of units of the variable factor e.g. labour employed. e.g. when 4 units of labour are used, 40 meals a day are produced, $AP = \frac{40}{4} = 10$

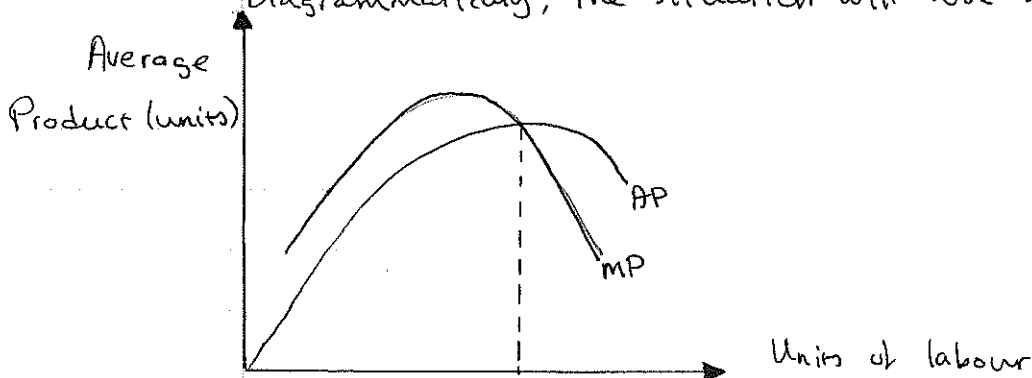


AP of a variable factor (labour) is likely to rise and then fall. This will be due to the typical pattern for; marginal product.

Marginal Product (MP) - the extra output produced from the employment of an extra unit of the variable factor. $MP = \frac{\Delta TP}{\Delta V}$ e.g. if total output increases from 40 to 70 units a week following the employment of a fourth unit of labour, then the $MP = \frac{30}{1} = 30$ units.

The relationship between average and marginal values will always be; if the marginal value is greater than the previous average, then the new average will be higher than previously (if $MP > AP \rightarrow \uparrow AP$). If the marginal value is less than the previous average, then the new average will be lower than previously (if $MP < AP \rightarrow \downarrow AP$).

Diagrammatically, the situation will look like;



In the case of average and marginal product; marginal product curve will always cut the AP curve at the AP curve's highest point (in the case of average and marginal cost curves, marginal cost will always cut the AC curve at the AC curve's lowest point (inverse)).

Labour units	TP	AP	MP
0	0	—	—
1	120	120	120
2	300	150	180
3	500	166.66	200
4	640	160	160
5	675	135	35
6	675	112.5	0

NB When plotting marginal values on a graph they should be plotted at the mid-points because they represent the change. e.g. the MP of a 3rd worker employed (i.e. the difference between the TP of 3 workers and the TP of 2 workers) should be plotted against 2.5 workers.

The Law of Diminishing Returns

(short run situation - therefore at least one factor of production is fixed)

a.k.a. The Law of Variable Proportions (i.e. the ratio of variable to fixed factors changes)

Def: As additional units of a variable factor are added to a given quantity of a fixed factor, the extra output (marginal product) of each additional variable factor will eventually decline.

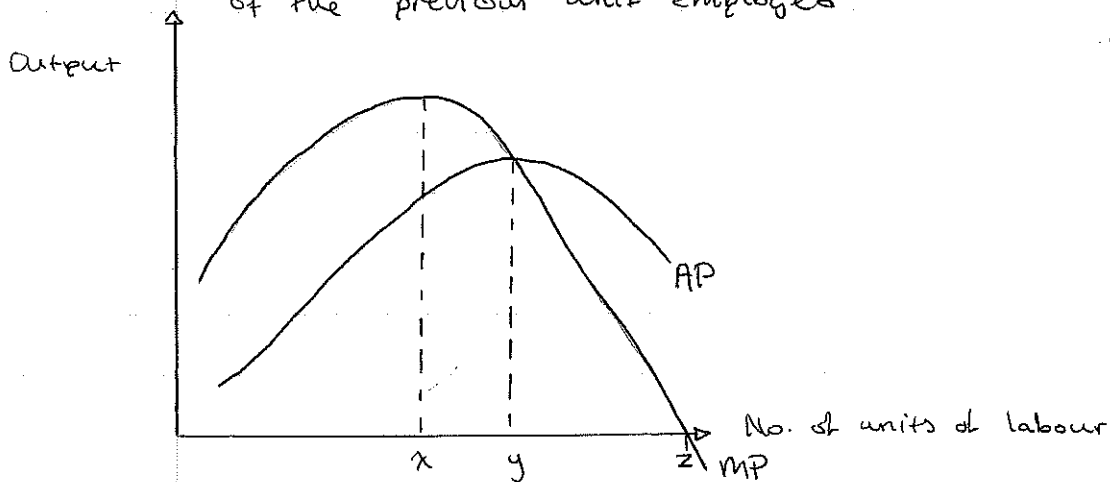
e.g. a restaurant with fixed capital equipment employs additional chefs. Eventually the extra # of meals produced by employing a new worker will be less than the extra added by the previous worker. (see Burger explanation, pg 80, 81)

exercise Dorton Pg 31

# variable factors	TP	AP	MP <small>→ plot at mid points</small>
0	0	-	-
1	5	5	5
2	12	6	7
3	21	7	9
4	32	8	11
5	45	9	13
6	56	9.3	11
7	63	9	7
8	68	8.5	5
9	72	8	4
10	75	7.5	3
11	75	6.81	0
12	73	6.08	-2

look at the accompanying graph version *

Diminishing marginal returns to a variable factor (e.g. labour) occur when marginal product of an extra unit of labour employed is less than the marginal product of the previous unit employed.



- Up to the employment of x units of labour, there are increasing returns to labour, i.e. marginal product of labour is rising.
- When more than x units of labour are employed, there are diminishing returns to labour, i.e. marginal product is falling.

NB - Total product will be increasing so long as MP is positive, i.e. up to the employment of z units of labour. When more than z units of labour are employed, MP becomes negative and TP will therefore fall.

- Up to y units of labour being employed, MP is greater than AP, therefore AP is rising. When more than y units are employed $MP < AP$, therefore AP is falling.
- Therefore $MP = AP$ at AP's highest value.
- After the employment of y units of labour there are diminishing average returns.

Costs

In economic analysis costs of production can be divided into two categories;

- economic costs (opportunity costs)
- accounting costs (business costs)

a) Economic costs

The economic costs of production refer to the opportunity cost of using resources to produce a good or service. Resource costs (a.k.a. factor costs) can be divided into two categories;

- explicit costs (often accounting costs)
- implicit costs

i) Explicit costs

These are firms' costs of production when the firm has to buy resources which it does not already own, e.g. employing worker and paying them wages, buying raw materials, capital, etc... They involve a direct payment to acquire the resources. Opportunity cost present.

ii) Implicit costs

These are when a firm uses resources which it already owns but for which there is an opportunity cost in terms of earnings foregone from selling the resources to another producer) e.g. a firm owns its own premises which it uses for making its products in. It does not have to pay rent for the premises. However, the premises could be rented to another firm for 5000 CHF/month. Therefore the opportunity cost of the firm using the premises itself is 5000 CHF rent income foregone. e.g.2, a self-employed chef could have earned 7000 CHF a month in his/her next best alternative employment. Therefore, the opportunity cost of him/her "employing" himself/herself is 7000 CHF/month wages foregone.

Because of this distinction between accounting / explicit costs and implicit costs, an accountant's view of a firm's profits will be different from an economist's view.

6.2 Pg 82

1)

Losses

- 20,000\$ depreciation implicit
- 40,000\$ in wages explicit
- 100,000\$ raw materials explicit
- 50,000\$ possible rent revenue implicit
- 40,000\$ electricity explicit
- 70,000\$ possible alternate job implicit
interest foregone
- 3000\$ initial investment implicit

Gain

TR = \$450,000

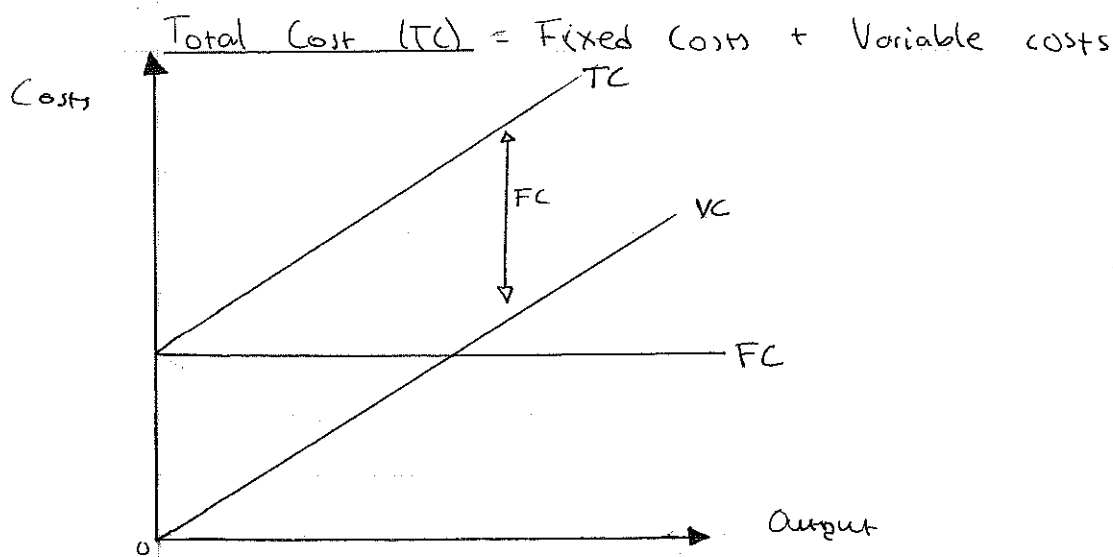
- 2) a) an accountant = $450,000 - 180,000 = 270,000$ accounting profit
 an economist = $450,000 - 363,000 = 87,000$ economist profit

Fixed Costs and Variable Costs

In the SR, i.e. where at least 1 factor of production is fixed in supply, firms will have to pay fixed costs and variable costs. Fixed costs (FC) are costs of product which do NOT vary with output. i.e. they are the costs of production which a firm would still have to pay in the SR if it was producing zero output. Variable costs (VC) are costs of production which vary directly with output, i.e. when output rises, variable costs rise. When output is 0, variable costs would also be 0.

example Mountain Hotel & Restaurant

<u>Fixed Costs</u>	<u>Variable costs</u>	
Insurance	Fuel	
Rent	Raw materials	
Maintenance (semi-variable)	Wages	
Capital	Transport (semi-variable)	
Salary	} both	
Loan repayments		Electricity
Advertising		Water
	Gas	



NB. FC occur only in the SR, because of the assumption that in the SR at least 1 factor of production is fixed in supply. In the LR, all costs are variable.

