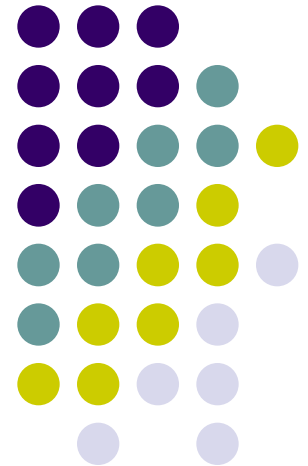


Economics 3.2

Year 13 Revision 2009



Production Possibilities Curve



- The PPC is also known as the Production Possibilities Frontier (PPF)
- It shows what combinations of goods can be produced using existing resources
- It is a particularly useful model as it can be used to illustrate a number of economic concepts

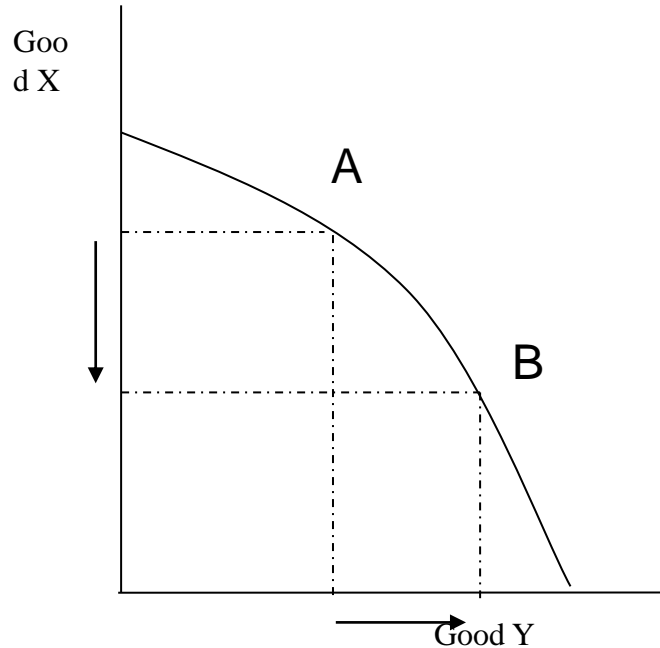
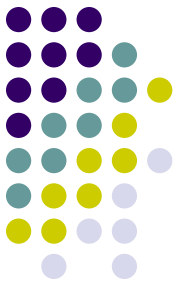
Production Possibilities Curve



- **Assumptions**

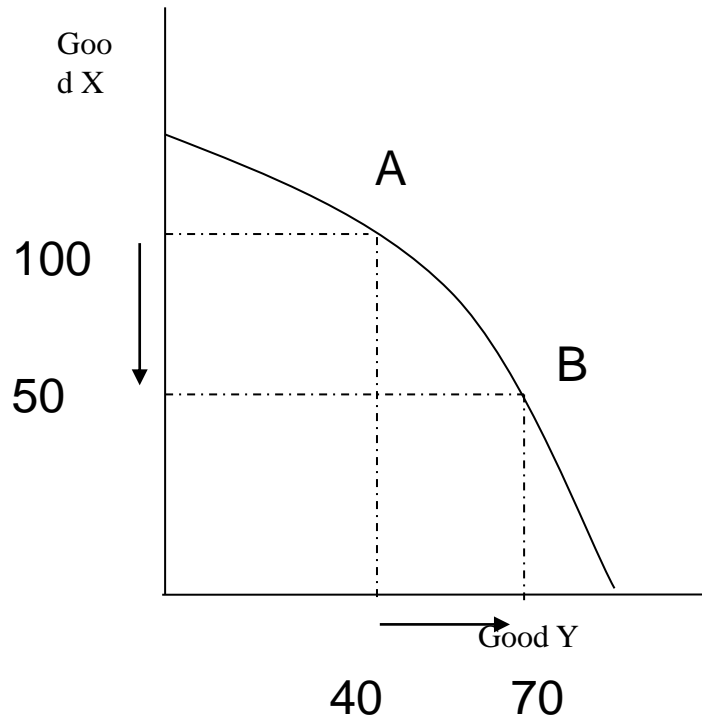
- Only two goods are produced
- There is a given level of resources and technology

Production Possibilities Curve



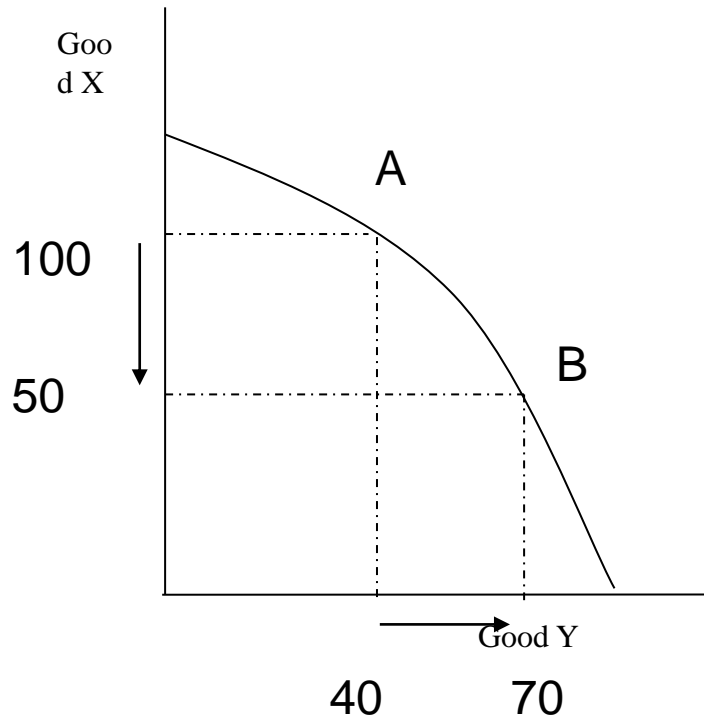
- The vertical axis shows the quantity of good X that could be produced
- The horizontal axis shows the quantity of good Y that could be produced

Production Possibilities Curve



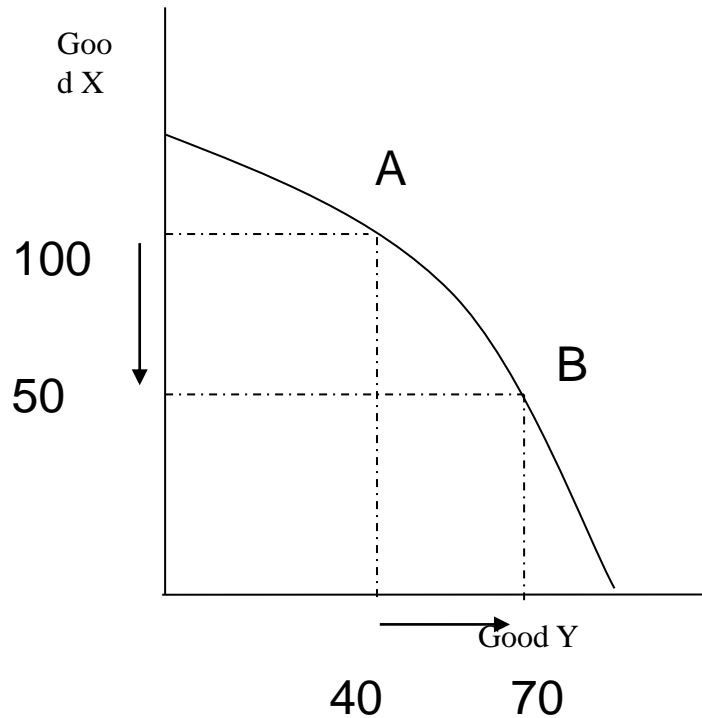
- An economy could choose to produce at point A which results in 100 units of X and 40 units of Y
- If the economy wanted to produce more Y they could move to point B which yields an additional 30 units of Y but they must give up 50 of X to do so.

Production Possibilities Curve



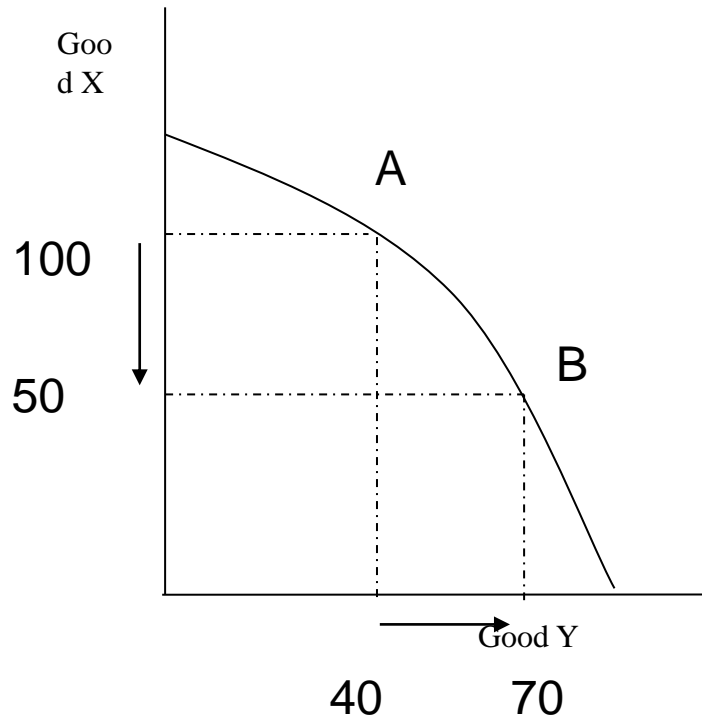
- The PPC illustrates scarcity because the economy can not have a production bundle that is outside its PPC
- E.g. 100 X and 70 Y
- It also illustrates opportunity cost because the movement from point A to point B requires the sacrifice of 50 of Product X.

Production Possibilities Curve

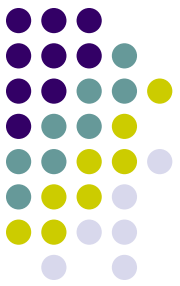


- The PPC can also illustrate the concept of unemployment because if the production bundle was 50 X and 40 Y this would mean that some resources are not being used efficiently

Production Possibilities Curve



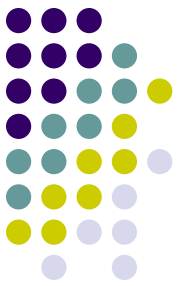
- Any point that is on the PPC (such as points A and B) is said to be **production efficient**
- This means resources are all being used efficiently



PPC for Robinson Crusoe

- Robinson Crusoe is shipwrecked and living on a desert island. He lives on coconuts that he collects and fish that he catches. The table at right gives his choices:

	Fish (kg)	Coconuts
A	0	75
B	1	70
C	2	60
D	3	45
E	4	25
F	5	0



PPC for Robinson Crusoe

- Plot Robinson Crusoe's PPC
- Describe his opportunity cost of consuming an extra fish by going from ... point A to B ...E to F
- Why would this be so?

	Fish (kg)	Coconuts
A	0	75
B	1	70
C	2	60
D	3	45
E	4	25
F	5	0

PPC for Robinson Crusoe



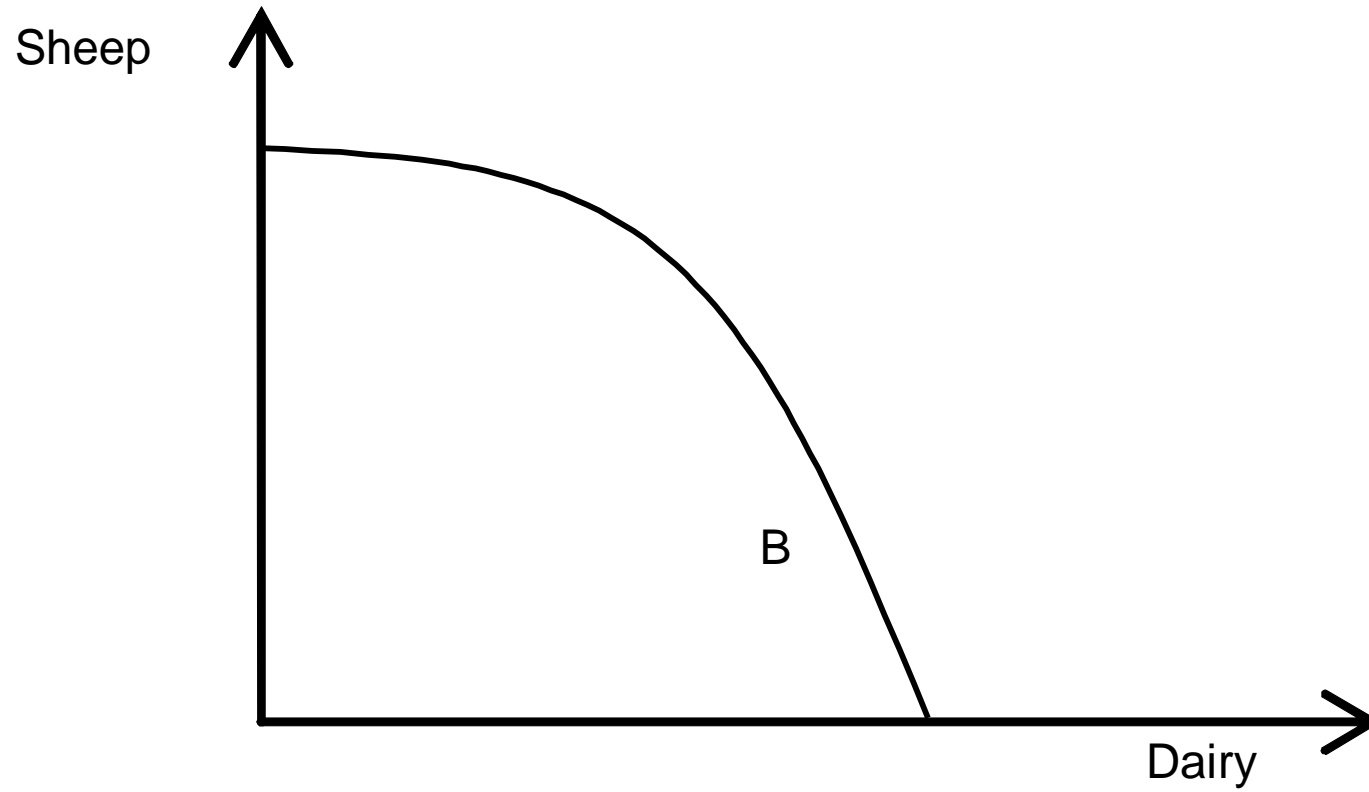
- Resources are generally not perfectly suited to the production of both commodities
- This means that opportunity costs increase as we move along the PPC as we begin to use resources inefficiently
- Conversion of land from sheep farming to dairy in recent times

Shifts of PPC Curves



- PPC curves can shift in or out as circumstances change and the base assumption (level of resources/technology) is changed.
- A PPC will shift out when **new resources become available** or **when existing resources can be used more efficiently**
- PPC Shifts out with:
 - **Positive net migration**
 - **Discovery of new resources**
 - **Increased production of capital goods**
 - **Increased productivity of labour**
 - **Technology improvements**
- A PPC could also shift at one end only due to a change relating to the production of one good only.

