RAFFLES INSTITUTION
YEAR 5 H2 ECONOMICS 2022

PRICE MECHANISM AND ITS APPLICATIONS (PART 1)

Outline of Contents

References:

1. Sloman, John. (2013). 'Chapter 2: Markets, demand and supply' and 'Chapter 3: Markets in action'. In *Essentials of Economics 6th Edition*. Pearson Education.
2. Mankiw, Gregory N.; Quah, Euston & Wilson, Peter. (2013). Part 2: Supply and Demand 1: How Markets Work. In *Principles of Economics: An Asian Edition 2nd Edition*. Cengage Learning.
3. McEachern, William A. (2013). 'Chapter 4: Demand, Supply, and Markets' and 'Chapter 5: Elasticity of Demand and Supply'. In *Microeconomics: A Contemporary Introduction 10th Edition*. Cengage Learning.
4. Krugman, Paul & Wells, Robin. (2012). 'Part 2: Supply and Demand' and 'Part 3: Individuals and Markets'. In *Microeconomics 3rd Edition*. Worth Publishers.
5. Gillespie, Andrew, Foundations of Economics, 2nd Edition, New York: Oxford University Press

Lecture Objectives:

After this series of lectures and tutorials, students should be able to:

- Explain how the price mechanism allocates resources in a free market
- Identify the determinants of demand and supply, and explain how they influence demand and supply
- Explain and analyse how prices are determined by free market forces of demand and supply
- Apply demand and supply analysis in various markets in various markets

1. MARKET ECONOMY

1.1 The Market System

In the free market system (free of government intervention), resources are allocated according to the market forces of demand and supply. It is the level of demand and supply of each factor of production or final good/service that determines their respective prices and quantities traded.

Households are consumers of final goods/services, and their consumption decisions give rise to the market forces of demand. Firms are producers of goods/services, and their production decisions give rise to the market forces of supply. The coming together of buyers and sellers to transact goods/services is known as a market. In a free market system, resources are allocated according to the market forces of demand and supply.

The following characteristics are necessary for the market-based economy to allocate resources efficiently:

- **Perfect Competition**

Perfect competition is an essential feature of the free market economy. In perfect competition for each type of good/service, there are many buyers and sellers, each having an insignificant share of the market. No single buyer or seller is strong enough to control a market and exploit other sellers or buyers.

Question:
Does this happen commonly in the real world? Which market most closely resembles this?

- **Rational Behaviour and the Pursuit of self-interest**

Consumers and producers are assumed to behave rationally. Economic activity in the free-market system is driven by **self-interest**. Producers or firms try to maximise profits, while consumers try to maximise utility.

- **Freedom of choice and enterprise**

All decisions are made by households and firms. Consumers are free to decide what to buy with their incomes. This is known as **consumer sovereignty**. Firms are free to choose what to sell and what production methods to use.

Note:
There is consumer sovereignty when they influence the production decisions of the economy.

- **Private ownership of property**

Individuals have the right to own, control and dispose of land, capital and natural resources. Owners of factors of production have the right to the income (in the form of rent, interest and profits) earned from the use of these factors of production.

1.2 The Price Mechanism

The price mechanism operates in market economies where **changes in prices** (resulting from changes in demand or supply) will cause resources to move in or out of industries. According to Adam Smith (1776) *The Wealth of Nations*, the price mechanism is the ***invisible hand*** that allocates resources, based on the self- interest of consumers and producers, to result in the right mix of goods and services for society.

Guided by self-interest, households and firms interact in markets to eventually determine **what and how much to produce, how to produce and for whom to produce**. A market occurs as long as demand and supply forces exist.

Recall from The Central Problem of Economics:

1. What are the 3 different types of economic systems?
2. What are the 3 fundamental questions of resource allocation?

1.3 An Overview of Demand-Supply Model

Market Equilibrium
The meaning of "*equilibrium*":

A situation in which buyers and sellers are on aggregate satisfied with the current combination of price and quantity of a good bought or sold and are under no incentive to change their present economic actions. Market equilibrium refers to a position of balance - a position from which there is **no inherent tendency for change** and is achieved at the point where **market demand intersects market supply**. Quantity demanded equates quantity supplied of a good at the equilibrium price level.

Equilibrium Price and Output

- The equilibrium price is the price at which the quantity demanded is equal to the quantity supplied, i.e., the price at which the equilibrium quantity is traded.
- Equilibrium price can therefore be referred to as the **market clearing price.**
- At any other price where quantity demanded and quantity supplied are not the same, the market is said to be in **disequilibrium**. There will be shortages or surpluses of the good in the market.