Average Cost (AC)

$$ATC/AC = \text{output}$$

$$AFC = \frac{FC}{Q}$$

$$AVC = \frac{VC}{Q}$$

$$\therefore AC/ATC = AVC + AFC$$

Marginal Cost (MC)

→ The cost of producing an extra unit of output.

$$MC_{100} = TC_{100} - TC_{99}$$

$$MC_n = TC_n - TC_{n-1}$$

(eg. TC of 99 units = CHF 980

TC of 100 units = CHF 1000

$$\therefore MC_{100} = \text{CHF } 20)$$

$$MC = \frac{\Delta TC}{\Delta Q}$$

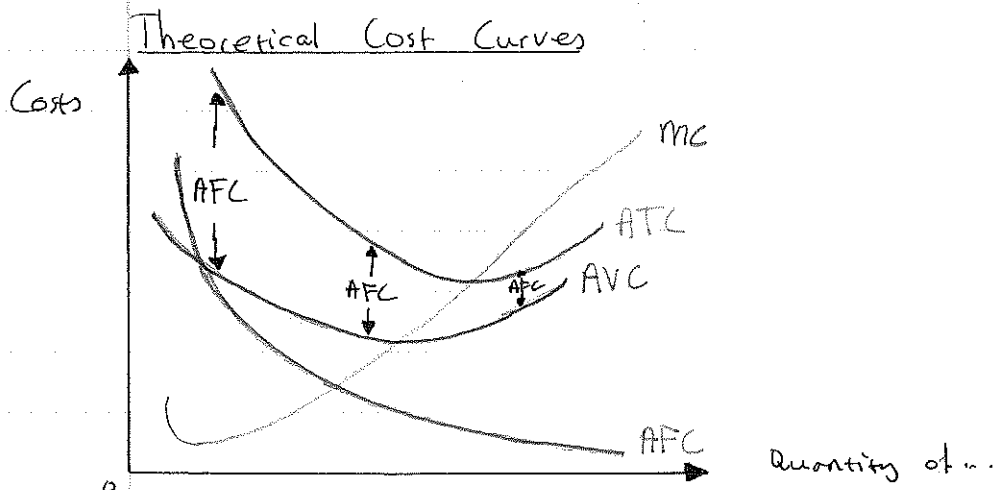
NB Marginal values are plotted at the mid-point of the change in quantity. i.e. in the above example the MC of the 100th unit is 20 CHF and so it should be plotted against an output of 99.5.

4 machines, 100 \$ each
workers, 200 \$ each

Dorton e.g Pg 32

Workers	Output	TFC	TVC	TC	AFC	AVC	ATC	MC
0	0	400	0	400	—	—	—	20
1	10	400	200	600	40	20	60	13.3
2	25	400	400	800	16	16	32	10.00
3	45	400	600	1000	8.88	13.3	22.2	8.00
4	70	400	800	1200	5.71	11.43	17.14	10.00
5	90	400	1000	1400	4.44	11.11	15.55	13.33
6	105	400	1200	1600	3.81	11.43	15.24	20.00
7	115	400	1400	1800	3.48	12.17	15.65	40.00
8	120	400	1600	2000	3.33	13.33	16.66	

$$MC = \frac{\Delta TC}{\Delta Q}$$



- $AFC + AVC = ATC$

- As $AFC \downarrow$ as output \uparrow , \therefore vertical distance between between ATC and AVC will decrease as output rises.

- AVC and ATC and MC are 'U' shaped, due to increasing returns and diminishing returns

- MC cuts AVC and ATC at their lowest points

Revenues

Revenue refers to the income received by a firm from the sale of its products.

Total Revenue (TR) a.k.a Turnover - i.e. the total amount of income received by a firm through the sale of its products.

$$\text{Total Rev} = P/\text{unit} \times \text{no. of units sold}$$

$$\therefore TR = P \times Q$$

Average Revenue (AR)

$$AR = \frac{TR}{Q}$$

$$\therefore AR = P$$

↳ if the P/unit is constant, then AR will be the selling price. If AR is not constant, then AR will equal the average selling price. (AR refers to the amount received per unit by the seller at a particular level of sales. How much is received per unit will depend upon consumers' willingness and ability to pay. Therefore, consumers' D curve will be the firm's AR curve)

Marginal Revenue (MR), i.e. the extra revenue received by a firm, from the sale of one extra unit of output.

$$MR_{100} = TR_{100} - TR_{99}$$

$$\text{(or) } MR = \frac{\Delta TR}{\Delta Q}$$

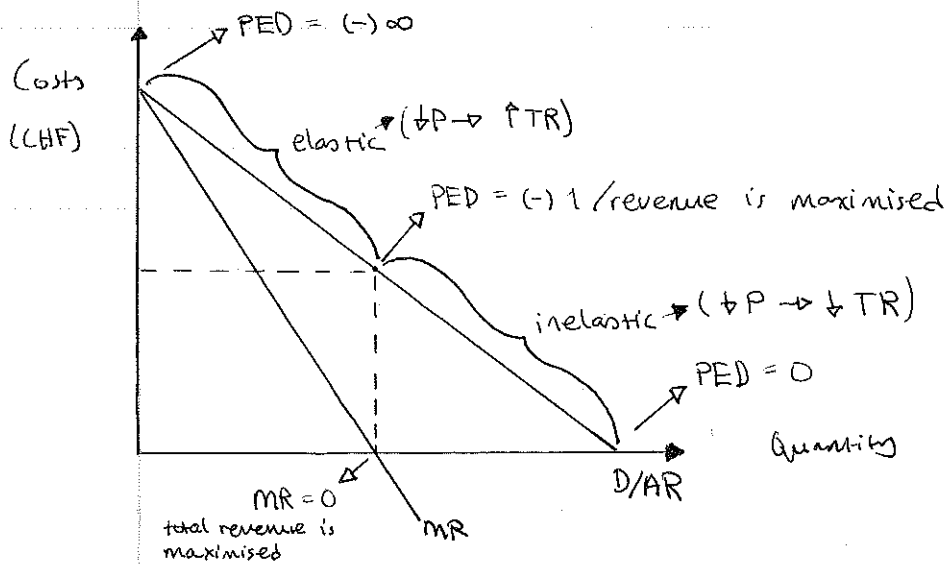
- When MR is positive, TR is rising
- When MR is negative, TR is falling
- \therefore When $MR = 0$, TR is maximised
- When $MR = 0$ (TR is maximised), $PED = -1$ (unitary)
↳ (refer to graph overleaf)

Ian Dorton

Q	P	AR	TR	MR	plotted against
0	-	-	-	70	(5)
10	70	70	700	50	(15)
20	60	60	1200	30	(25)
30	50	50	1500	10	(35)
40	40	40	1600	-10	(45)
50	30	30	1500	-30	(55)
60	20	20	1200	-50	(65)
70	10	10	700		
80	-	-	-		

- Question 1)
- a) TR when sales are 50 units = 1500 \$
 - b) TR when P is \$ 40 = 1600 \$
 - c) 20 \$
 - d) 20 \$
 - e) 50 \$
 - f) ~~30 \$~~ -10 \$
- 2)
- a) PED = -0.33 inelastic
 - b) PED = -1.67 elastic
 - c) MR at the given price

Relationship between MR and PED



Profits (π)

Profit is the residual when total costs are subtracted from total revenue.

$$\text{Total } \pi = \text{TR} - \text{TC}$$

Profit margin is the average profit made per unit sold.

$$\text{Profit margin} = \text{AR} - \text{AC}$$

* Economists distinguish between different types of profit;

$$\text{Accounting } \pi = \text{Normal } \pi + \begin{matrix} \text{Abnormal/} \\ \text{Economic/} \\ \text{Supernormal } \pi \end{matrix}$$

Normal π

Normal π can be defined as the cost of enterprise or the cost of entrepreneurship. It is the minimum level of profit that a firm needs to make in order to remain in its present line of business. It is the level of profit which it could have made in its next best alternative line of business, i.e. normal profit can be defined as the opportunity cost of continuing current production.

(it is the amount of revenue needed to cover implicit costs)

If a firm is making only normal profit i.e. 0 (zero) economic (supernormal) profit, then economists would say that the firm is 'breaking even' i.e. no economic loss or economic profit. To accountants, a firm making only normal profit will still be profitable.

Economic/Abnormal/Supernormal π

This is any profit made above normal profit, e.g. a firm makes an accounting π of CHF 100,000/year, making sports shoes.

Alternatively, the firm could have made CHF 70,000 accounting profit (next best alternative) making fashion shoes. Therefore, CHF * 70,000 = normal π and CHF 30,000 = economic π .

NB Economists regard normal π as the cost of enterprise. Therefore, any cost curves drawn will incorporate normal profit as a cost of production.

When a firm is said to be breaking even in economics, it means that the firm's revenues equal the firm's costs, including normal profit. A firm may be making accounting profit in the short-run but negative economic profit.