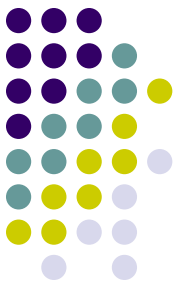
Answers



Answers



- b) Producers will convert sheep farms to dairy farms to gain the higher prices
- c) Resources are not perfectly transferable between sheep and dairy farming therefore increasing production of one good leads to increasing (opportunity) costs
Or
Some resources used to produce sheep products cannot be used to dairy products therefore increasing production of dairy products leads to increasing (opportunity) costs
- d) At point A there are under utilised resources the economy can increase production of dairy / sheep without giving up sheep / dairy production



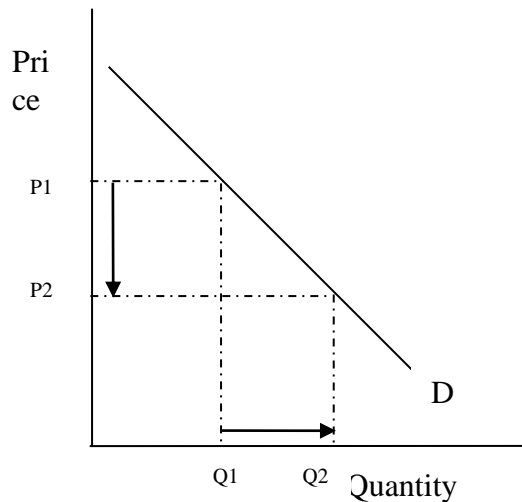
The Demand Function

- Market Demand for a good is a function of (dependent on) six things:
 1. The price of the product
 2. Price of related products (substitutes and complements)
 3. Income
 4. Tastes and preferences
 5. Size of the market
 6. Future price expectations
- 1 is the other variable in a demand model. 2 – 4 are held constant when a demand curve is drawn (to meet ceteris paribus condition)



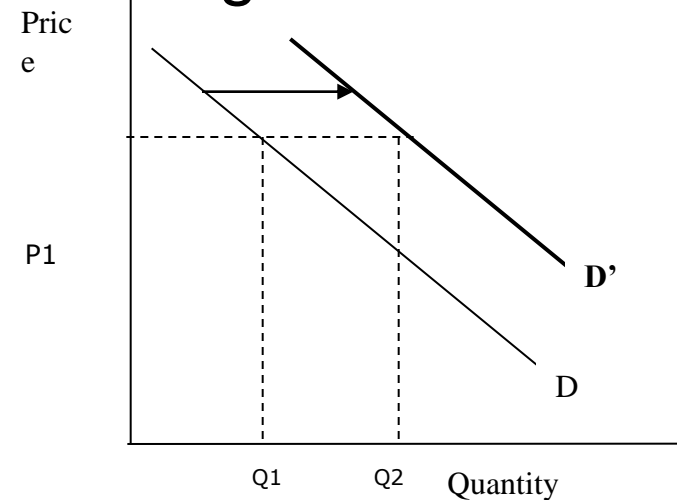
Movement vs Shift

- Change in quantity demanded

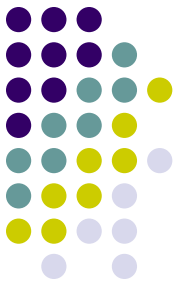


Price has changed hence a new **quantity** is demanded

- Change in demand



Something other than price has changed so more demanded at every price



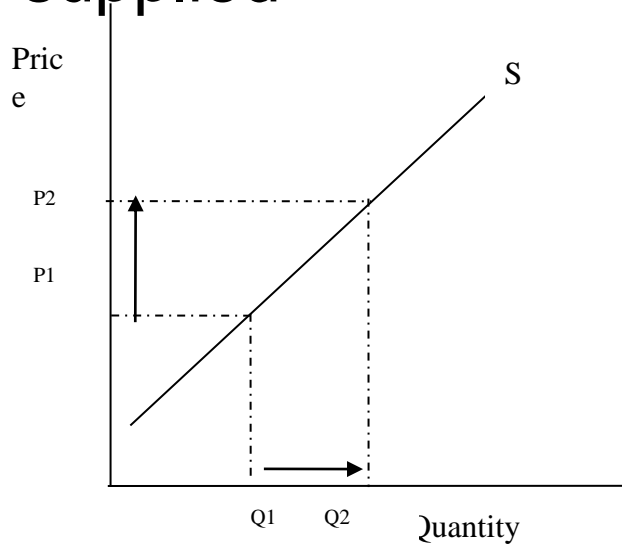
Influences on Supply

- Supply is influenced by 6 factors:
 1. Price of the product
 2. Price of related goods (use same resources)
 3. Cost of Raw Materials
 4. Cost of Labour
 5. Productivity of Labour
 6. Price expectations
 7. Number of suppliers
- Number 1 is the other variable, 2 – 7 are the factors held constant to meet ceteris paribus assumption.

Movement vs Shift



- Change in quantity supplied



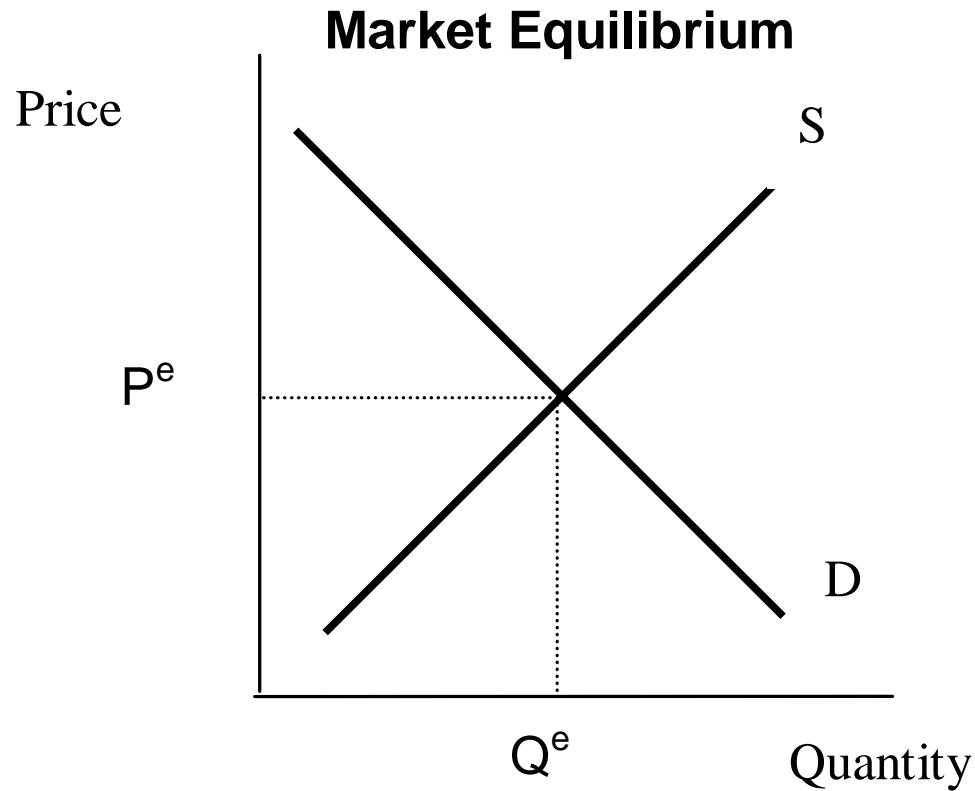
Price has changed hence a new **quantity** is supplied