Price ($)	Quantity Demanded	Quantity Supplied	Surplus or Shortage	Price will...
1.25	8	28	Surplus	fall
1.00	14	26	Surplus	fall
0.75	**20**	**20**	**None**	**remain unchanged**
0.50	24	16	Shortage	rise
0.25	32	12	Shortage	rise

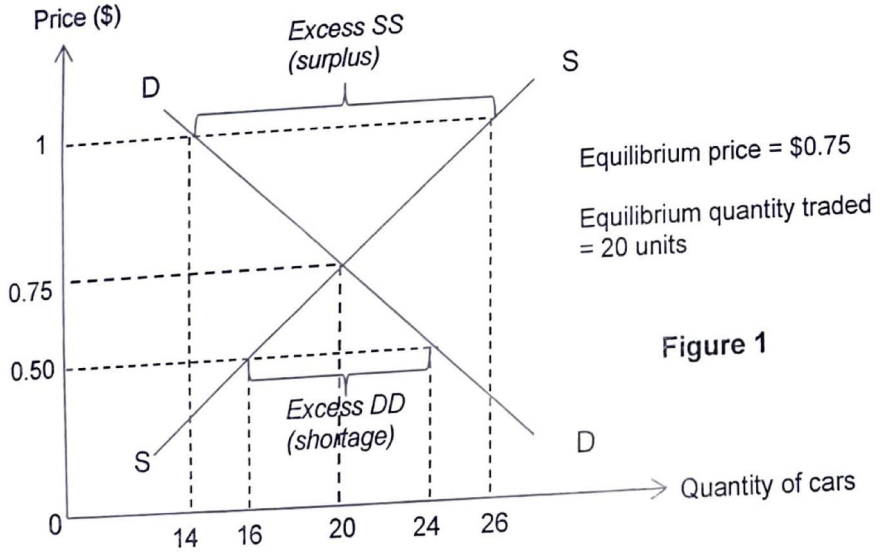


Figure 1

Market Adjustment:

As seen in Figure 1, at prices above the equilibrium price of $0.75 (e.g., $1), there is a surplus in the market since quantity supplied exceeds the quantity demanded resulting in a downward pressure on the price. To sell their surplus, producers will begin to lower prices. As price falls, consumers are willing and able to buy more causing quantity demanded to increase. As price falls, producers will also be less incentivised to produce

Refer to Section 2 and 3 for demand and supply theory.

due to a fall in profitability, causing quantity supplied to decrease. This fall in price continues until the equilibrium price ($0.75) is reached. At this equilibrium price, quantity demanded is equal to quantity supplied at 20 units.

The opposite would happen if price was initially below the equilibrium price (e.g. $0.50). There is a shortage in the market as quantity demanded exceeds quantity supplied and consumers will be unable to purchase all they will like. This will put an upward pressure on the price as consumers try to outbid one another for existing supplies. As price increases, producers will be incentivised to produce more due to an increase in profitability. Due to the increase in price, consumers will be less willing and able to buy, thereby causing quantity demanded to fall. This increase in price continues until the equilibrium price ($0.75) is reached. At this equilibrium price, quantity demanded is equal to quantity supplied at 20 units.

Equilibrium price and quantity change in the real world due to changes in market demand or supply which will trigger the market adjustment process. This causes price to change to a new equilibrium where the new quantity demanded is equal to quantity supplied.

Sectional Summary

- In the free market economy, price mechanism determines what and how much to produce, how to produce and for whom to produce,
- Market equilibrium occurs when quantity demanded is equal to quantity supplied at the same price. At the equilibrium price and quantity, there is no tendency to change.
- Markets are in disequilibrium when there is a shortage or a surplus. A shortage creates upward pressure on price, while a surplus creates downward pressure on price.

2. DEMAND THEORY

2.1 Definition of Demand

The demand for a commodity refers to the amount that consumers are **willing** and **able** to purchase at each given price over a given period of time. For demand to be effective (thus also called 'effective demand'), willingness to pay must be supported by the ability to pay.

2.2 The Law of Demand

The Law of Demand states that the **quantity demanded** of a good/service is inversely related to its **price**, ceteris paribus. The lower the price of a good, the greater its quantity demanded and vice versa. Graphically, this is represented as a movement along the downward-sloping demand curve.