Porton Pg 35

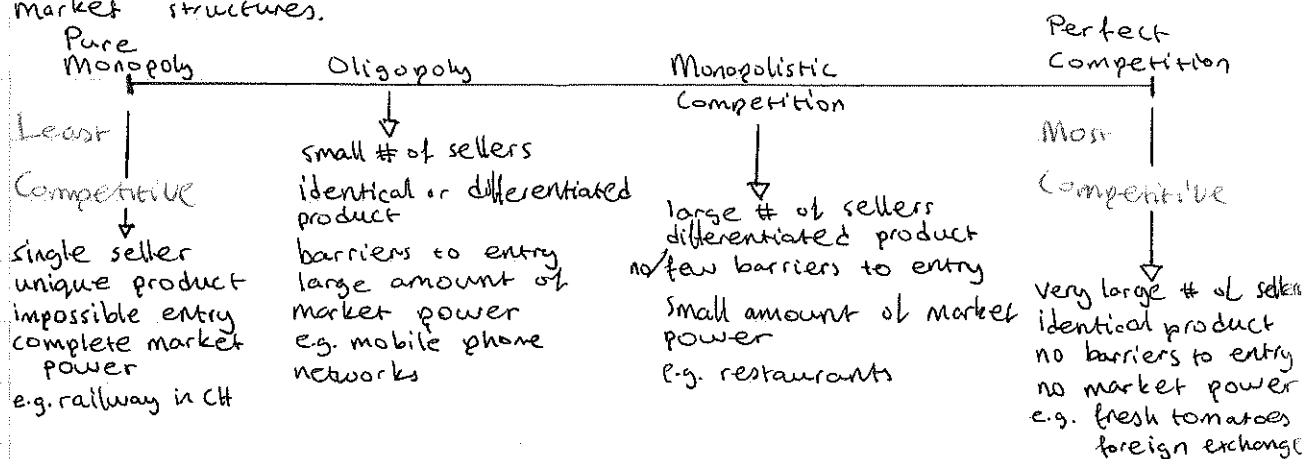
1) Output	Price/unit	ATC	Profit/unit
100	\$ 25	\$ 17	\$ 8
200	\$ 19	\$ 15	\$ 4
300	\$ 12	\$ 12	\$ 0

2) Output	Total Revenue	Total Cost	Total Profit
100	\$ 2500	\$ 1700	\$ 800
200	\$ 3800	\$ 3000	\$ 800
300	\$ 3600	\$ 3600	\$ 0

Market Structure Models in the Neo-classical Theory of the Firm

The Neo-classical theory of the firm categorises firms (producers) into different market structures, mainly based upon the degree of competitiveness in the industry. This may be due to the number of firms in the industry, the ability of new firms to enter the industry, the existence of substitutes, etc.

It is possible to refer to a competitiveness spectrum which gives an indication of the level of competition within the different market structures.



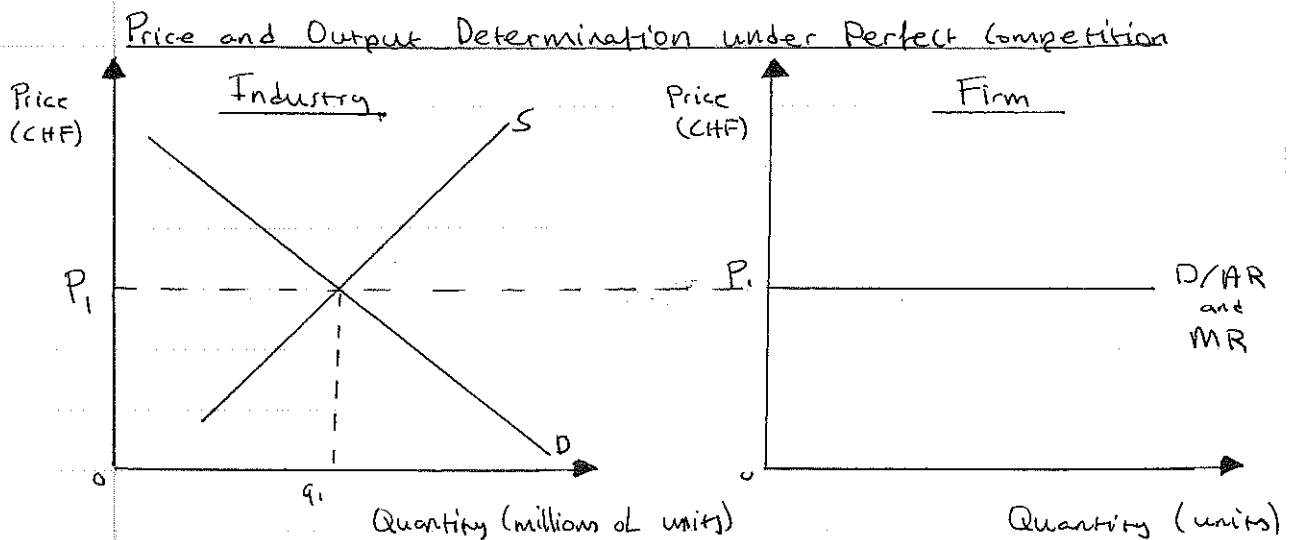
Perfect Competition

A perfectly competitive market is assumed to be the most competitive market structure. In reality, no market will be perfectly competitive but, some agricultural markets and the foreign currency exchange markets come close to this extreme model.

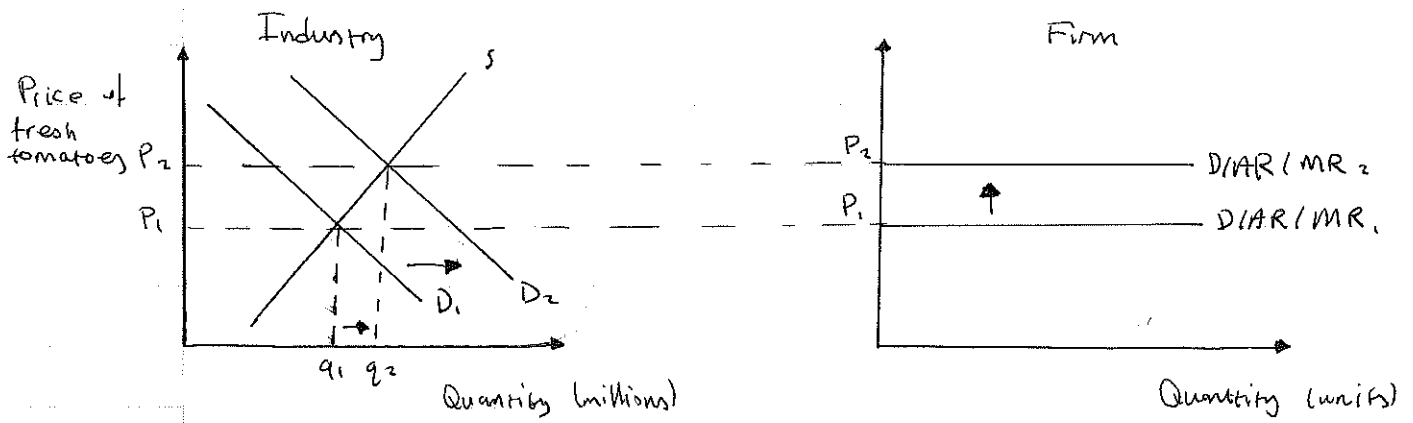
— Key assumptions of perfect competition: (Pg 102-103)

- Firms are short-run profit maximisers (same for all neo-classical market structures), i.e. output set where $MC = MR$.
- Very large number of buyers and seller, i.e. there is no market power. Firms are 'price-takers'
- All firms' products are homogeneous/identical. Consumers cannot choose between different firms' products i.e. no differentiation
- No barriers to entry or exit. Any firm can enter or leave an industry. When profits increase, producers will enter the market and vice versa (in the long-run).

- e) Perfect mobility of resources if a firm requires more resources to grow.
- f) Perfect knowledge — all stakeholders know everything about the market.
- g) There is rationality amongst producers and consumers i.e. producers aim for maximum profit where as consumers aim for maximum utility.



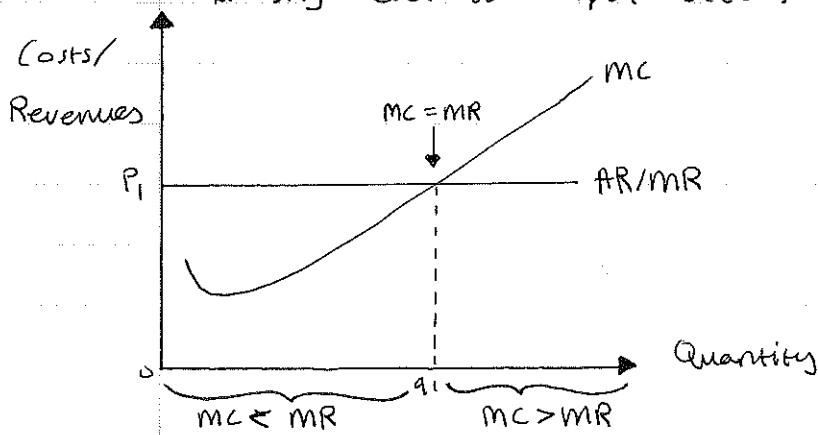
In any ^{free-}market, the price of the product is set by the interaction of D and S for the product. In a perfectly competitive market, every firm is too small and too insignificant to have any influence on the market price. Each firm is therefore a PRICE-TAKER. If the firm tried to charge a higher price than the market price, it would not sell any units, as all the other firms are producing perfect SUBSTITUTES. If a firm unilaterally drops its selling price (without there being a fall in the AC in the industry) then the firm would make a loss and would leave the industry in the long-run. As a result therefore, each firm will face a perfectly elastic D/AR curve for its product. Because P/AR is constant for the firm, MR will have the same value. Therefore the MR curve is superimposed on the AR curve. A Δ in P, and therefore a shift in the firm's AR/MR curves will occur if there is a Δ in market conditions, i.e. causing a shift in the market D or S curves.