- Change in supply

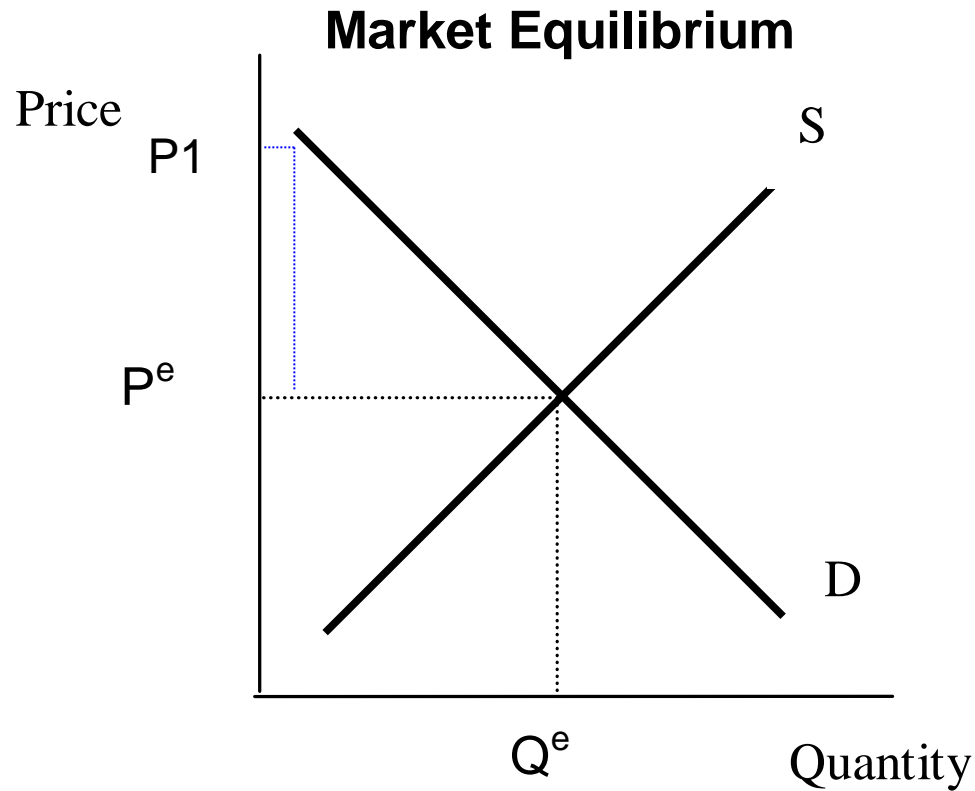


Something other than price has changed so more is supplied at every price

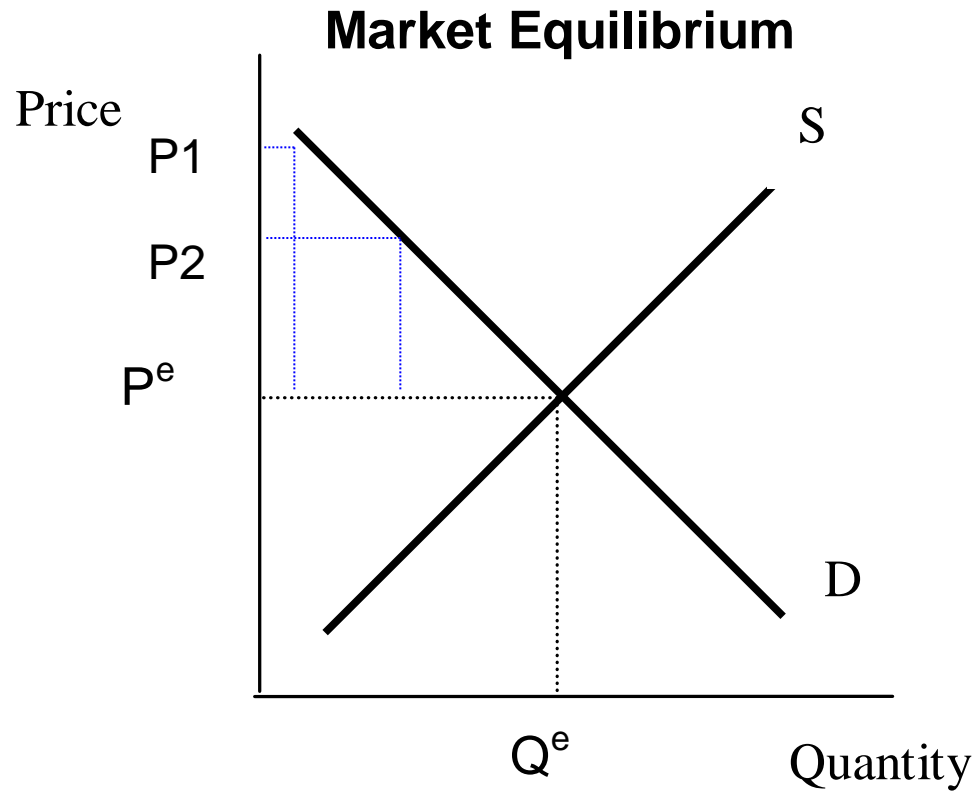
Market in Equilibrium



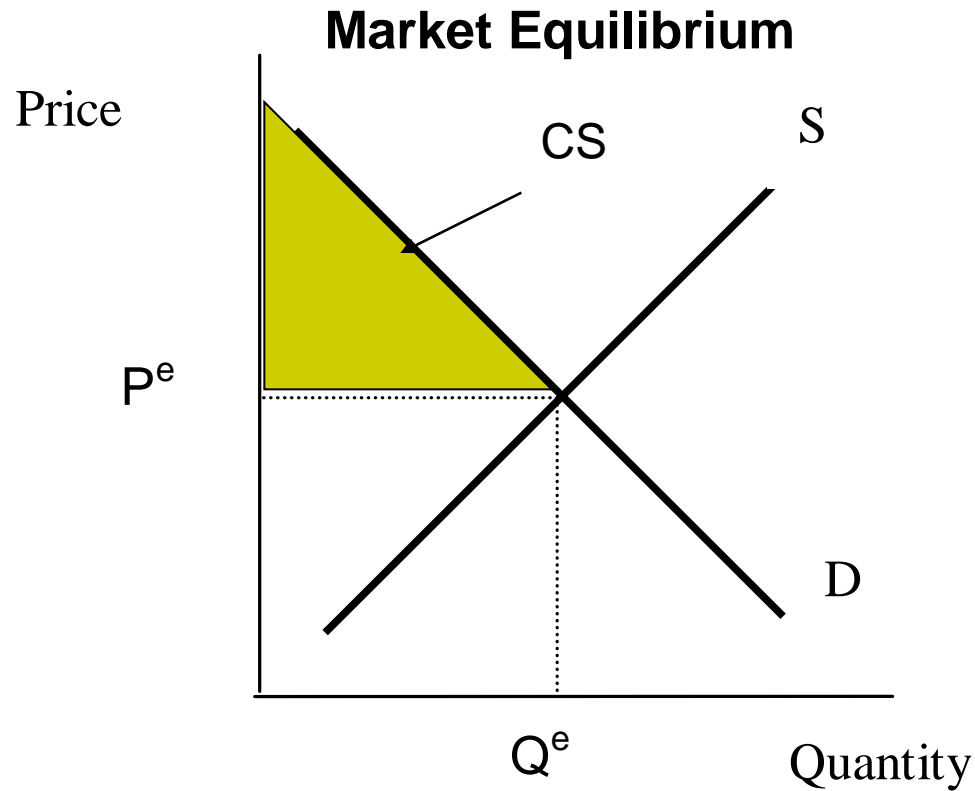
Market in Equilibrium



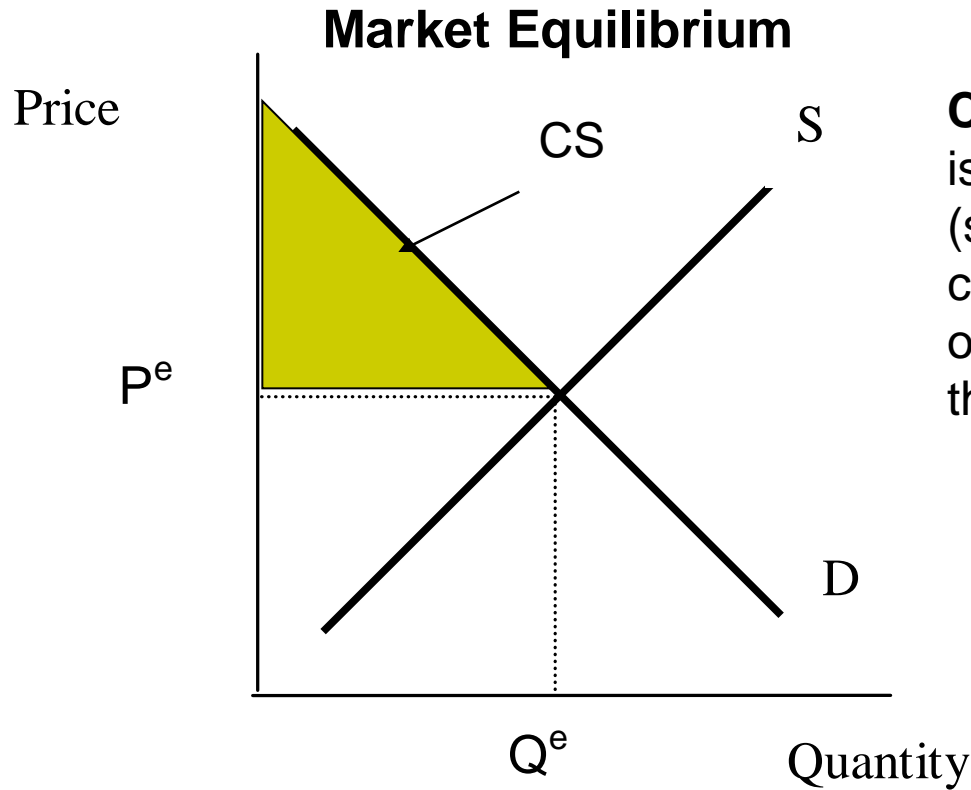
Market in Equilibrium



Market in Equilibrium

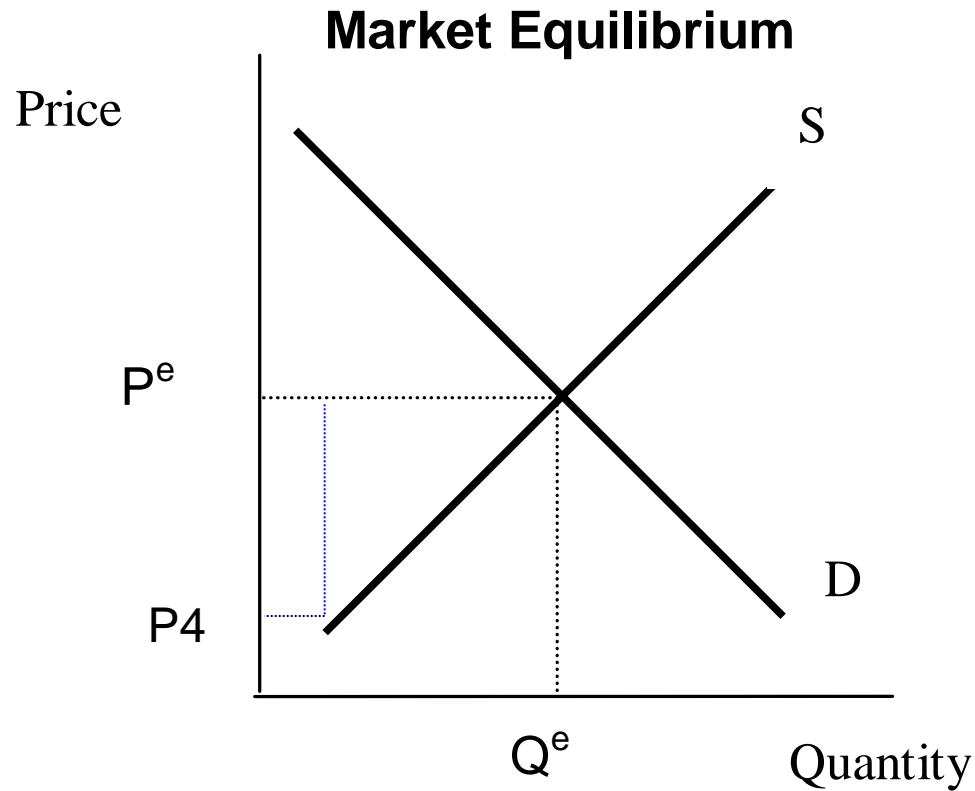


Market in Equilibrium

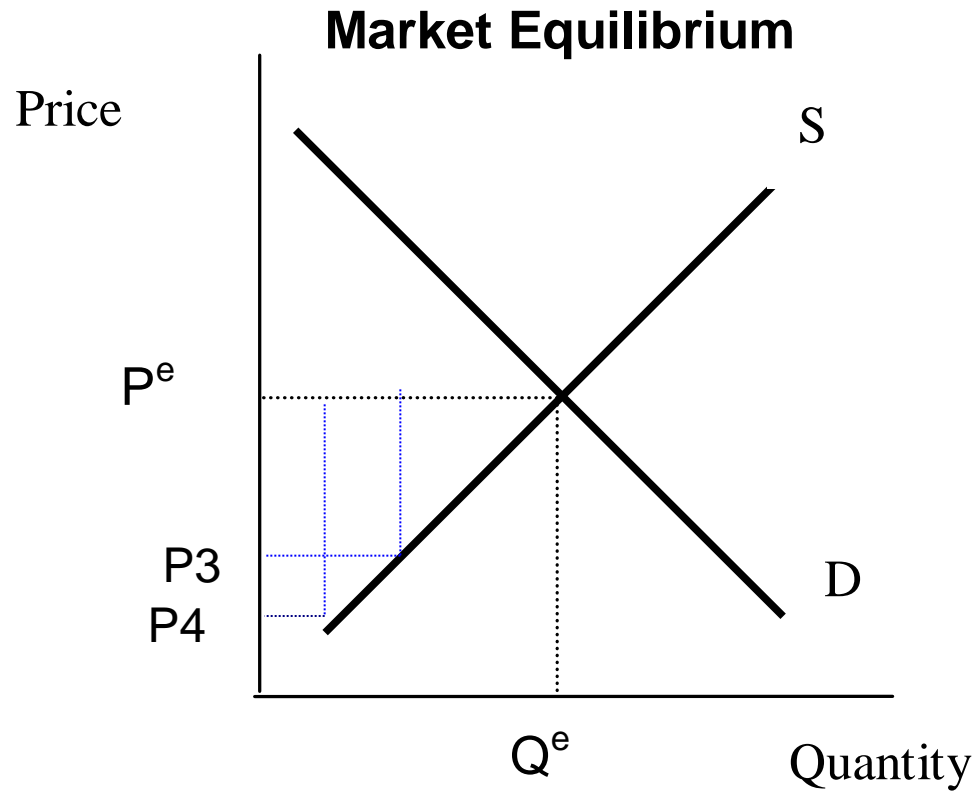


Consumer Surplus is the utility (satisfaction) that a consumer receives over and above what they have paid for.