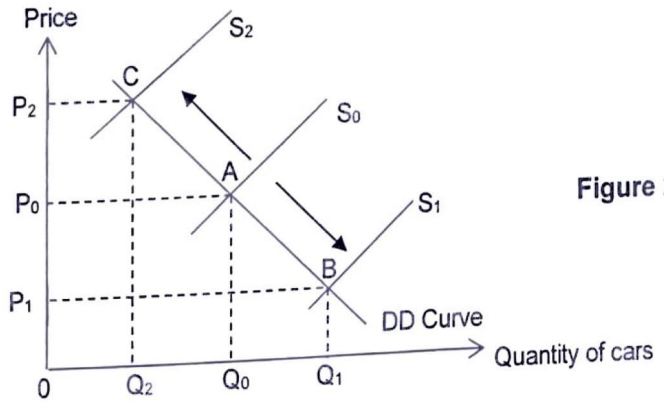


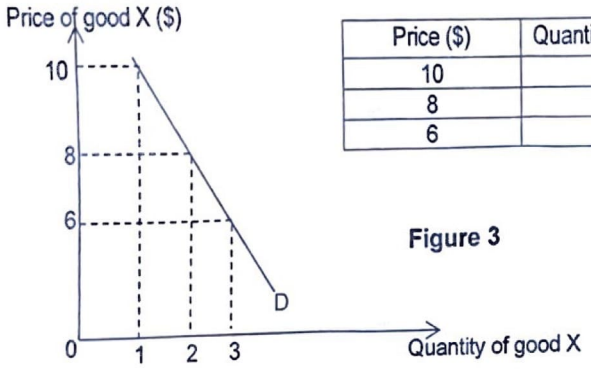
Figure 2

Note:

Movement along the demand curve is caused by shifts in supply curve.

Demand Curve

An individual demand curve is a graphical representation of the relationship between the price of the good and its quantity demanded, ceteris paribus. It shows the amount of a good that a consumer is able and willing to purchase at each given price over a given period of time.



Price ($)	Quantity demanded
10	1
8	2
6	3

Figure 3

The marginal utility that a consumer derives from consuming an additional unit of a good is important in determining how much he/she is willing to pay. Referring to the above diagram:

- With reference to Figure 3, Consumer A derives $10 equivalent of utility from consuming the 1st unit of good X, $8 equivalent of utility from consuming the 2nd unit of good X, and $6 equivalent of utility from consuming the 3rd unit of good X.
- The marginal utility of consuming additional units of good X is decreasing due to the Law of Diminishing Marginal Utility.
- Being a rational consumer seeking to maximise his/her utility given a budget constraint, Consumer A will apply the Marginalist Principle in deciding how many units of good X to purchase.
- According to the Marginalist Principle,
  - Consumer A should purchase an additional unit of good X if its marginal utility is equal to or more than its price. Doing so allows consumer A to become better-off, as he/she is able to derive utility which exceeds the amount he has spent.
  - Consumer A should not purchase an additional unit of good X if its marginal utility is less than its price. Doing so makes consumer A worse- off, as the amount he has spent exceeds the utility he is able to derive from consuming the good.
- Applying the Marginalist Principle to this example:
  - If P=$10, Consumer A should purchase 1 unit of good X.
  - If P=$8, Consumer A should purchase 2 units of good X.
  - If P=$6, Consumer A should purchase 3 units of good X.
  - The above constitutes the individual demand curve of good X.

Recall:
LDMU states that beyond a certain point of consumption, each extra unit consumed gives less additional utility than previous units.

In summary, a consumer experiences diminishing marginal utility in consuming additional units of good X. In maximising utility with a given budget, the rational consumer will increase the quantity demanded as price decreases, and vice versa. This gives rise to a downward sloping individual demand curve. The individual demand curve of good X

indicates the decreasing marginal utility that consumers derive from consuming each additional unit of the good.

As shown in Figure 4, the market demand curve is the **horizontal summation** of all individuals' demand curves.

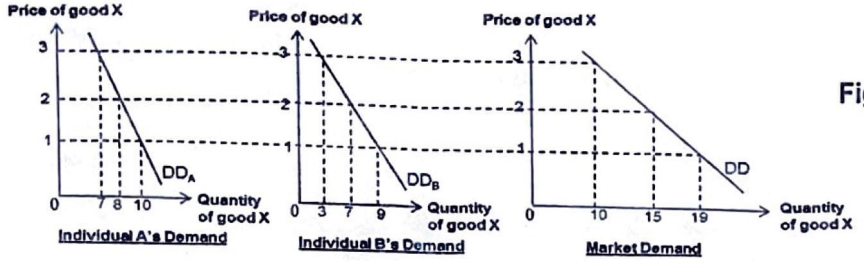


Figure 4

The market demand curve is downward sloping due to the Law of Demand. There are two reasons for this law:

- Substitution effect

It is the effect of a change in the price of the good on its quantity demanded arising from the consumer switching to, or from, alternative products, ceteris paribus. For example, an increase in the price of strawberries leads to it being replaced by a substitute, such as grapes. Hence, the substitution effect will cause consumers to buy less of the strawberries when the price of strawberries increases.