Output determination under P.C

$MC = MR$

One of the assumptions of the Neo-classical theory of the firm is that all firms are short-run profit maximisers. The profit maximising level of output occurs where $MC = MR$.



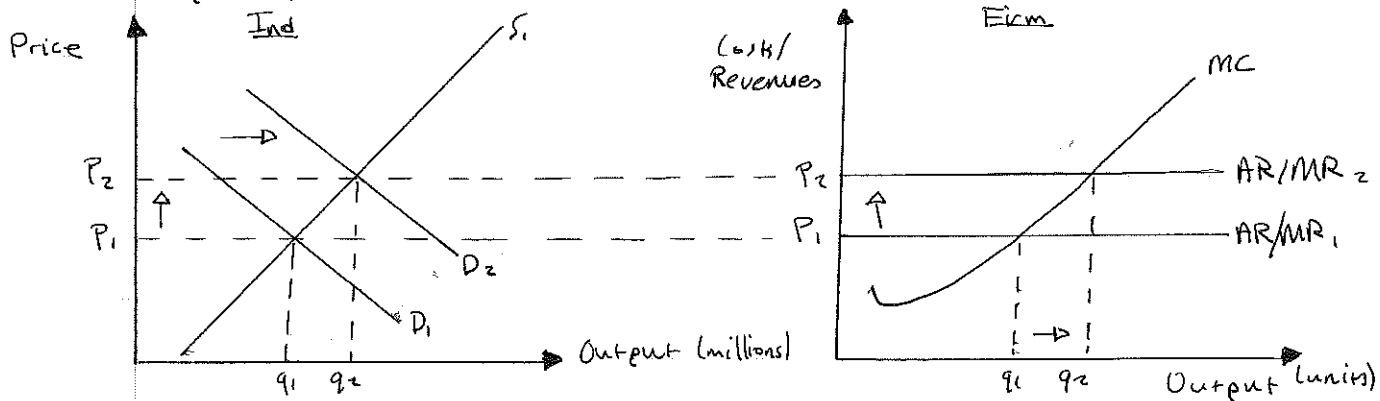
every unit produced or sold is marginally profitable, \therefore its sale increases total π

every unit produced, sold is marginally loss-making, \therefore its sale reduces total π

Total π is the sum of the marginal π of every unit produced. To profit-maximise, a firm should produce and sell every marginally profitable unit and NOT produce/sell any marginally loss-making units. Assuming that ^{firms} will experience diminishing returns, so that marginal costs are rising as output rises, the firm should produce at the output level where $MC = MR$ for profit maximisation. Therefore, for profit maximisation in any market structure, output should be set where $MC = MR$.

Changing market conditions will cause a change in market price

which will change the price and the profit maximizing level of output for the firm.

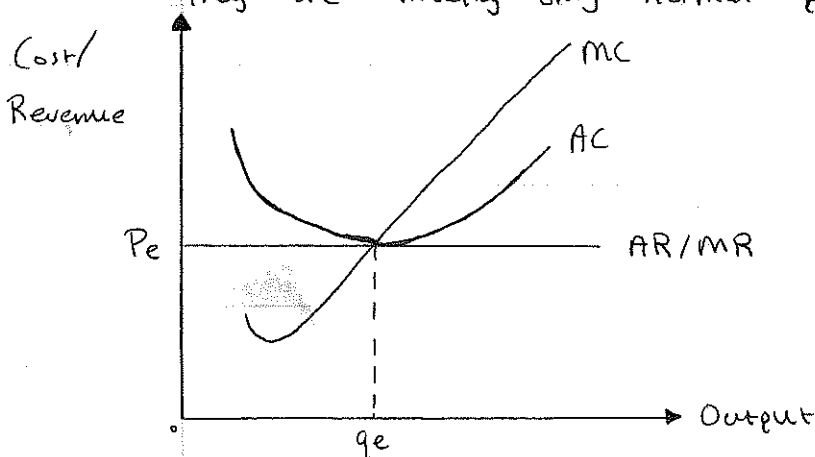


A rise in market price from P_1 to P_2 raises the firm's AR/MR curve, from AR/MR_1 to AR/MR_2 . As a result of an increased selling price, the quantity supplied by the firm will increase from q_1 to q_2 . The shift of the firm's AR/MR curve has caused a movement along the MC curve. Price and output for the firm are determined by the interaction of the AR and MC curves. The AR curve is the demand curve. The upward ^{sloping} part of the MC curve is the firm's supply curve.

Profit/Loss/Break-even under PC in SR and LR

Total $\pi = TR - TC$ ($\pi =$ economic profit)
 \therefore Average $\pi = AR - AC$ (abnormal / super-normal)

Under perfect competition firms can make economic profit or losses in the SR. However in the LR, due to an absence of barriers to entry and exit, these economic profits/losses will be competed away and all firms will be in LR equilibrium where they are making only normal profit, i.e. breaking even.



Long-run Equilibrium
 (Break-even / Making only normal π)

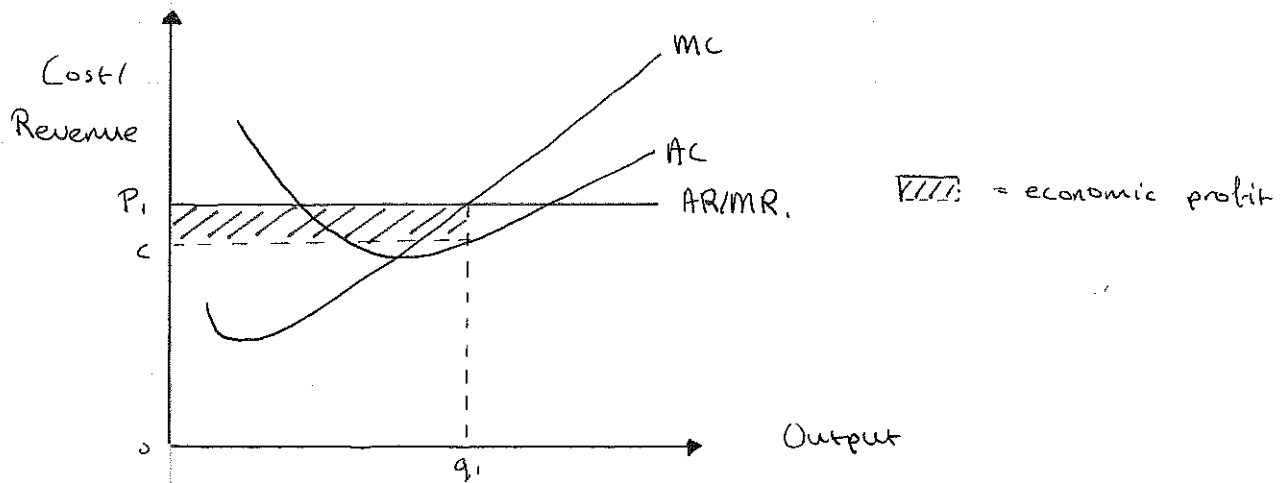
The diagram on the other page shows the LR equilibrium position for firms in a perfectly competitive market. The equilibrium price P_e is determined by supply and demand for the industry's product. Because there are so many firms in the industry, each firm is a price-taker, and has to charge the market price. Each firm's D/AR curve is therefore perfectly elastic at the market price P_e . Therefore the AR curve is in the same place as the MR curve.

Because each firm is assumed to be a profit maximiser, it will set output where $MC = MR$, at q_e . In LR equilibrium firms do not make economic profit and therefore $AC = AR$ at the profit maximising level of output q_e .

It is possible for firms to make economic profit or losses in the SR. A change in market conditions will shift either the supply curve or the demand curve for the industry as a whole, resulting in a change in market price and therefore a shift in each firm's AR/MR curves. This will result in economic profits or losses being made in the SR but, in the LR, the entry or exit of firms will return the market to equilibrium, where only normal profits are made.

Short-run disequilibrium (Making Economic Π)

Assume that there is a change in market conditions which raises the market price (either an increase in demand or a reduction in supply). Assuming that firms' cost of production do not change, then firms will now be making economic profit. This is shown overleaf.



The rise in market price means that the AR/MR curves are now above the AC curve at the profit maximising level of output q_1 ($MC = MR$). At q_1 , AR is above AC and therefore economic profits equal to the shaded area are being made by existing firms

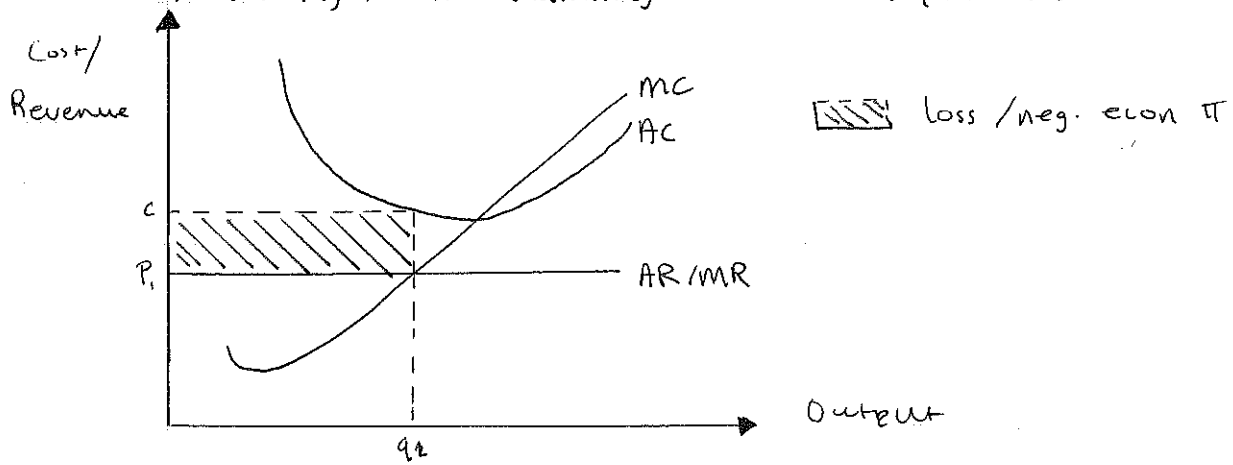
In the LR, the absence of barriers to entry will mean that new firms will enter the industry attracted by the prospect of making economic profits. The entry of new firms will increase the market supply of the product, which will lower the market price and shift each firm's AR/MR curves downwards so reducing the economic profits made. (At the same time, the increased number of firms in the industry will increase the demand for resources which may shift each firm's AC curve upwards.)