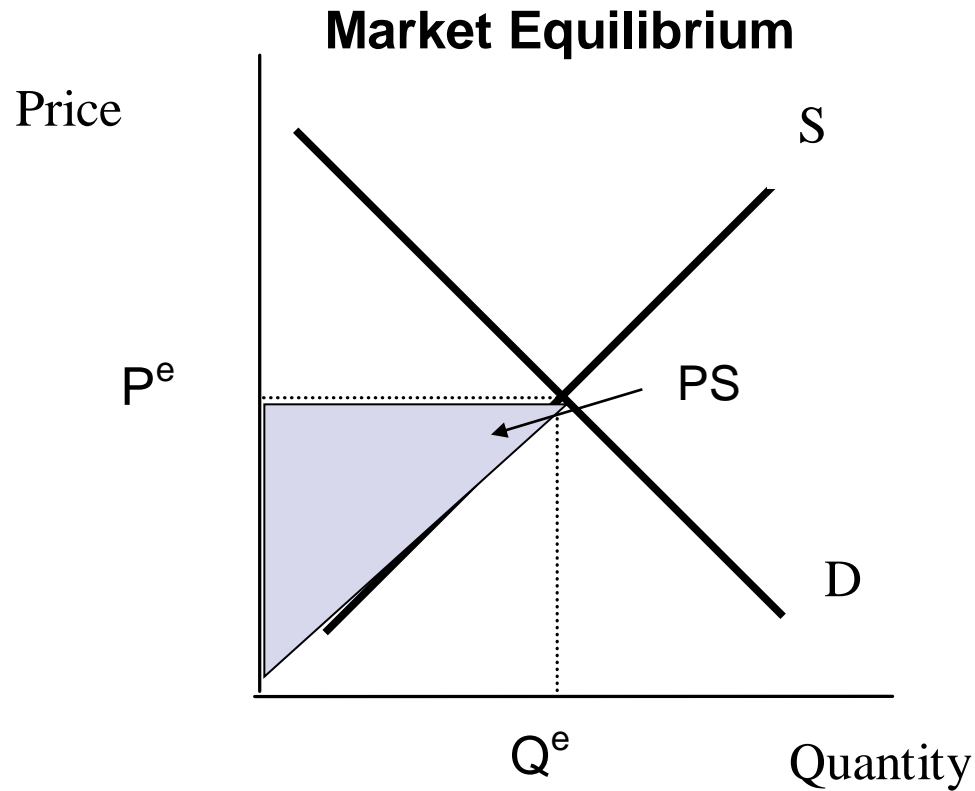
Market in Equilibrium



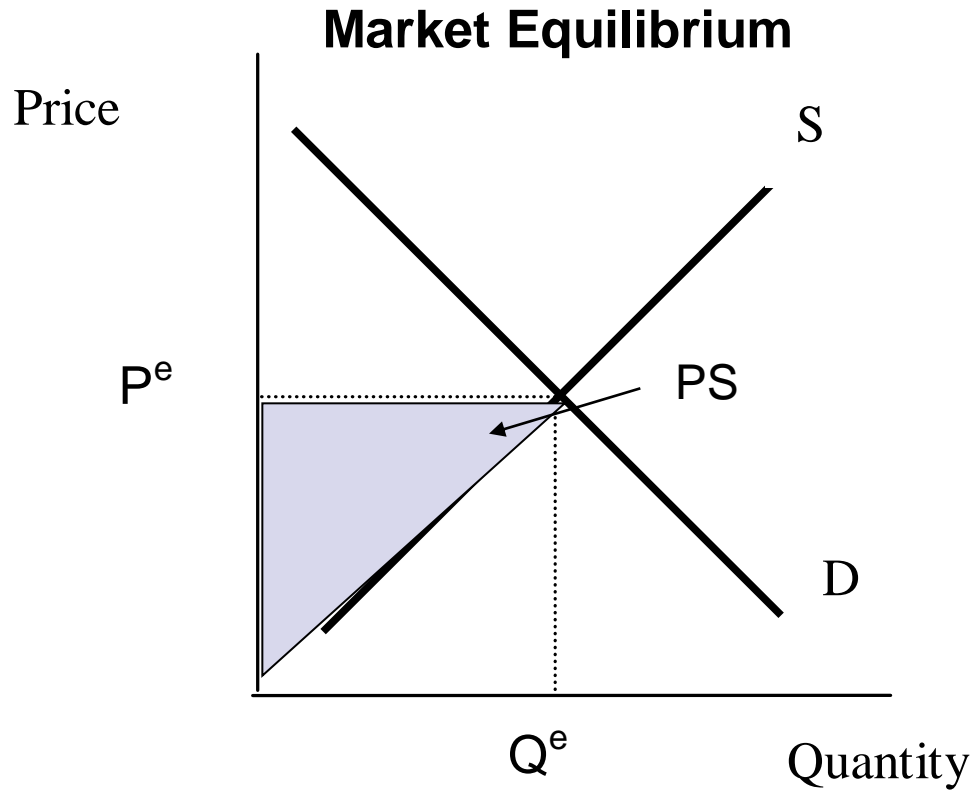
Market in Equilibrium



Market in Equilibrium

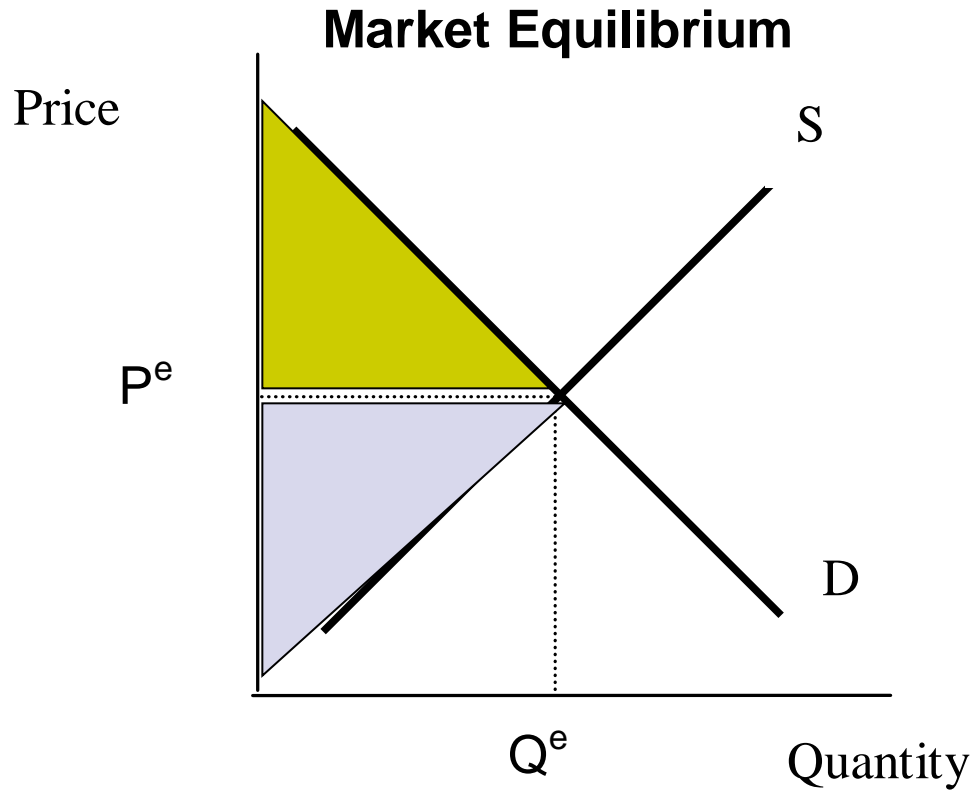


Market in Equilibrium



Producer Surplus is the amount a producer benefits by selling a product at a market price higher than they would willingly sell for.

Market in Equilibrium



The amount of the producer and consumer surpluses can be calculated by working out the area of the triangles using the formula $\frac{1}{2}$ Base X Height

Answers

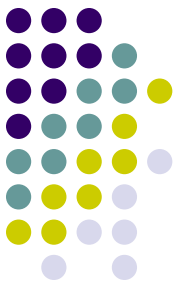


- a) Supply of labour right and labelled
New equilibrium price and quantity labelled
- b) Demand right and labelled
New equilibrium price and quantity labelled
- c) Increase demand creates excess demand at original equilibrium
(some) consumers are willing to pay a higher price
price increase causes quantity supplied to increase and quantity demanded to decrease until $QD = QS$ / new equilibrium is reached

What is Elasticity



- Elasticity measures how much one variable changes in response to a change in another variable.
- The law of demand states that if the price of a product increases then the quantity demanded will fall
- But the question remains – by how much will demand fall?
- Obviously the answer to this question will differ from product to product
- Price Elasticity of Demand (PED) measures the responsiveness of the quantity demanded of a product to a change in its price



Price Elasticity of Demand

Price (\$)	Quantity
2	3000
2.50	2000

Total Revenue Method

- At a price of \$2 the total revenue from this product is \$6 000 ($\2×3000 units).
- When the price rises to \$2.50 the total revenue falls to \$5 000 ($\2.50×2000 units).

When the price rose, total revenue fell so we can say the product has **elastic** PED



Price Elasticity of Demand

Price (\$)	Quantity
2	3000
2.50	2400

Total Revenue Method

- At a price of \$2 the total revenue from this product is \$6 000 ($\2×3000 units).
- When the price rises to \$2.50 the total revenue remains \$6 000

When the price rose, total revenue fell so we can say the product has **unitary elastic** PED



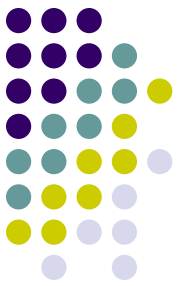
Price Elasticity of Demand

Price (\$)	Quantity
2	3000
2.50	2500

Total Revenue Method

- At a price of \$2 the total revenue from this product is \$6 000 ($\2×3000 units).
- When the price rises to \$2.50 the total revenue increases to \$6 250

When the price rose, total revenue rose so we can say the product has **inelastic** PED



Calculating PED

- Calculating PED gives more information than relying on the total revenue method
- **Midpoint Method**
 - $$\text{PED} = \frac{\Delta \text{Quantity} \div \text{Average Quantity}}{\Delta \text{Price} \div \text{Average Price}}$$

It is convention in Economics to ignore the negative sign when calculating PED.



Price Elasticity of Demand

Price (\$)	Quantity
2	3000
2.50	2000

Midpoint Method

- Change in quantity is 1000 units. Average quantity is 2500 units
- Change in price is .50c. Average price is \$2.25

$$\text{PED} = \frac{1000 \div 2500}{0.50 \div \$2.25} = \frac{0.4}{0.222\dots} = 1.8$$

1.8 is greater than 1 therefore PED is **elastic**



Price Elasticity of Demand

Price (\$)	Quantity
2	3000
2.50	2400

Midpoint Method

- Change in quantity is 600 units. Average quantity is 2700 units
- Change in price is .50c. Average price is \$2.25

$$\text{PED} = \frac{600 \div 2700}{0.50 \div \$2.25} = \frac{0.222\dots}{0.222\dots} = 1$$

1 is equal to 1 therefore PED is **elastic**



Price Elasticity of Demand

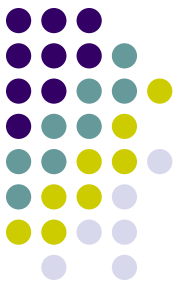
Price (\$)	Quantity
2	3000
2.50	2500

Midpoint Method

- Change in quantity is 500 units. Average quantity is 2750 units
- Change in price is .50c. Average price is \$2.25

$$\text{PED} = \frac{500 \div 2750}{0.50 \div \$2.25} = \frac{0.1818...}{0.222...} = 0.81$$

0.81 is less than 1 therefore PED is **elastic**



Price Elasticity of Demand

- **Standard Method**

- This is a more simple calculation than the midpoint method but is not as accurate and the co-efficient is different for a price increase and a price decrease.
- **Do not** use this formula if you are asked to use the midpoint method.

$$PED = \frac{\% \Delta Q_d}{\% \Delta P}$$



Extremes of PED

- **Perfectly Inelastic Demand**

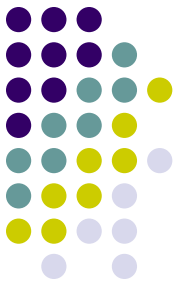
- If a change in the price of a good brings about no change in the demand for the good then $PED = 0$
- This means that consumers will buy the product no matter what price is charged
- On a graph the demand curve would be vertical
- It is difficult to come up with a real world example of a good with perfectly inelastic demand



Extremes of PED

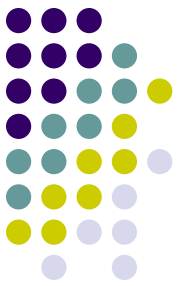
- **Perfectly Elastic Demand**

- If an increase in the price of a good results in no demand at all then $PED = \text{infinity}$
- This means that consumers will not buy the product at a higher price
- On a graph the demand curve would be horizontal
- Two roadside stalls selling apples side by side would have perfectly elastic PED. If one stall raised its price then all consumers would go to the other stall (*ceteris paribus*)



Influences on PED

- A product will tend to have **elastic** demand if:
 1. There are many substitutes (buy something else instead)
 2. It is a luxury (can be cut back if prices rise)
 3. It is durable (postpone replacement if prices rise)
 4. You are looking over a long time period (PED tends to get more elastic over time as consumers adjust spending patterns)
 5. Spending on the product is a large proportion of income



Summary of PED

Description	Co-efficient	Explanation	Effect of P \uparrow on Revenue	Effect of P \downarrow on Revenue
Perfectly elastic	Infinity	Small ΔP total ΔQ_d	Decrease to 0	Increase to infinity
Elastic	> 1	$\% \Delta Q_d > \% \Delta P$	Fall	Increase
Unit Elasticity	$= 1$	$\% \Delta Q_d = \% \Delta P$	No change	No Change
Inelastic	< 1	$\% \Delta Q_d < \% \Delta P$	Increase	Fall
Perfectly Inelastic	0	QD unchanged at all prices	Large increase	Large fall



Cross Price Elasticity (XED)

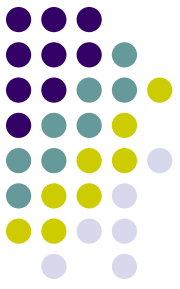
- **Example**

The price of a movie ticket increases from \$9 to \$11. As a result the demand for popcorn falls from 800 units per week to 600 units. New Sky subscriptions increase from 100 a week to 120.

Popcorn

$$\text{XED} = \frac{-200 \div 700}{2 \div 10} = -1.42$$

The co-efficient is both –ve and greater than 1 therefore there is a strong complementary relationship between movie tickets and popcorn.



Cross Price Elasticity (XED)

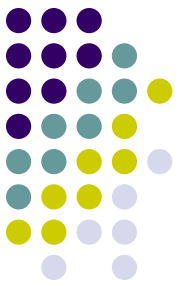
- **Example**

The price of a movie ticket increases from \$9 to \$11. As a result the demand for popcorn falls from 800 units per week to 600 units. New Sky subscriptions increase from 100 a week to 120.

Sky Subscriptions

$$XED = \frac{20 \div 110}{2 \div 10} = 0.91$$

The co-efficient is both positive and less than 1 therefore movie tickets and Sky subscriptions are weak substitute goods.