- Income effect

The income effect occurs when a change in the price of the good affects consumers' real income or purchasing power which in turn affects consumers' ability to buy the good. For example, the increase in the price of strawberries will lead to a fall in real income, ceteris paribus. When consumers' purchasing power falls, their ability and willingness to buy strawberries will fall and hence, they can only buy less of that.

2.3 Factors influencing market demand

The conditions of demand determine the **position of the demand curve.** A change in the non-price determinants of demand changes the quantity that consumers are willing and able to purchase at any given price. Graphically, this is represented by a shift of the demand curve. Any change in non-price determinants of demand that lowers the quantity that consumers are willing and able to purchase at any given price is a fall in market demand. With reference to Figure 5, this is represented by a shift of the demand curve to the left from D to D1. Similarly, any change in non- price determinants of demand that increases the quantity demanded by consumers at every given price is an increase in market demand. This is represented by a shift of the demand curve to the right from D to D2.

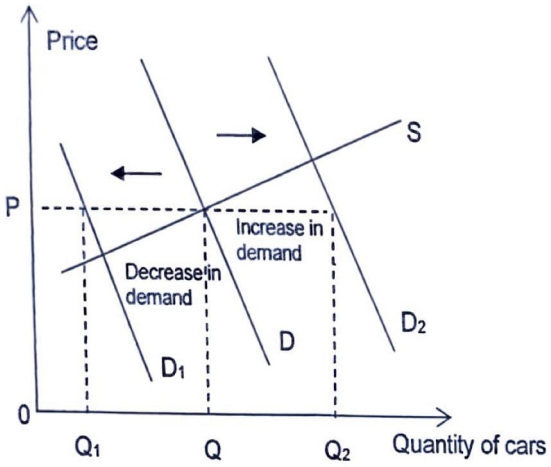


Figure 5

Note:

Shifts in the demand curve results in the movement along the supply curve.

These **non-price determinants of demand** include:

a. Tastes and Preferences

Taste is significant in influencing consumers' desired purchases and hence their willingness to purchase a good.

Question:

To what extent do you think are consumers today affected by ads?

Do consumers really make their own decisions, or are we "controlled" by subliminal messaging?

Factors affecting taste include the effects of advertisements, education, culture and age group. A change in taste towards a particular good is likely to increase the demand for that good and will cause the demand curve to shift to the right, vice versa.

For example, temporary increases in demand for merchandise can occur due to fads, latest craze like K-pop and Korean dramas. Similarly, there have been permanent decreases in demand for CD players as a result of new inventions, new improved products like iPods and iPads.

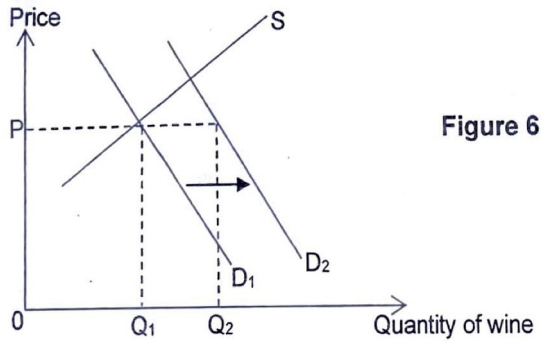


Figure 6

Key Point:

Any change in demand will result in changes in equilibrium price and quantity of the good.

Refer to section 4 for changes to equilibrium price and quantity.

As seen in Figure 6 above, suppose that the original demand curve for ice cream is given by D_1. If the given price is OP, then the demand curve D_1 indicates that quantity $0Q_1$ will be demanded.

Suppose there is a discovery by the British Medical Association that people who regularly drink wine live longer, healthier lives. The discovery would **raise the demand** for wine. Consumers are now more willing to purchase a greater quantity of wine at every price. The **demand curve shifts rightwards** from D_1 to D_2. At the same price OP, quantity demanded increases from OQ_1 to OQ_2.

b. Seasonal changes / Climatic changes (a sub-set of *tastes & preferences*)

For example, during the hot season, the demand for air conditioners and fans increases. The hot weather increases the consumers' willingness to purchase more air conditioners and fans in order to keep cool, causing the demand curve to shift to the right. On the other hand, during winter, the demand for winter clothes would increase.

Question:
What other examples can you think of?