The market will continue to adjust until all firms in the industry are making only normal profit (breaking-even) and the industry is once more in equilibrium where $AC = AR$ at the profit maximising level of output where $MC = MR$

Short-run disequilibrium (Making losses $(-\pi)$)

Alternatively, a fall in market price (rise in supply or fall in demand) will shift the AR/MR curves for existing firms downwards,

resulting in losses. i.e. AR is less than AC at the profit maximising / loss minimising level of output where $MC = MR$.



At q_1 (where $MC = MR$) AC is greater than AR so existing firms are making a loss equal to the shaded area. In the LR some existing firms will leave the industry. This will reduce the supply in the industry, raise the market price, and shift the AR/MR curves for remaining firms upwards (AC curve may also shift downwards). This will continue until remaining firms are making normal profit and the industry is in LR equilibrium.

Alternative Aim of Firms (Pg 99)

Profit maximisation may not always be the main aim of firms. Other potential aims include;

a) Revenue maximisation

If entrepreneurs measure success by the amount of sales revenue, they will produce where the MR is zero. This means that they will produce above the profit maximising level of output ($MC = MR$)

b) Growth maximisation

Companies may aim to achieve growth in the SR (instead of maintaining profits) in order to gain a large market share to dominate the market in the LR. Growth is measured through quantity of sales, sales revenue, employment or the percentage of the market share.

c) Satisficing

This is where an economic agent (firm) aims to perform satisfactorily rather than to a maximum level. This may be because they chose to pursue other goals (leisure) or because the achievement of a profit-maximising state does not affect the workers that are in the management, i.e. management is non-owner worker whose lives don't change based on whether maximum profit is achieved. Family firms may forego undue risk to ensure that the firm survives for later generations, and therefore might not aim for profit-maximisation.

d) Corporate social responsibility (CSR)

Where a business includes the 'social/public interest' in its decision making by adopting an ethical responsibility to the environment and the community it operates in. This may include educational and fair-trade projects, reduction of harmful emissions and the use of sustainable resources.

e.g. Lush advertises the fact that it does not carry out any animal experimentation.

Barriers to Entry (and Exit) (Monopoly)

A monopoly can only make economic profit in the LR if it is able to keep new firms from entering its markets. These are called barriers to entry;

1) Economies of Scale

Most monopolies, as they are large firms, benefit from economies of scale in the form of cost-savings and lower unit costs. Any new firm in a market will likely start off small and not experience the benefits of economies of scale, having higher unit costs. Without equal economies of scale, a monopolist could simply reduce the price to the level of normal profits to compete away the new entrants, who are now making losses due to their high average costs. Therefore, economies of scale discourage entries into a monopolistic market.

2) Natural Monopoly.

An industry is a natural monopoly when there are only enough economies of scale available in the market to support 1 firm. Examples include utility supply, i.e. gas, water and electricity. If another firm were to enter the market, demand would be taken from the monopolist, leaving both firms in a situation where it is impossible for them to make even normal profit.

3) Legal Barriers

In certain situations, a firm may have been given a legal right to be the only producer in an industry. Intellectual property rights are an example of this where patents, copyrights and trademarks protect certain goods/ideas from replication by other firms (for approx. 20 years). Another legal barrier to entry may be if a government sets up a nationalised industry (post office) and bans other firms from entering the industry, ensuring its monopoly position.

4) Brand Loyalty

If the brand loyalty for a certain monopoly, new firms may be put off from entering the market, as they feel that they will not be able to produce a product sufficiently unique enough to generate such a strong brand loyalty.

5) Anti-competitive Behaviour

A monopolist may also attempt to stop competition by adopting restrictive practices (legal OR illegal). e.g. an established monopolist is in a strong position to start a "price war" following the entry of a new firm into the industry.

The monopolist can lower its price to loss making levels and sustain it long enough to bankrupt its competitor. This knowledge is enough to discourage new entrants.

Economies and Diseconomies of Scale

1) Economies of scale are decreases in LR AC when firms alter all of their factors of production to increase its output. Economies of scale lead to firms experiencing increasing returns to scale. There are different economies of scale that can benefit a firm as its output increases.

a) Specialisation

In small firms, the labour is limited and therefore has to take on many different jobs/roles, leading to higher unit costs. As firms grow, the management can specialise in individual areas of expertise, e.g. production, finance, marketing, and thus become more efficient.

b) Division of Labour

A breaking down of the production process into small activities that workers can perform repeatedly and efficiently, reduces their unit costs. e.g. cars and television sets on a conveyor belt.

c) Bulk buying

A larger firm can negotiate discounts with their suppliers. The cost of their input is therefore reduced, resulting in a reduction in their unit costs of production.

d) Financial Economies

Large firms can raise financial capital (money) more cheaply than small firms as banks usually charge a lower interest on their loans to large firms. This is because larger firms are considered ^{to be} less of a risk and are less likely to fail to repay their loans.

e) Transport economies

Large firms making bulk order may be charged for delivery. Similarly, a large firm may have its own transport fleet, bringing down the cost of delivery significantly.

f) Large machines

Some machinery is too large to be owned by a small firm. Larger firms can have large machinery, reducing their

unit costs of production, e.g. a combine harvester in a small farm compared to a large farm.

g) Promotional economies

Almost all firms promote their products through advertisements. The costs of ~~production~~ promotion tend not to increase by the same proportion as output. i.e. if a firm doubles its output, it is unlikely that its promotional costs will also be doubled. Thus the cost of promotion per unit of output falls. There are similar scenarios with other fixed costs, e.g. insurance, security.

2) Diseconomies of Scale are any increases in LR AC that come about after all factors of production to increase output. Diseconomies of scale lead to the firm experiencing decreasing returns to scale.

a) Control and Communication Problems

As a firm grows in size, the management will find it more difficult to control and coordinate the activities of the firm, leading to increases in unit costs of production and inefficiency. There will be a similar problem arising with the difficulty of communication in a large firm, also leading to an increase in unit costs of production.

b) Alienation and Loss of Identity

It is suggested that managers and workers may feel insignificant in a large firm and lose motivation to be efficient, leading to an increase in unit costs of production. This is due to a loss in the sense of belonging and loyalty caused by being in a very big organisation.

Internal economies/diseconomies of scale = increase in firm size
External " " " " = increase in industry size

Price Discrimination Notes

29/10/13

Price discrimination is the practice of charging different prices to different consumer groups for the same product, where the price difference is not justified by differences in cost.

In order for a producer to be able to price discriminate, three conditions are necessary;

- a) The producer must have some price-setting ability, i.e. the market must be imperfect (mostly found in monopoly or oligopoly markets).
- b) The consumers must have different PEDs for the product, i.e. consumers with inelastic demand would be willing to pay more for a product.
- c) The firm must be able to separate consumer groups to ensure that no resale of the product can occur. If not, low price consumers could sell the product to high price consumers at a price lower than that of the firm.

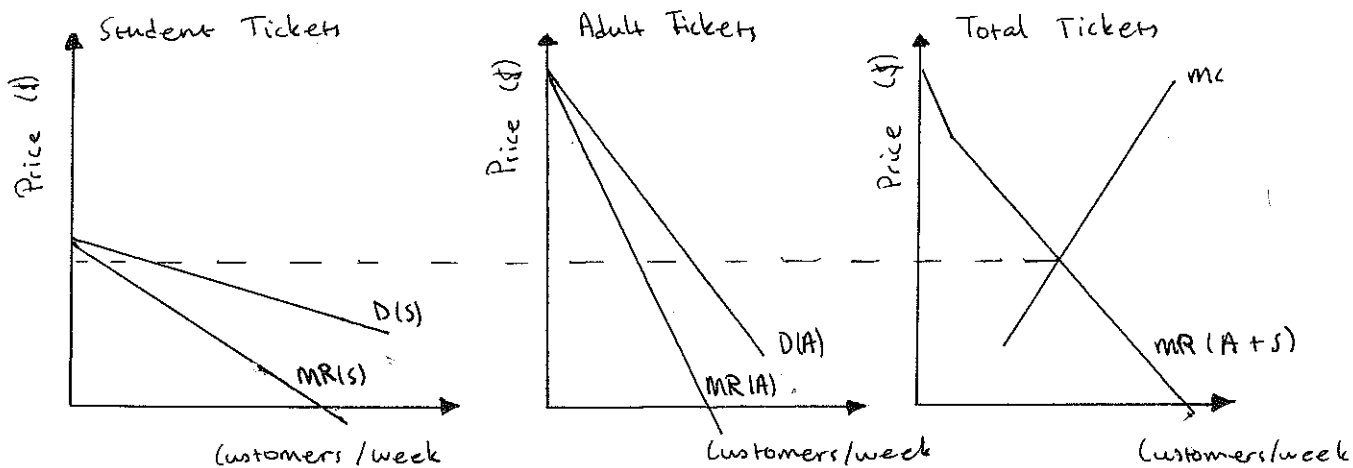
Producers can separate markets in different ways;

- 1) Time - consumers are willing to pay higher prices at certain times for the same good/service. Commuters' demand for transportation is less elastic during rush hour to/from work. Therefore, firms can charge a higher price to these consumers.
- 2) Age - children are often lower prices as they have more elastic demand due to their lower incomes.
- 3) Gender - women and men may be charged differently e.g. a football club charges less for female supporters as they believe females' demand is more elastic compared to men.
- 4) Income - wealthy clients of a lawyer may be charged more for legal services than poorer clients as their demand will be relatively inelastic.
- 5) Geographical distance - Firms often sell products at different prices in different locations. This is only possible if the price in transferring the product is greater than the difference in the prices.