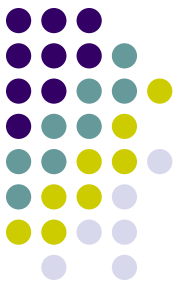


Cross Price Elasticity (XED)

- XED measures how a change in the price of one product will impact on the demand for another.

$$\text{XED} = \frac{\Delta Q_A \div \text{Average Quantity}_A}{\Delta P_B \div \text{Average Price}_B}$$

- Unlike PED with XED the sign (+ve or -ve) is important



Cross Price Elasticity (XED)

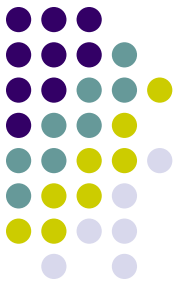
- **Summary**

Coefficient	Relationship
Between 0 and +ve 1	Weak substitutes
Over +ve 1 (i.e. 1.5)	Close substitutes
Between 0 and -ve 1	Weak complements
Over -ve 1 (i.e. -1.5)	Strong complements

Income Elasticity (YED)



- We know intuitively that an increase in income will result in an increase in demand for a good.
- But what about a product like electricity – will a higher income lead to people consuming more electricity?
- What about food?
 - Will consumers buy more food just because their income has increased?
 - Will the types of food bought change when income increases



Income Elasticity (YED)

- YED measures the responsiveness of demand to a change in consumer incomes

$$\text{YED} = \frac{\Delta \text{ Quantity}}{\Delta \text{ Income}} \div \frac{\text{Average Quantity}}{\text{Average Income}}$$

As with XED the sign (-ve/+ve) is important.



Income Elasticity (YED)

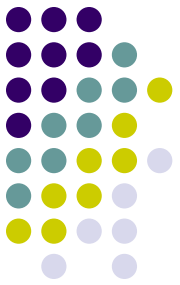
Example

Huia's income increases from \$900 per week to \$1100 per week. When this happens Huia's demand for restaurant meals increases from 1 per week to 2 per week. Her demand for bread goes from 25 to 30 slices per week. Her demand for sausages goes from 3kg per week to 2kg per week.

Bread

$$\text{YED} = \frac{5 \div 27.5}{200 \div 1000} = 0.91$$

The co-efficient is between 0 and 1 therefore bread is a **normal necessity** good.



Income Elasticity (YED)

Example

Huia's income increases from \$900 per week to \$1100 per week. When this happens Huia's demand for restaurant meals increases from 1 per week to 2 per week. Her demand for bread goes from 25 to 30 slices per week. Her demand for sausages goes from 3kg per week to 2kg per week.

Restaurant Meals

$$YED = \frac{1 \div 1.5}{200 \div 1000} = 3.33$$

YED is +ve and greater than 1 so restaurant meals are **normal luxury** goods



Income Elasticity (YED)

Example

Huia's income increases from \$900 per week to \$1100 per week. When this happens Huia's demand for restaurant meals increases from 1 per week to 2 per week. Her demand for bread goes from 25 to 30 slices per week. Her demand for sausages goes from 3kg per week to 2kg per week.

Sausages

$$YED = \frac{-1 \div 2.5}{200 \div 1000} = -2$$

The co-efficient is negative. Therefore sausages are an **inferior** good for Huia.

Inferior Good



- When income increases the demand for an inferior good will decrease (hence YED is –ve)
- An inferior good is a cheaper substitute for a normal good such as blade steak for eye fillet steak or mutton for lamb.
- A generally accepted example of an inferior good are home brand products (Signature range etc).
- Some things may be considered inferior goods by some but normal goods by others



Income Elasticity (YED)

Summary

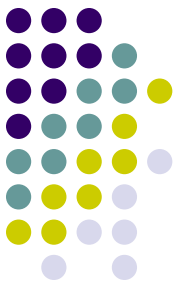
Co-efficient	Meaning
-ve	Inferior Good
+ve < 1	Normal necessity
+ve > 1	Normal Luxury



Price Elasticity of Supply

- PES measures the responsiveness of the quantity supplied to a change in the price.
- We expect a price increase to cause an increase in the quantity supplied.

$$\text{PES} = \frac{\Delta \text{ Quantity} \div \text{Average Quantity}}{\Delta \text{ Price} \div \text{Average Price}}$$

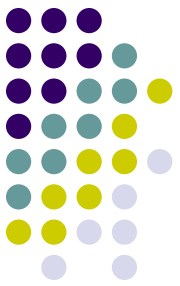


Example

- When the price of bread increases from \$2 per loaf to \$2.50 per loaf, a bakery goes from producing 100 loaves a day to producing 140 loaves.

$$\text{PES} = \frac{(2.50 - 2.00) \div 2.25}{(140 - 100) \div 120} = 0.67$$

This means that the PES is relatively inelastic

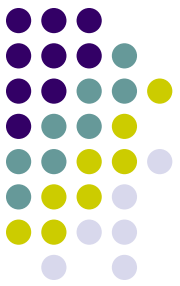


Example

- When the price of boats decreases from \$45 000 to \$35 000, a boat builder goes from producing 50 boats a year to producing 40 boats.

$$\text{PES} = \frac{(35 - 45) \div 40}{(40 - 50) \div 45} = 1.125$$

This means that the PES is relatively elastic



Influences on PES

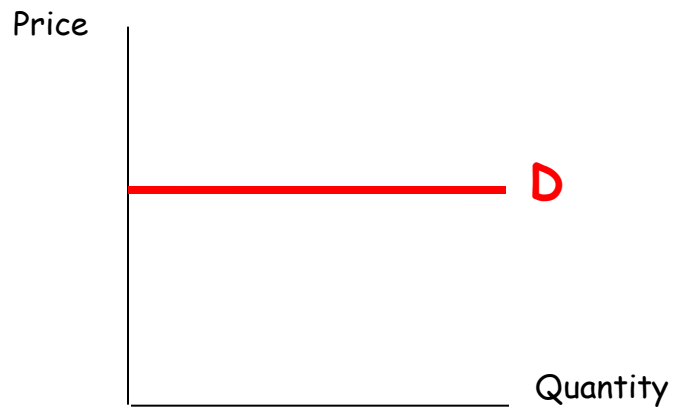
- The main influence on PES is the amount of time the producer has to react to the new prices.
- Economists talk of 3 distinct time periods
 - The momentary time period – all factors of production are fixed, supply is perfectly inelastic
 - The short run – at least one factor is fixed, supply is relatively inelastic
 - The long run – all factors are variable, supply is relatively elastic

Answers

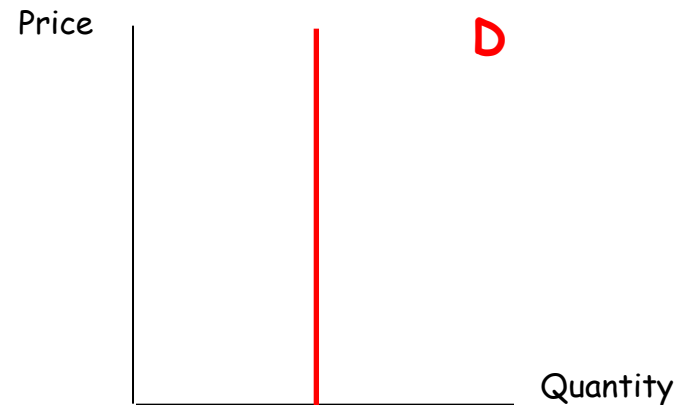


- 0.8 Inelastic

Perfectly Elastic Demand



Perfectly Inelastic Demand



Answers



<i>Availability of Substitutes</i>	<i>The more substitutes available the more elastic the demand as people can switch from consuming one good to another when it rises in price</i>
<i>Is it a luxury</i>	<i>The more luxurious a good, the more elastic the demand. As when the price rises, then people may forego the luxury item.</i>
<i>Proportion of Income spent on the good</i>	<i>If it a large proportion of income then the demand will be more elastic as when the price rises consumers may be unable to afford it.</i>
<i>Is it a necessity?</i>	<i>The more necessary the item, the less elastic the demand as consumers don't have a choice but to buy it even if the price rises.</i>

Answers

- 19.5 – it is a luxury

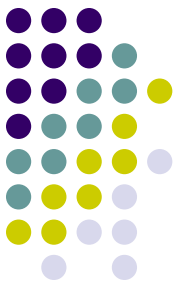
Description	XED	Explanation	Example
Substitutes	Positive	If the price increases the demand for the other good increases	Pen and Pencil
Unrelated	0	If the price increases the demand for the other good stays the same	Pen and tomato
Complement	Negative	If the price increases the demand for the other good decreases	Pen and paper



Answers



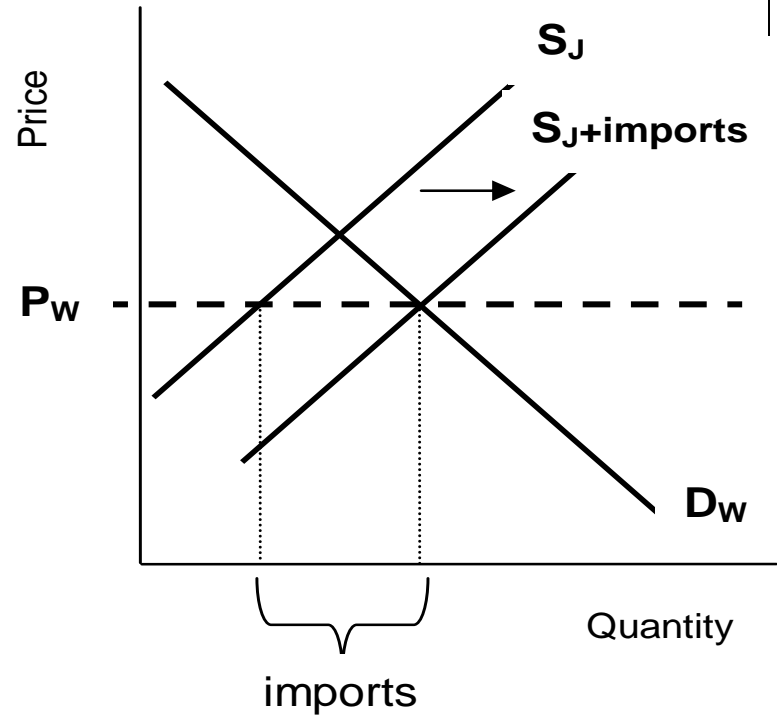
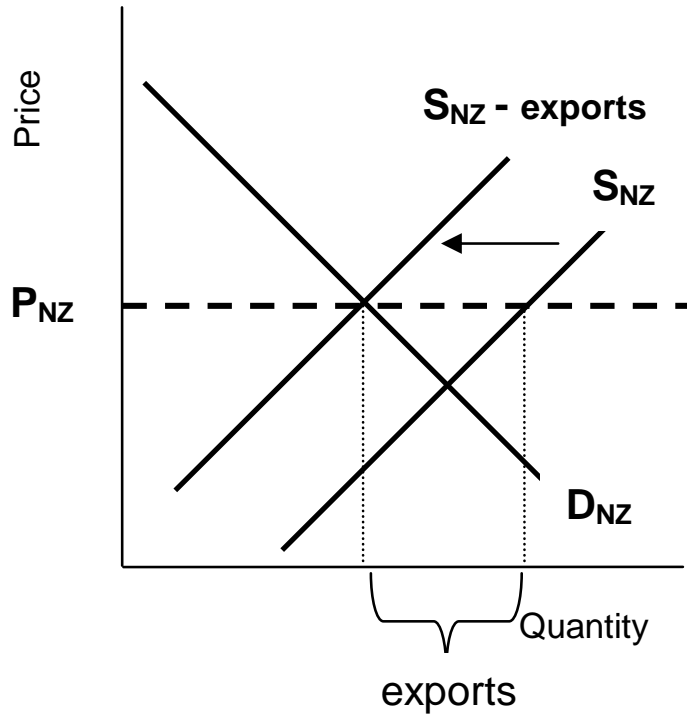
- a) “Elasticity of Supply measures the ***responsiveness*** of ***quantity supplied*** to a change in the ***price***”.
 - b) Elasticity of Supply is mostly influenced by ***time periods***
 - c) In the ***long*** run, the supply curve will be relatively flat.
 - d) A vertical supply curve illustrates ***perfectly inelastic*** supply. This is sometimes called ***momentary*** supply.
 - e) The longer the time period the more ***elastic*** the supply.
- 2.5 Elastic



Two Country Model

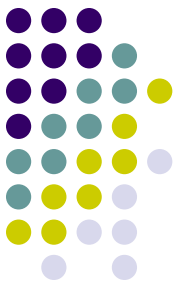
- This model shows the basis for trade between two countries
- In the New Zealand Market the (pre-trade) price of apples is less than the price in Japan.
- If free trade is allowed between countries the market price will rise in NZ and fall in Japan until the surplus in the NZ market is matched by the deficit in the Japan market
- The NZ surplus will be exports, the Japanese shortage will be imports. Both markets are satisfied.