- b) Types of consumer - Firms can sell at different prices to different users, e.g. electricity companies may charge different prices to industrial users versus domestic users.

Degrees of price discrimination

- A) First-degree price discrimination = each consumer pays exactly the price that s/he is prepared to pay e.g. traders in a bazaar where sellers bargain to sell at the highest price that the consumer is willing to pay.
- B) Second-degree price discrimination = a firm charges different prices to consumers depending upon how much they purchase. Utility companies usually charge a higher price for the first few units and then lower price for any marginal consumption.
- C) Third-degree price discrimination = consumers are identified in different market segments, and a separate price is charged in each market segment, recognising the different price elasticities in each of the segments.

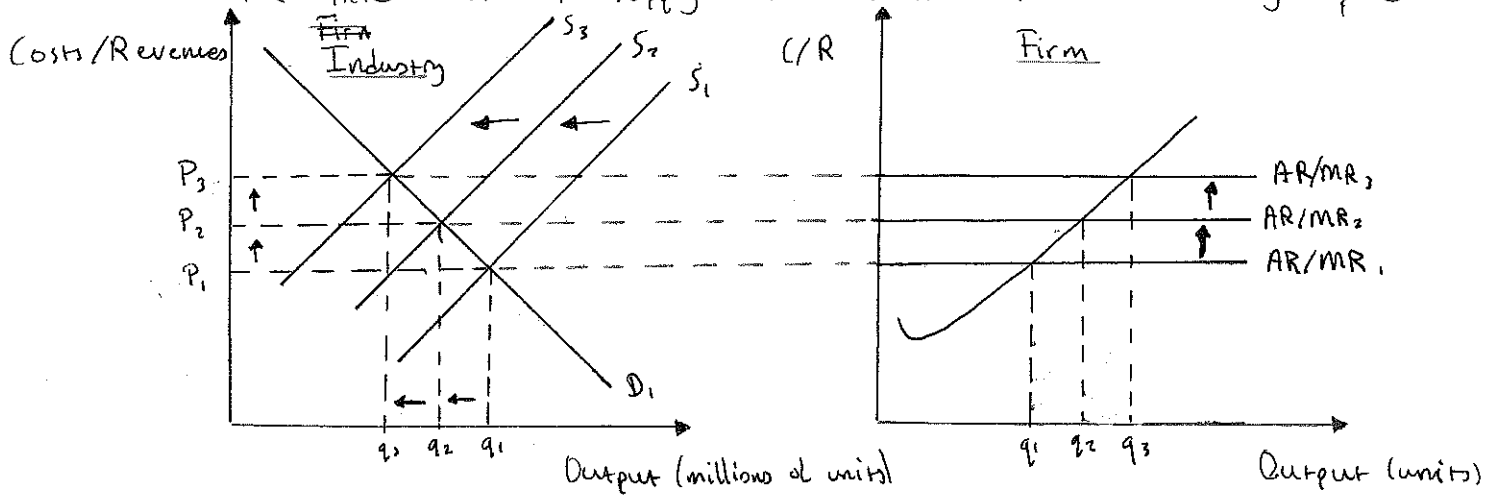


The supply curve under P.C. - Shut Down price and Break Even price

Supply curve under P.C.

The supply curve for a firm under P.C. will be its MC curve above its average variable cost curve.

Under P.C., the price charged by a firm will be determined by the interaction of supply and demand for the industry's product.



Assuming π maximisation ($MC = MR$)

- @ P_1 firm will produce q_1
- @ P_2 " " " q_2
- @ P_3 " " " q_3

$P_1 q_1, P_2 q_2, P_3 q_3$ are on MC curve

\therefore MC curve is the firm's supply curve.

Monopoly

A monopoly is a market structure where there is a single (or dominant) supplier of a good or service. Pure or perfect monopoly is where one firm provides a 100% of the industry's output, i.e. the firm IS the industry.

(In most countries a monopoly is legally defined as having a dominant position in the market, e.g. in the EU over 25% of the market's output.)

Examples of Monopolies;

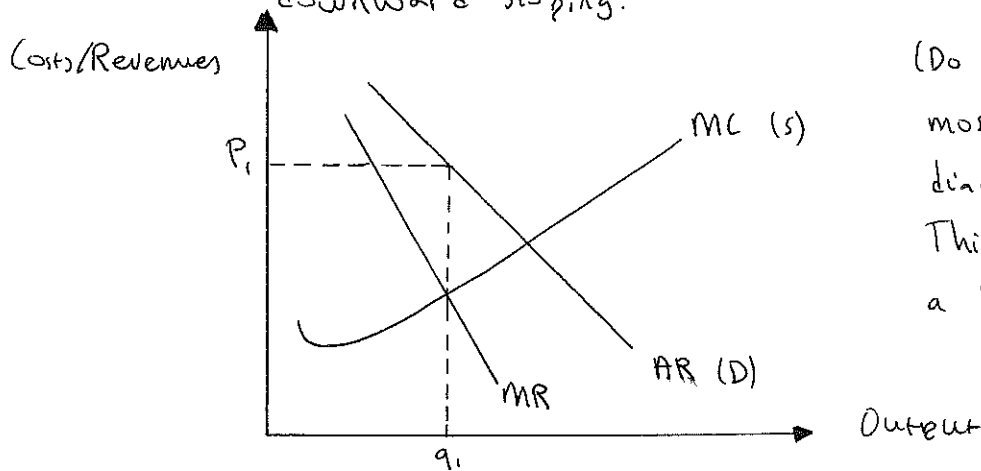
- Sale of alcohol by the government in Finland
- Railroad services by CFF in Switzerland
- Novae in Campus des Nations

A monopolist has the power to determine either the price at which the product will be sold or the quantity to be sold but not both. Monopoly power is restrained by consumers' demand preferences. Monopoly power is the ability to make economic profits in the LR (oligopoly's have monopoly power, perfectly competitive firms do not and monopolistically competitive firms have very little). Monopoly power depends upon two main factors; 1) The existence of barriers to entry (monopolies and oligopolies have them and PC and monopolistic competition do not) - these allow existing firms to prevent new entrants into the market, thus protecting economic π and 2) The non-availability of close substitutes, i.e. the more inelastic demand for the firm's product, the greater the monopoly power.

Price and Output determination under Monopoly

In a pure monopoly situation the firm is the industry. Therefore, the demand curve / AR curve for the firm will be

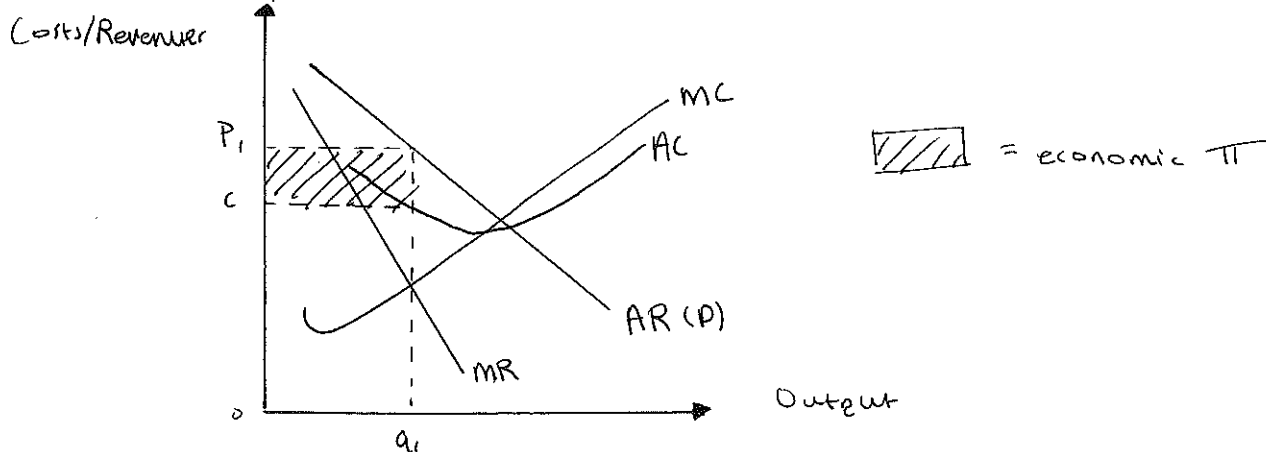
the demand curve for the industry's product, and will be downward sloping.



(Do not use this version in most answers - use full diagram with AC curve. This is just for developing a better understanding)

The AR/D curve is downward sloping. As AR falls as output rises, MR must lie below the AR curve. Because SR profit-maximisation is assumed, output is set where $MC = MR$, i.e. at q_1 . Price is shown from the AR curve at output q_1 , i.e. at P_1 (where $MC = MR$, go up and down).

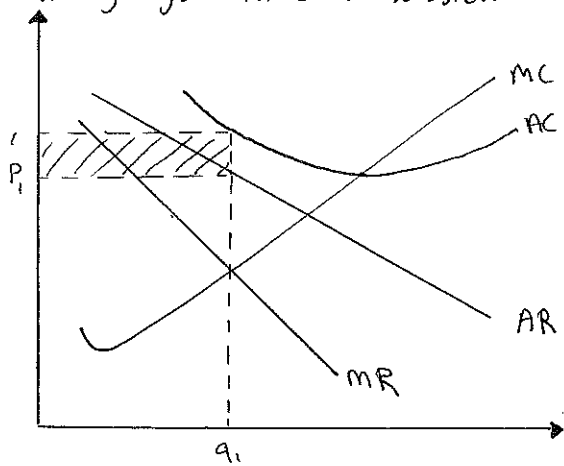
To determine whether or not the firm is making economic profits (or losses, $-\pi$) an AC curve needs to be incorporated.




At the profit maximising level of output, q_1 (where $mc = MR$), AR is greater than AC. The firm charges price P_1 per unit (AR) and the AC of production is 'c'. Total economic π is therefore shown by the shaded area.

Unlike under PC or Monopolistic Competition (where there are no barriers to entry/exit), a monopoly can continue to make econ. π in the LR, due to barriers to entry which keep potential entrants out of the market.

A loss making monopolist in a free-market will go bankrupt/leave the industry in the LR as it is making less than normal π , and other markets offer better chances of making econ. π . To remain in the market whilst making a loss, the monopolist will usually need to be subsidised by the government or nationalised e.g. many governments subsidise railway services.



 = econ loss ($-\pi$)

① q_1 (π maximising / loss minimising level of output - $MC = MR$),

$$AC > AR$$

\therefore losses = shaded area

Monopolistic Competition

Monopolistic Competition (like Oligopoly) is a form of imperfect competition i.e. in the market there is more than one firm competing with each other for consumers to buy their product, but the competition is not 'perfect'.

Characteristics / Assumptions

The assumptions are largely similar to those of Perfect Competition. i.e. large number of firms, no barriers to entry/exit, (near) perfect knowledge.

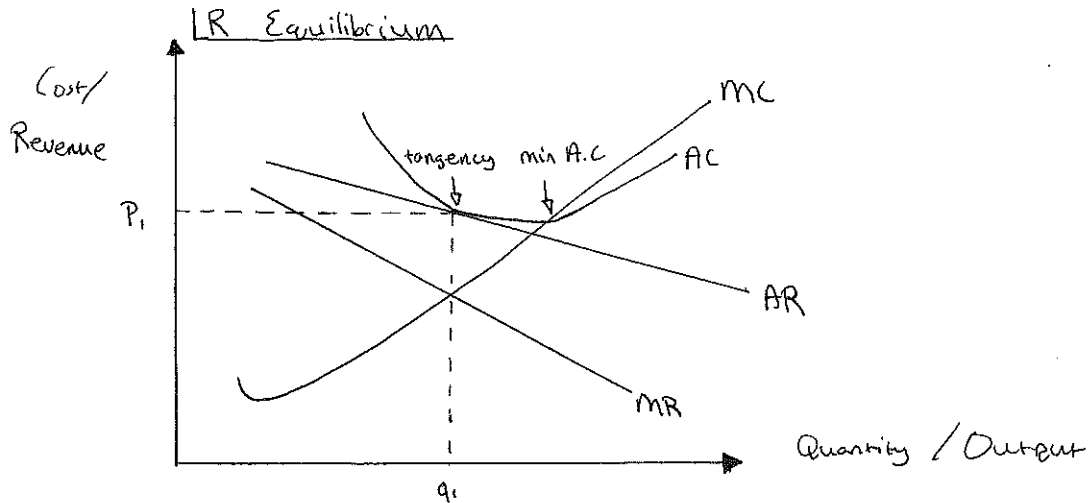
However, products in a monopolistically competitive market are not homogenous, although they will be very similar. Each firm's products are differentiated from those of its competitors. This means that consumers are able to express a preference for one firm's product compared to that of another firm, but each firm's products are close substitutes for each other and therefore demand will be very elastic. (but not perfectly elastic) e.g. restaurant industry in a city, hairdressing, etc..

Product differentiation can be of two main sorts; real and artificial. Real differentiation i.e. a difference/variation between the actual ingredients, physical characteristics or type of service for the product from producer/seller to another, e.g. different type/quality of food, different skills of a hairdresser. Artificial differentiation - the use of advertising, branding, packaging, etc to make the product appear different to consumers. e.g. bottled water.

Price and output determination under M. Competition

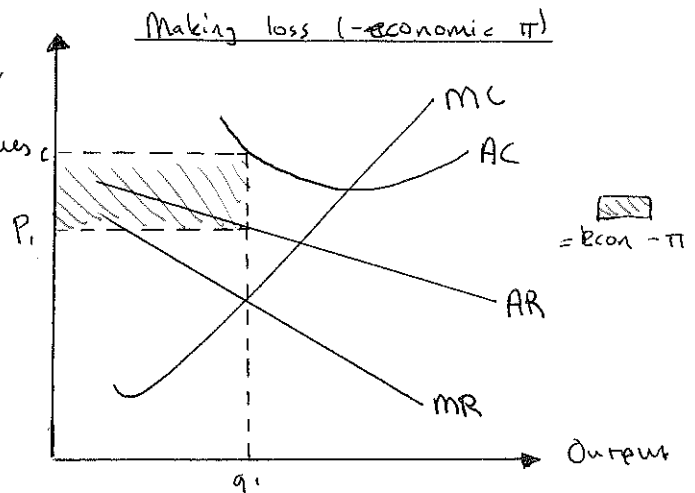
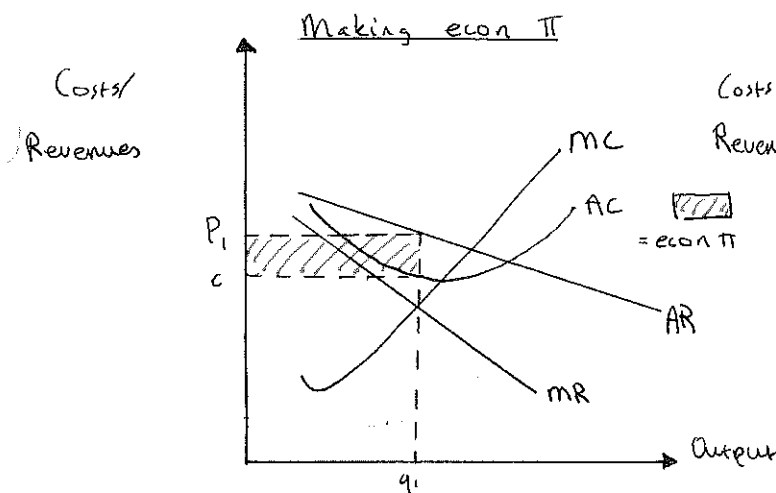
D/AR curve will be downward sloping but very elastic. Because of product differentiation, consumers can express a rational preference for one firm's product (unlike under P.C where

products are homogenous) but other firms in the market are supplying very close substitutes. Because of an absence of significant barriers to entry (and exit) firms cannot make economic profits in the LR and will only make normal profits.



- Output is set at q_1 , where $MC = MR$
- Price is determined by AR curve at q_1 (P_1)
- @ q_1 , $AC = AR$ \therefore no economic π s (only normal π s)

SR Disequilibrium



- @ q_1 ($MC = MR$) $AR > AC$
 \therefore econ π are made in SR
- In LR, new firms enter market (no barriers to entry), and econ π s are competed away ($AR \rightarrow$ left)
- @ q_1 ($MC = MR$) $AC > AR$
 \therefore loss made in the SR
- In LR, some firms leave (no barriers to exit) and losses for remaining firms are competed away (remaining firms' AR curves \rightarrow right)

Oligopoly

(From the greek oligos meaning a few)

Oligopoly is a form of imperfect competition as there are more than one firm in a market but the competition is not perfect.

Characteristics

- a - The market is dominated by a few firms. There may be many firms in the industry but the market share of a few of them will be significant, and large enough to influence the market. e.g. in the USA, the soft drinks industry contains hundreds of firms but the market is dominated by two firms Coca Cola and Pepsi co. (duopoly). The market share and therefore, the degree of market power can be illustrated by the use of concentration ratios (CR_n). e.g. assume that the table below shows the market share of different firms in an industry with 25 firms.

<u>Firm</u>	<u>% of Industry's Output</u>	
Firm 1	23	
Firm 2	19	3 firm conc. ratio CR ₃ = 57%
Firm 3	16	4 firm conc. ratio CR ₄ = 67%
Firm 4	10	
Firm 5-25	<u>+ 33</u>	
	100%	

A problem with CR_n (n,5) is that, without a breakdown of the individual market shares, the concentration of market power in the hands of one or two firms is not clear. The Herfindahl-Hirschmann does take this into account.

- b - Strong barriers to entry, therefore economic profits can be made in the LR.

- c - Interdependence between firms.

When there are only a few firms which dominate a market, the actions of any one firm will affect all the other firm

and vice versa. This is a specific characteristic to oligopoly (unlike). In a pure monopoly there are no other firms. In perfect and monopolistic competition there are so many other firms that the actions of any one firm are insignificant. For economic analysis of the impact of interdependence see later notes on Kinked Demand Curve theory and Game Theory.

d- Product differentiation

Oligopolistic markets are characterised by firms making extensive use of non-price competition e.g. advertising, branding, packaging, and real differentiation, e.g. petroleum retail, perfume retail. In many oligopolistic markets, product differentiation is so great and involves massive expenditure by firms on advertising, packaging, etc that it generates huge brand loyalty and acts as a major barrier to entry (product differentiation is also used in monopolistic competition but it is far weaker and does NOT act as a barrier to entry)

e- Price Rigidity

Most oligopolistic markets are characterised by the absence of price competition, i.e. firms do not generally try to undercut their competitors' prices in order to increase market share (when 'price wars' do occur between firms, they are often initiated by the market-leader(s) in the market as a SR measure to force weaker competitors out of the market). Even if price competition used, it is of secondary importance to non-price competition.

Non-Collusive vs. Collusive Oligopoly

As mentioned above, interdependence between firms and the uncertainty which this brings is a major issue for firms in oligopoly. Firms will need to determine whether they will compete with each other (non-collusive) or work together (collusive). Collusive oligopoly will mean that the firms will be acting as a monopoly

and so increase their monopoly power, usually illegal). Non-collusive oligopoly behaviour can be explained by Kinked Demand Curve theory,

Non-collusive oligopoly

Kinked - demand curve theory;

This theory aims to explain why firms in an oligopolistic market will try to avoid price competition (lowering price to attract customers) and why there will be some price rigidity, i.e. where prices ^{may} ~~will~~ not change even if costs of production do.