Two Country Model





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Small Open Economy Model

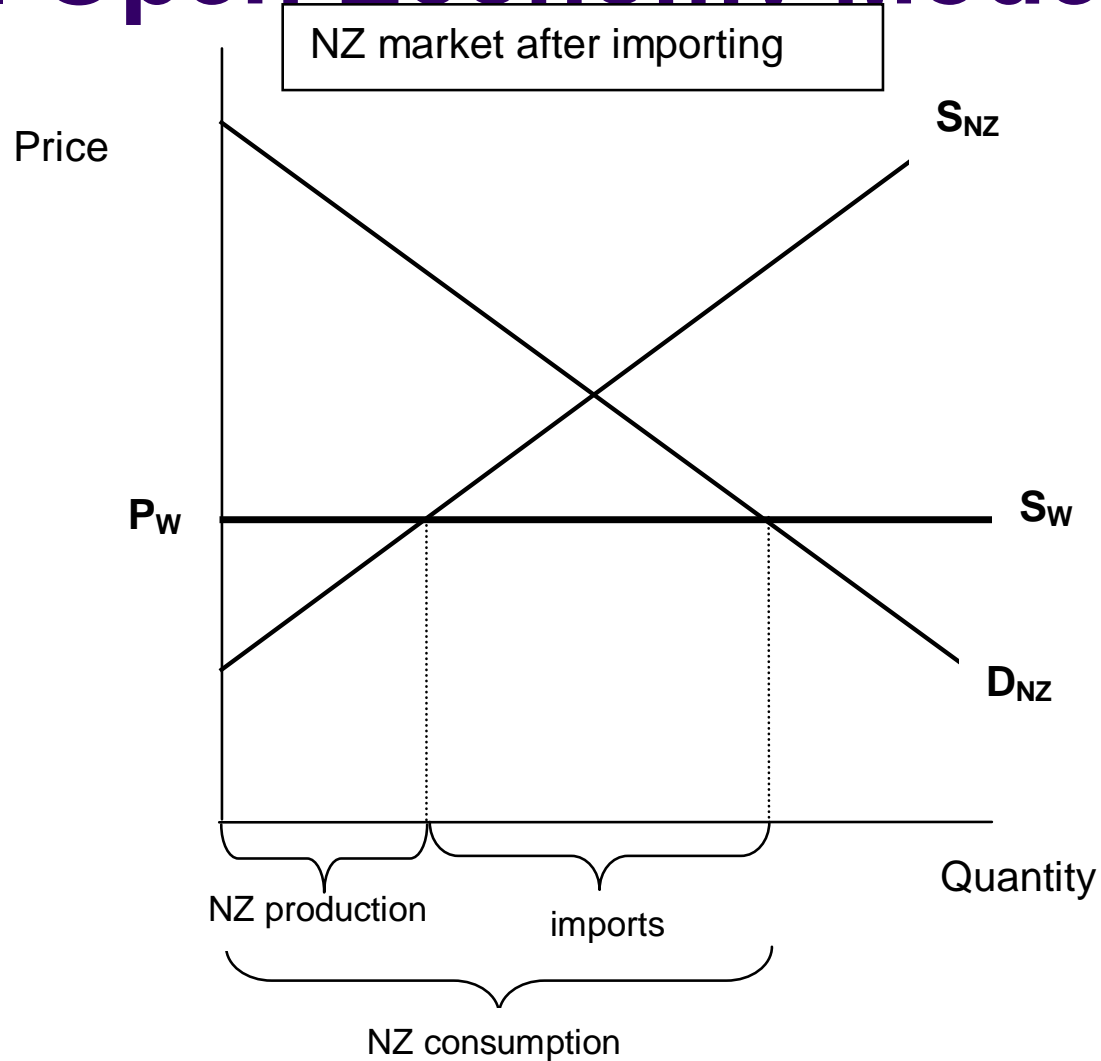
- This model is more realistic for NZ conditions because NZ is a price taker in almost all markets
- This is because NZ is insignificant in most markets in the world due to its small population
- Because NZ is a price taker the world price is drawn as a horizontal line

Small Open Economy Model



- In this example the world price of broccoli is lower than the NZ market price.
- This means NZ producers will produce where $S = P_w$
- The shortage in NZ is made up with imports from overseas
- The producer in NZ is slightly worse off as a result of this trade (less broccoli sold at a lower price)
- The NZ consumers are much better off (more broccoli is consumed at a lower price)
- This can be illustrated by shading the changes in the consumer/producer surpluses as a result of trade.

Small Open Economy Model

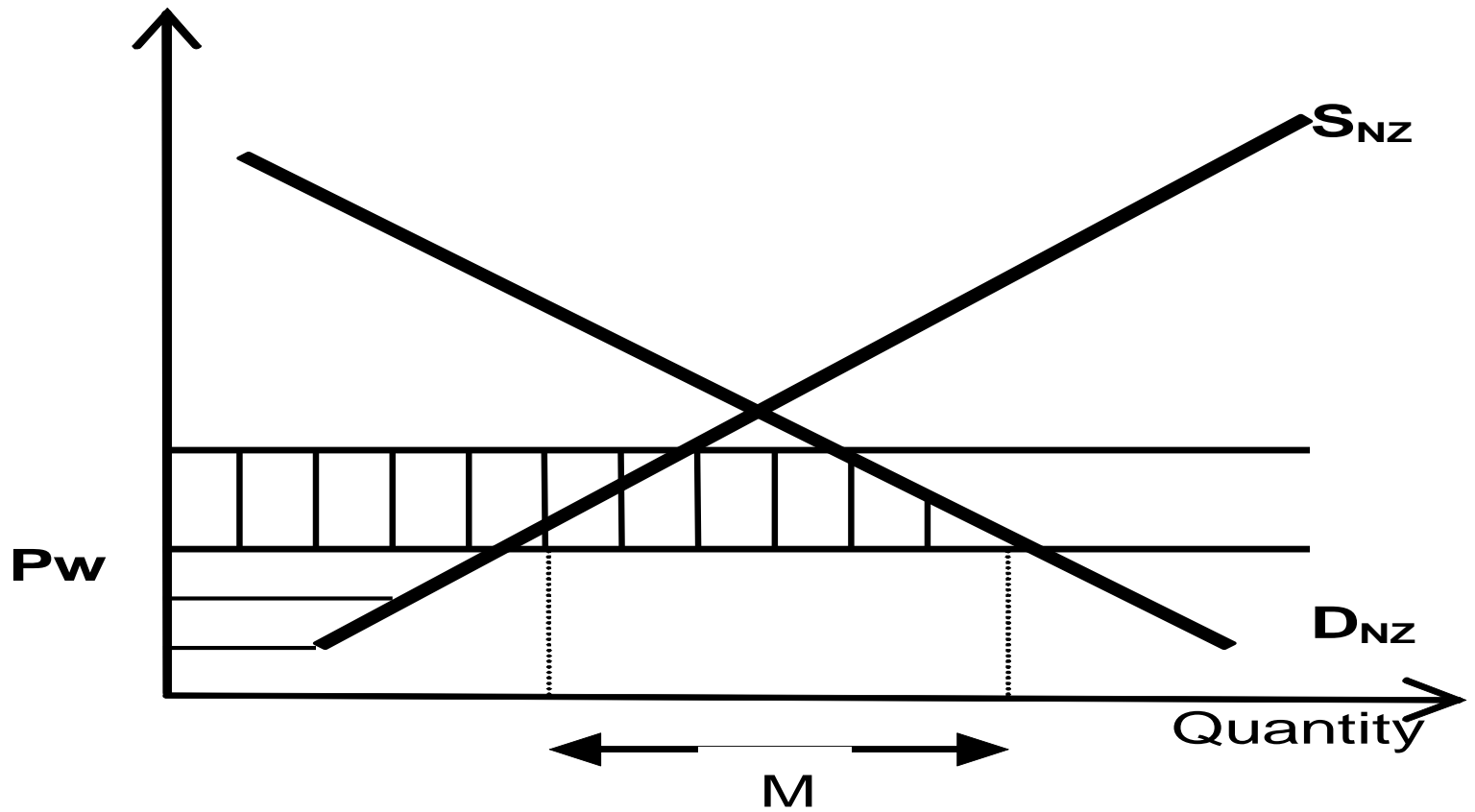
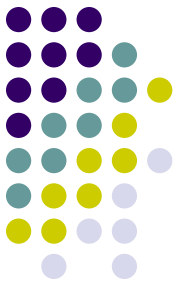


Small Open Economy Model



- In the case where the NZ market price is lower than the world price NZ will be an exporter.
- When this occurs the NZ consumers are worse off as illustrated by the decreased CS
- However NZ producers are better off as illustrated by their increased producer surplus.