The assumptions of this theory are;

- Oligopolistic market
- There is no collusion between firms
- Market leadership is weak
- Firms will behave differently when prices rise to when they fall
- The starting price and quantity is assumed.

Kinked demand curve theory assumes that firms will make their decisions in order to avoid losing their market share. If one firm, firm A, were to raise its price, then the other firms would respond by trying to maintain their original prices or by raising by less than firm A. This would enable them to increase their market share at the expense of firm A. For firm A therefore, a price rise will lead to a significant fall in quantity demanded (PED is elastic), ~~and so~~ a price rise with elastic demand leads to a fall in total revenue. Firm A will therefore try to avoid raising its price. Alternatively, if firm A were to lower its price in order to gain customers from its competitors, and increase its market share, the other firms would try to respond quickly by matching firm A's price fall. Firm A may therefore initially gain some extra consumer demand but it will not be significant, - the price fall will therefore

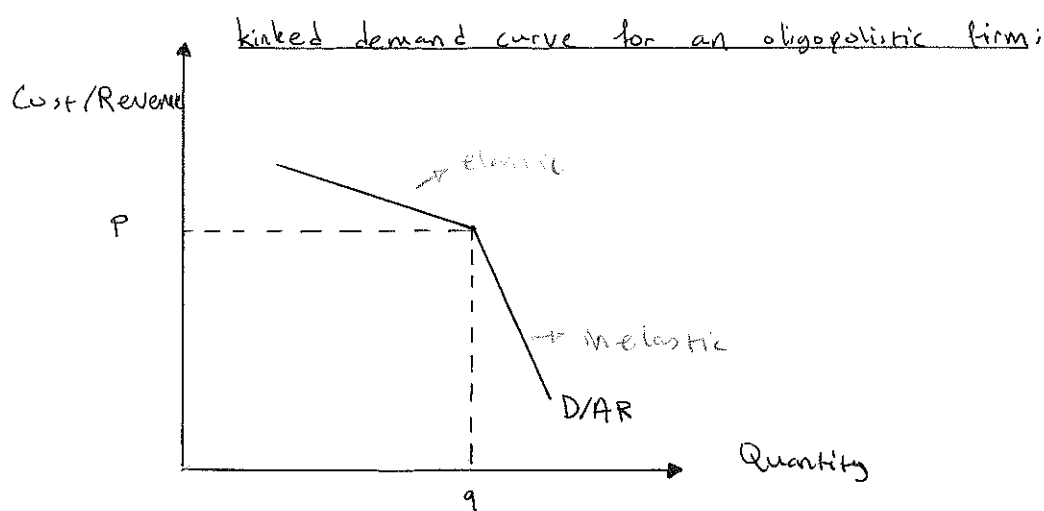
have an inelastic response. A price fall when demand is inelastic leads to a fall in total revenue.

Summary;

- $P \uparrow$ (elastic D) $\rightarrow \downarrow$ TR
- $P \downarrow$ (inelastic D) $\rightarrow \downarrow$ TR

Therefore, a price rise or a price fall by a firm in an oligopolistic market are both likely to result in lower total revenue for the firm and so firms are likely to avoid price competition.

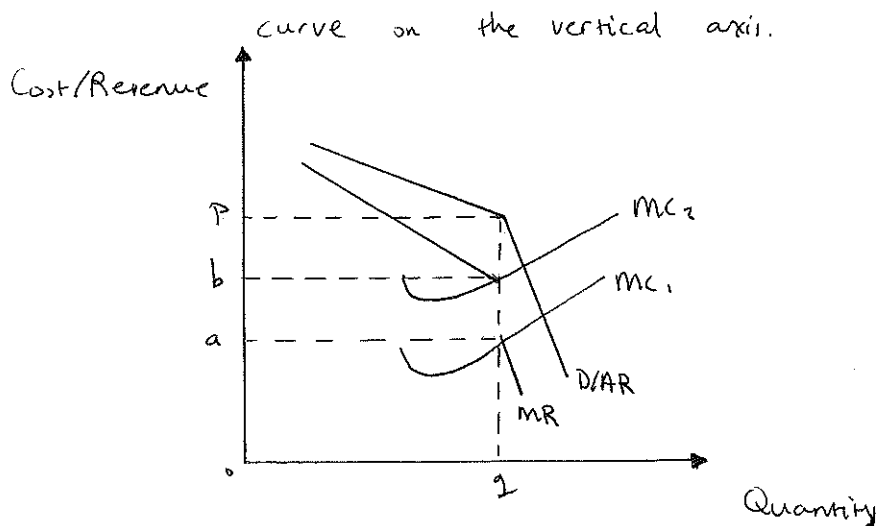
This situation can be depicted in the form of a kinked-demand curve for an oligopolistic firm.



The kinked-demand curve results from the expectation of how other firms will respond to price changes by one firm, i.e. it offers an explanation of why price competition will often be avoided in oligopolies.

The kinked demand curve may also be used to illustrate why there is likely to be price rigidity in oligopolistic markets, even if costs of production change.

Because the demand/AR curve is kinked at the original price and quantity, the MR curve will be discontinuous at this quantity. The MR curve will lie below the AR curve in such a way that it would meet with each section of the AR



At price and quantity P, q (the original values), the D/AR curve kinks. As a result of this, the MR curve will be discontinuous at output q , i.e. at q , MR can have any value between a and b . For profit maximisation $MC = MR$. If at q , MR can have any value between a and b , MC can also have any value between a and b for profit maximisation to occur at q . Therefore, the MC curve can be as low as MC_1 or as high as MC_2 without price and output changing from P, q . Therefore, the kinked demand curve theory can explain why firms in a non-collusive oligopoly will avoid price competition (they all lose revenue if they lower prices so it explains why firms avoid price competition) and why a firm can experience some changes in its costs of production and maintain the existing price and output.

Critique

- Kinked demand theory assumes that all firms are equally secure in the market. However, in some oligopolistic markets, the stronger firms which may be able to cope with reduced profits or even losses in the SR may engage in price wars in order to push weaker firms out of the market, gain their market share and raise prices again in the LR. e.g. the airline industry: Virgin Atlantic vs British Airlines and American Airlines

- The theory does not provide an explanation as to how the ^{original} price and quantity were determined.

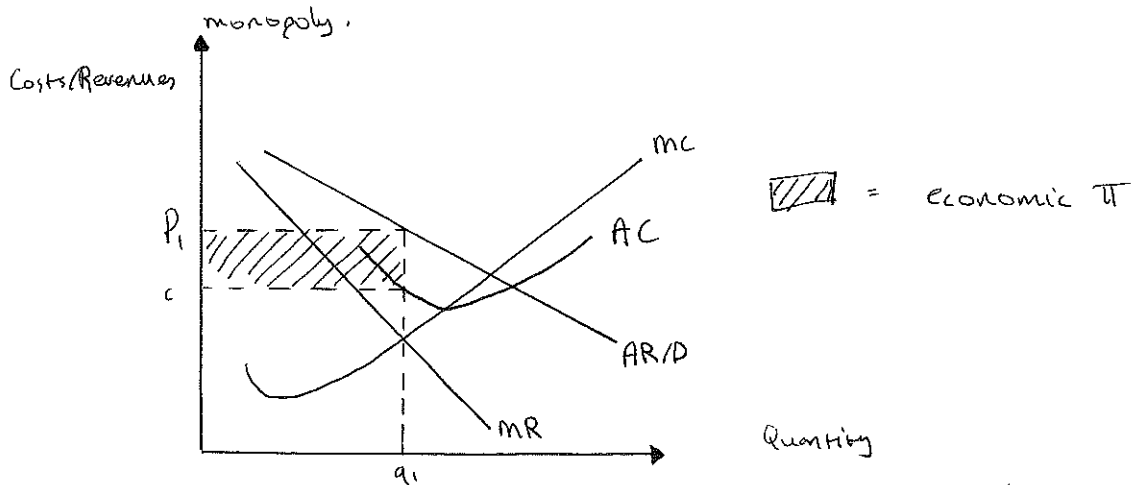
Collusive Oligopoly (Cartel)

ie. where firms work together in order to charge the same price, and set output levels for their product.

There are two types of collusion; open/formal and tacit/silent.

Open collusion is when producers/suppliers of a product openly agree on the price that they charge and sometimes on their level of output, their marketing expenditure, their market share, etc. Open collusion between firms results in a cartel (firms in a market which openly collude in price).

The aim of a cartel is to limit competition between member firms and to maximise joint profits, as if the firm were a monopoly.



(same diagram as for monopoly making economic π)

However, cartels and open collusion between firms is illegal in most countries (anti-trust laws in the USA and anti-competition laws in the EU) e.g. in 2011 Unilever and Procter and Gamble were found guilty of price-fixing washing powder/detergent in 8 European countries, and fined heavily.

However, international agreements resulting in formal collusion between governments may be ^(may occur) permitted although the WTO doesn't support it.

Cartels do not tend to be long lasting. Because firms in a cartel offer close substitutes for each other's products, some firms may be tempted to cheat, drop their prices and produce more than their quota. One of the ^{reasons} ~~conditions~~ for this may be if a producer becomes more efficient, discovers new resources, etc... so that the conditions in the market have changed.

Tacit/Silent Collusion

This is when firms charge the same prices, etc, without formal contact. The firms will examine other ^{firms'} prices and act in line with them, especially if there is a market leader. Tacit collusion is not strictly illegal as there is no evidence that collusion has taken place.

Game Theory

Game theory could be used to explain why in a duopoly (two dominant firms in an oligopoly) firms will maintain their prices rather than try to undercut each other. Using price competition will lead to reduced revenue and profits for both firms, where as keeping the 'status quo' means that both firms maintain higher revenue and profit. (see pages 129 → 130)