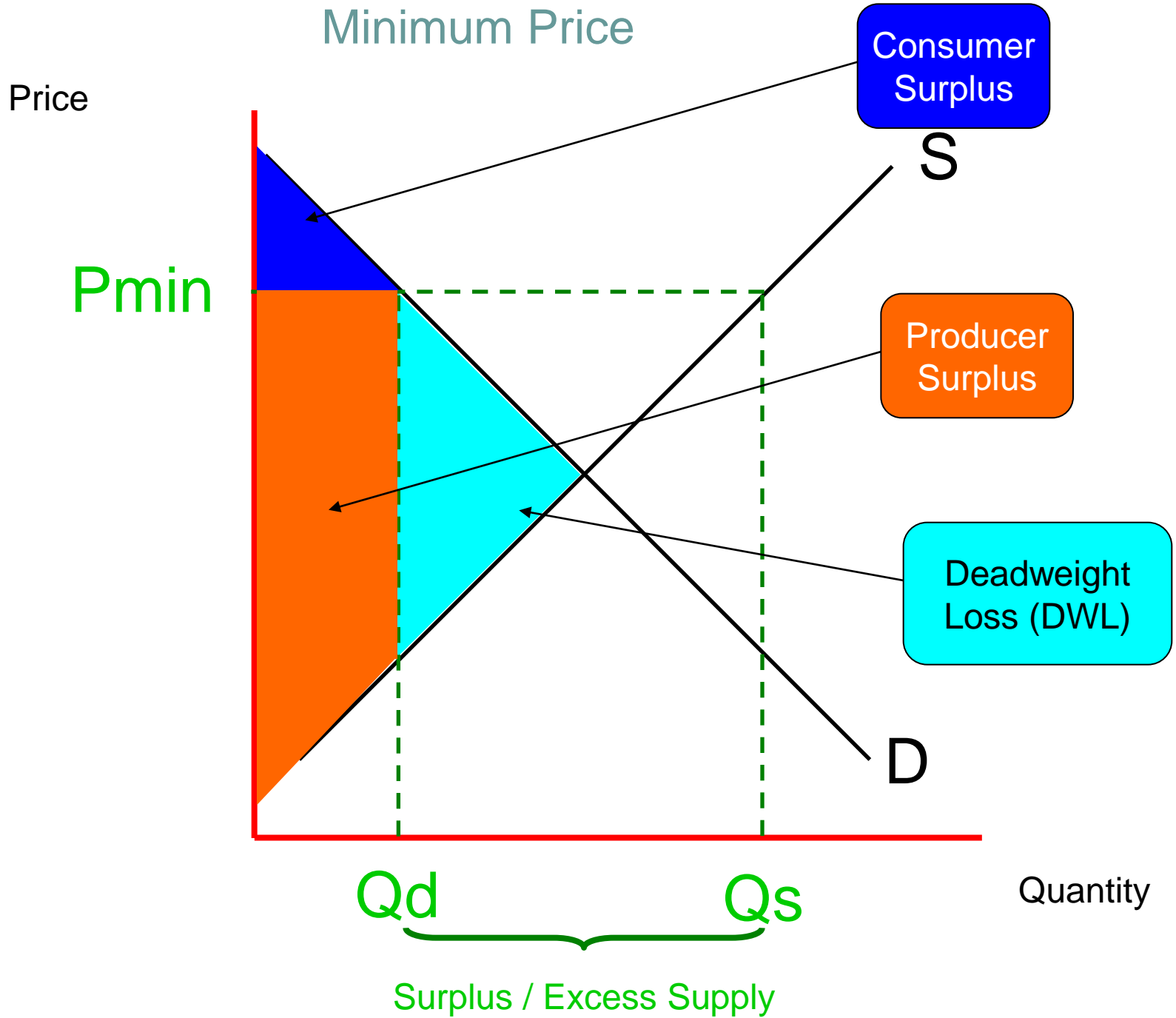
Answers

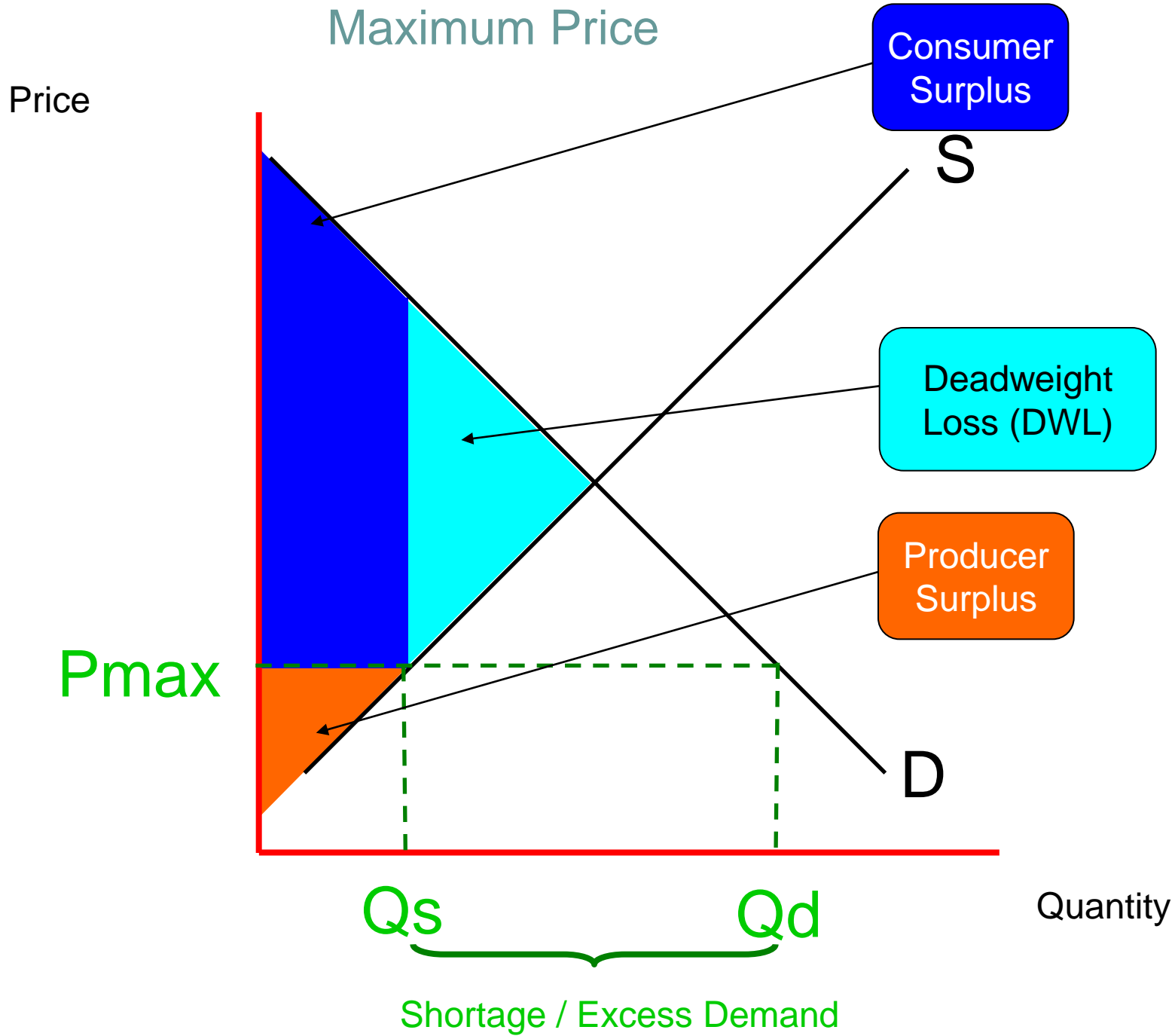


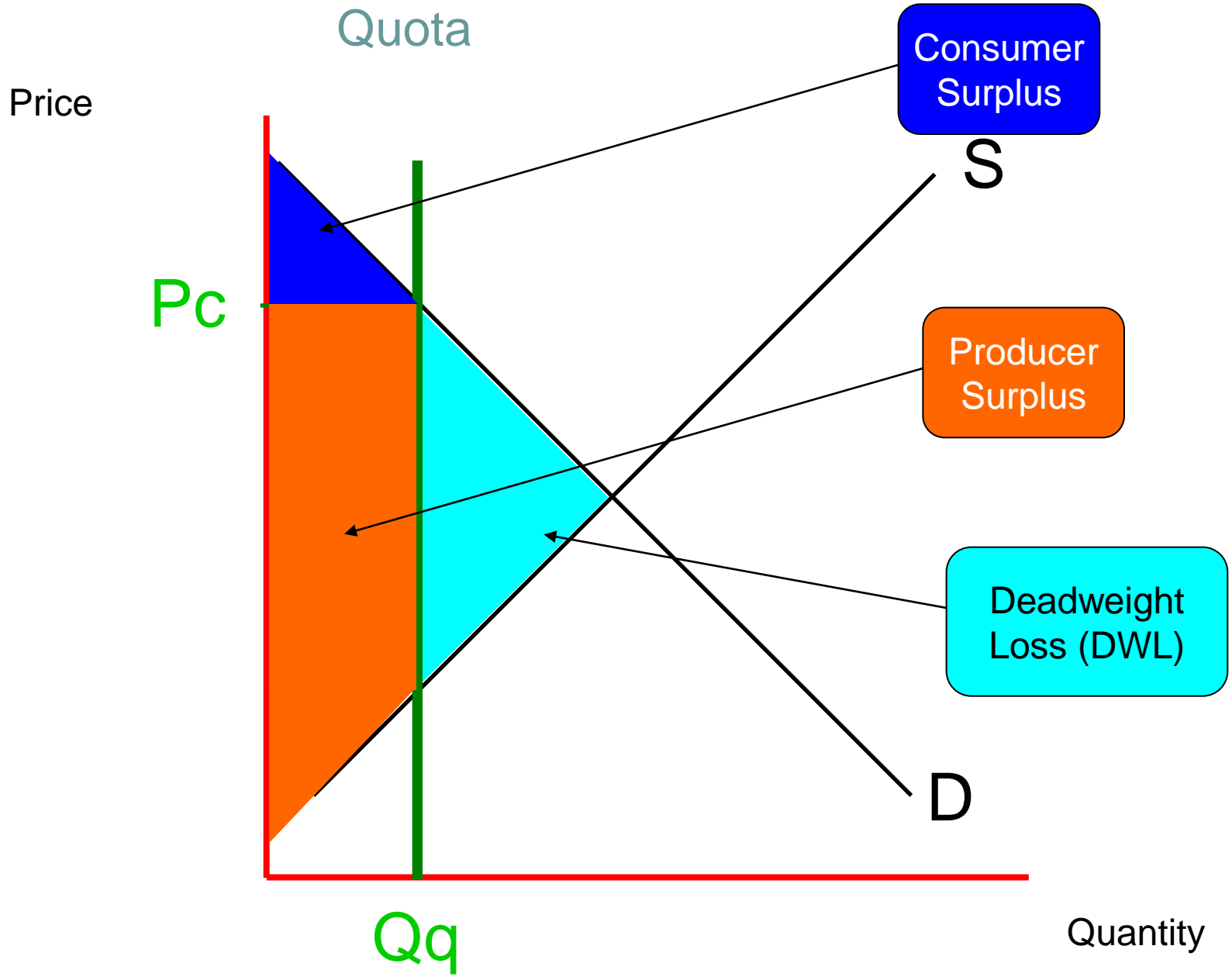
Answers



- b) The sum of consumer surplus and producer surplus will increase thus increasing allocative efficiency.
Lower prices transfer some producer surplus to consumer surplus.
Consumer surplus gain the deadweight loss and government revenue caused by the tariff.
Overall the sum of consumer surplus and producer surplus will increase thus increasing allocative efficiency.
- c) Removal of tariffs will lead to increased imports / lower prices
NZ clothing producers less competitive and decrease production
Fewer clothing workers will be needed to produce the lower output (derived demand idea)

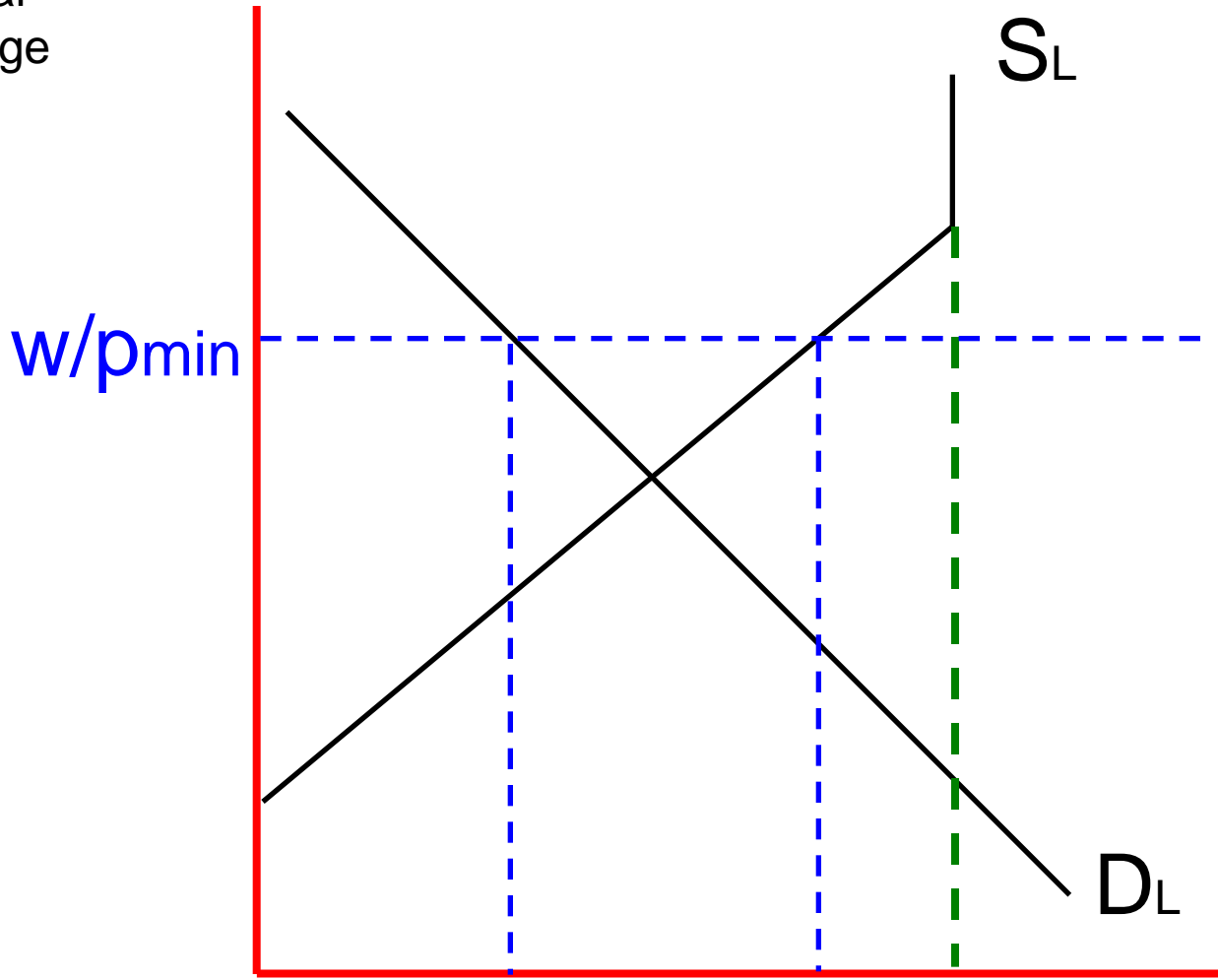






Labour Market

Real Wage



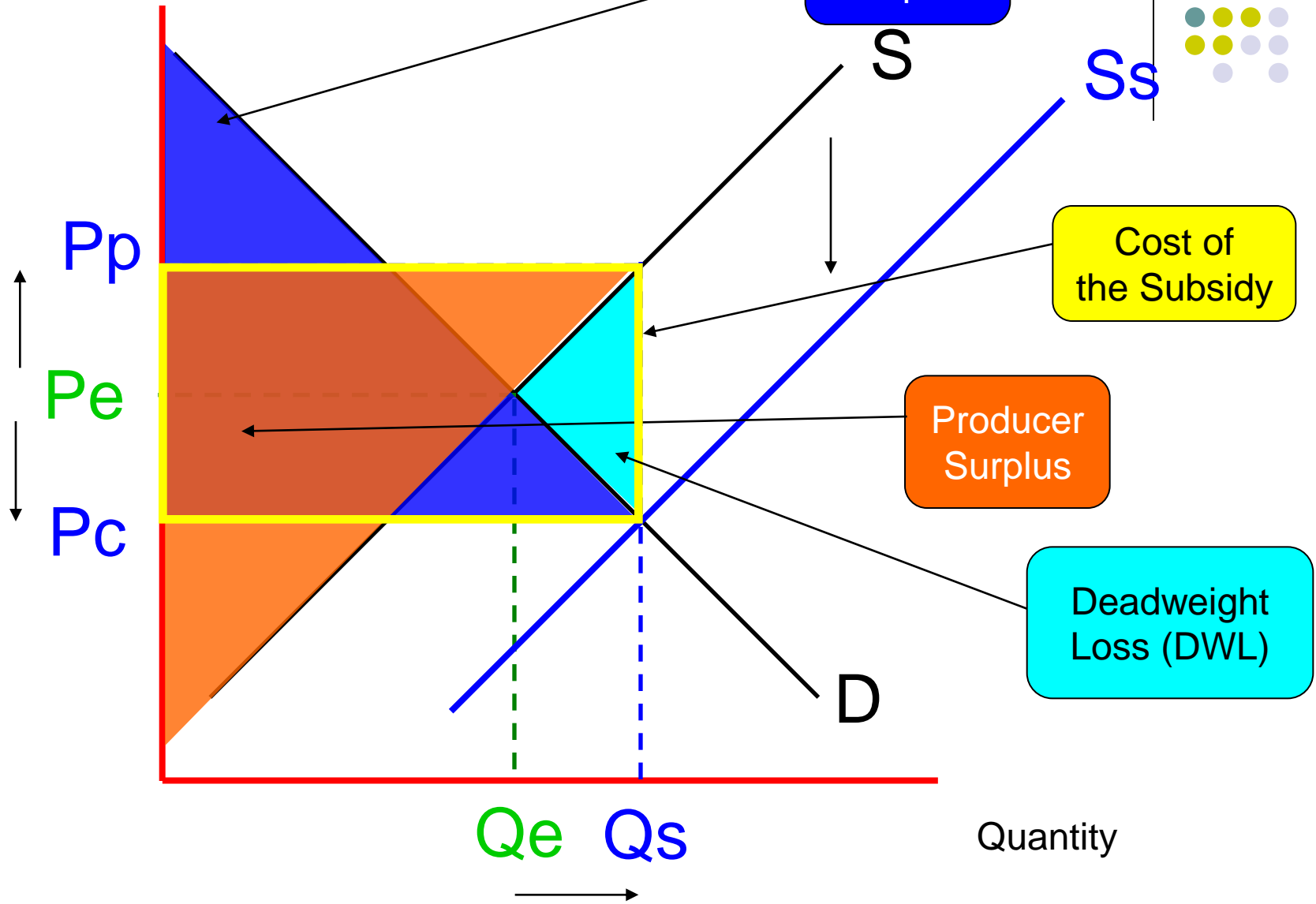
Q_L^d Q_L^s \bar{Q}_L

Quantity of Labour

employed Involuntary Unemployed Voluntary unemployed

Effect of a Subsidy

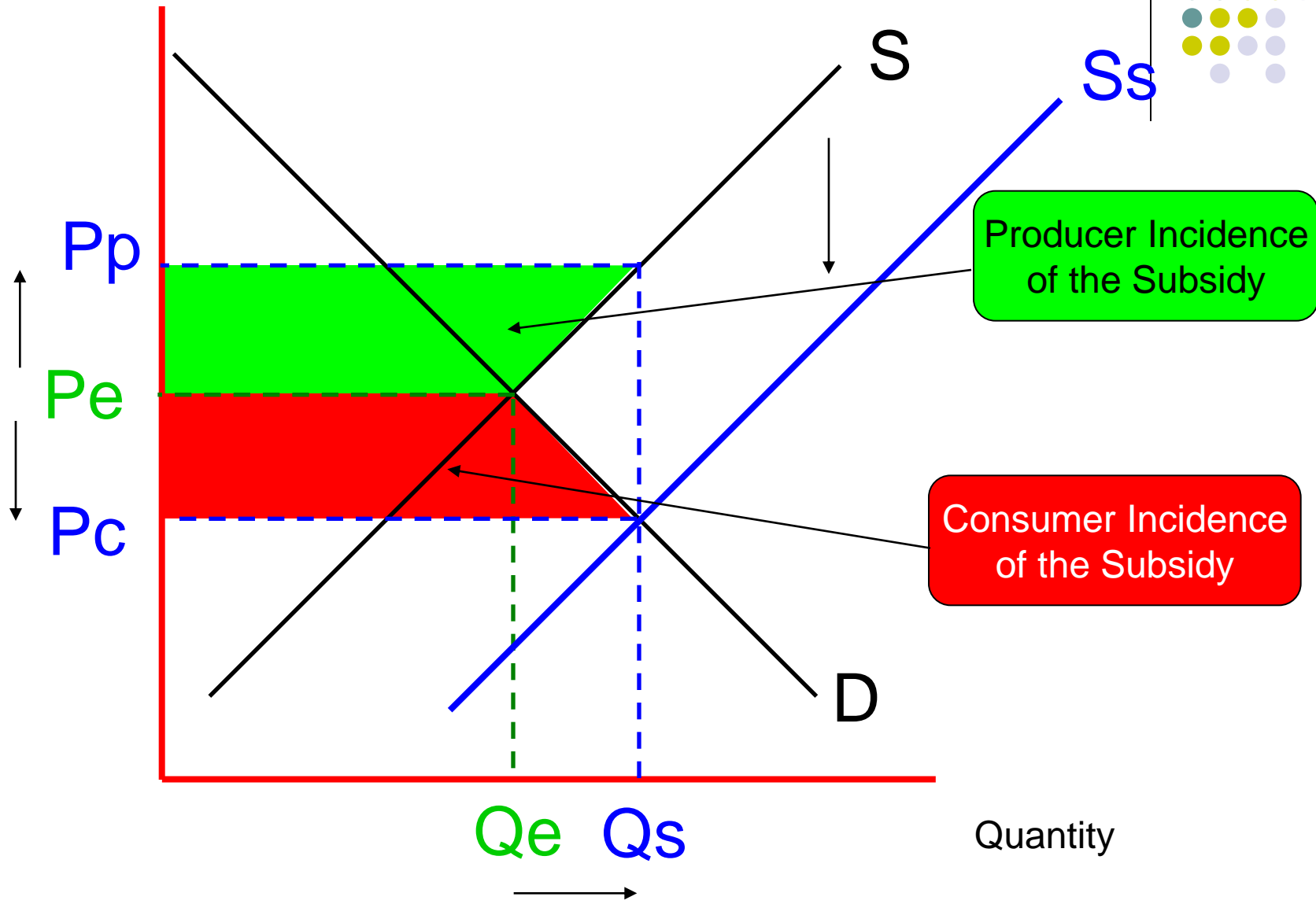
Price



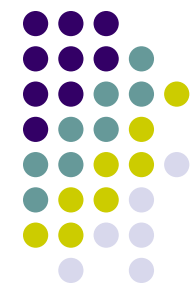
Effect of a Subsidy



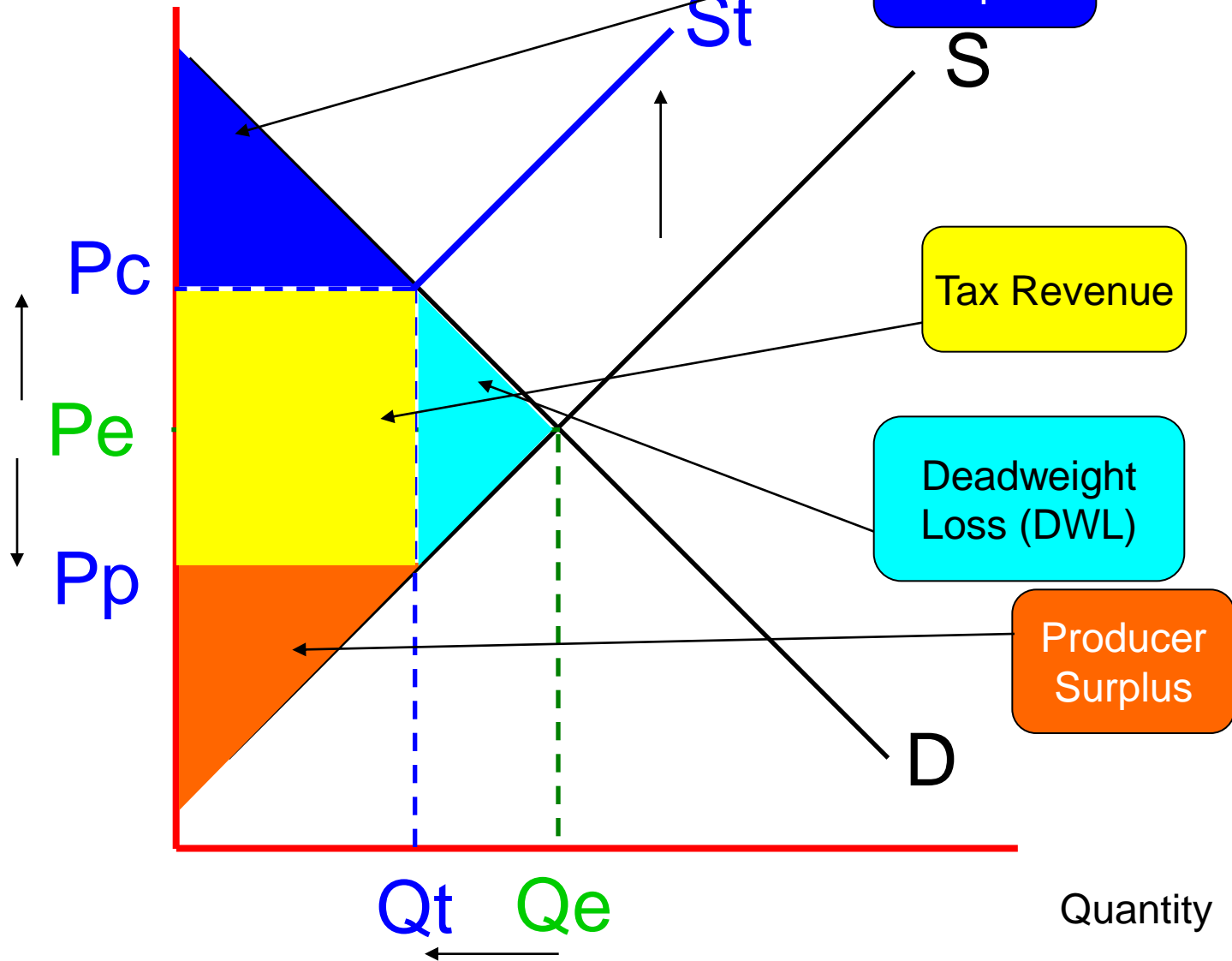
Price



Effect of an Indirect Tax



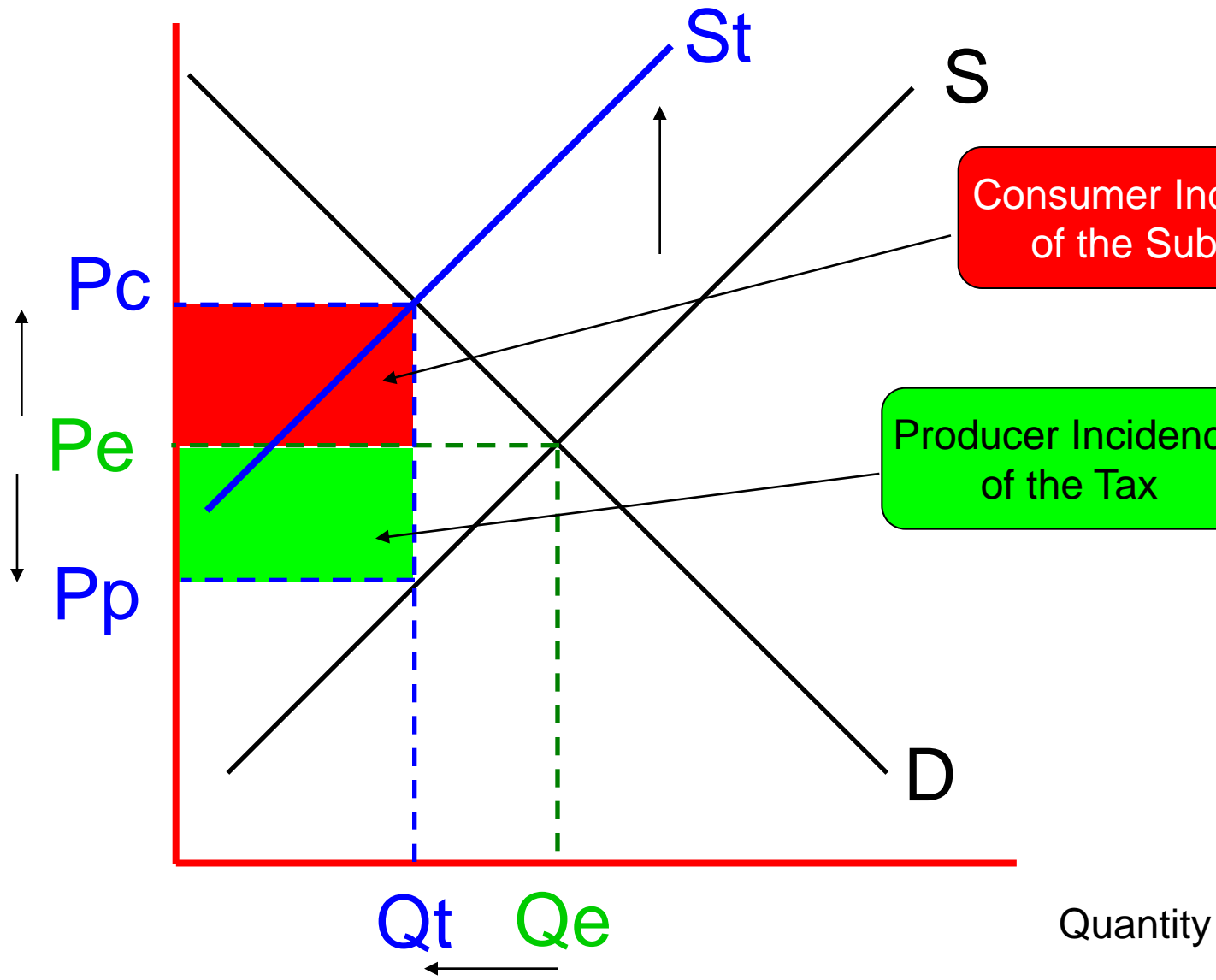
Price



Effect of an Indirect Tax



Price



Consumer Incidence of the Subsidy

Producer Incidence of the Tax

Q_t Q_e

Quantity