Festivals can also play a part. For example, just before Chinese New Year and Hari Raya, the demand for eggs, flour and new clothes increases. Similarly, Valentine's Day will see an increase in demand for flowers and restaurant meals.

c. Expectations of future prices

Another factor which influences the demand for goods is consumers' expectations of future prices of the goods. If consumers expect prices of the good (e.g. gold) to rise in the future, ceteris paribus, they would demand for more gold now, leading to a rightward shift of the demand curve. When consumers expect the price of gold to fall in the future, they will postpone consumption of gold now, leading to decrease in demand for gold in the current period.

d. Income

Changes in consumers' incomes will affect the consumers' ability to purchase goods and services. An increase in income means that consumers have more to spend in total and this increases their ability to purchase more goods and services. This will lead to re-adjustments of consumers' expenditure patterns, which increases demand for some goods and decreases demand for other goods depending on whether the goods are normal goods or inferior goods.

A good is a **normal good** when the demand for it increases in response to an increase in consumer income and vice versa i.e. **demand for the good varies directly with income**. Most goods are normal goods. An increase in income leads to a rise in demand hence shifting the demand curve to the right.

An **inferior good** is one where the demand will fall as consumers' incomes increase. They are often regarded as cheap but inferior substitutes for other goods. Examples of inferior goods are second-hand clothes, second-hand cars. As incomes increase, consumers experiencing an increase in their ability to buy, tend to switch to more expensive and better quality substitutes (new clothes, branded clothes, new cars). This results in a decrease in the demand for inferior goods. There is a **negative relationship** between income and demand for inferior goods.

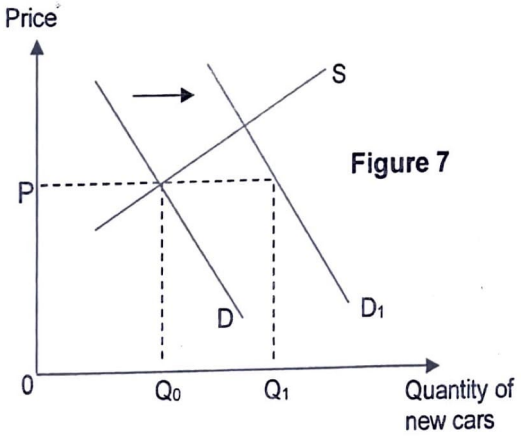


Figure 7

Market for new cars (normal goods)

An increase in income will increase the consumers' ability to buy new cars, thus increasing the demand for new cars.

As shown in Figure 7, the demand curve for new cars will shift to the right from D_0 to D_1. At the same price OP, quantity demanded increases from OQ_0 to OQ_1.

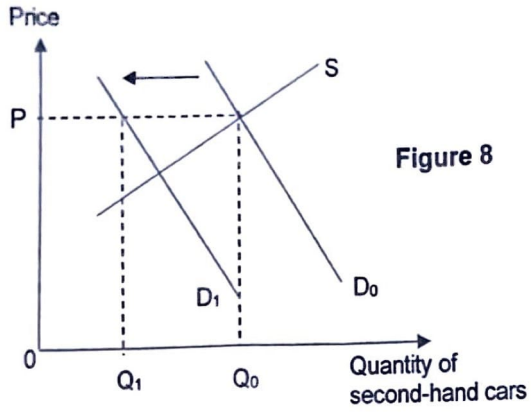


Figure 8

Market for second-hand cars (inferior goods)

As consumers' ability to buy new cars increases with increases in their income, consumers will tend to switch away from purchasing second-hand cars causing a decrease in the demand for second-hand cars.

With reference to Figure 8, the demand curve will shift to the left from D_0 to D_1. At the same price OP, quantity demanded decreases from OQ_0 to OQ_1.

e. Prices of Related Good

The demand for a good/service may change as a result of a change in the price of a related good. Related goods can either be substitutes or complements.

(i) Substitutes

A substitute is a commodity that can be used in place of another. It satisfies the same want. Substitute goods are thus in **competitive** demand, e.g. Coca-Cola & Pepsi, MRT & taxi services, Cadbury and Nestle chocolates, milk and yoghurt.

An increase in the price of Coca-Cola results in a rise in the demand for its substitute, Pepsi and vice versa. As the price of Coca-Cola rises, some consumers switch from Coca-Cola to Pepsi. This leads to an increase in demand for Pepsi.

With reference to Figure 9, suppose the rise in price of Coca-Cola is due to a rise in the cost of production, leading to a fall in the supply of Coca-Cola. The supply curve for Coca-Cola shifts left from S_0 to S_1 and the quantity traded falls from $0Q_0$ to $0Q_1$. Since Coca-Cola is now relatively more expensive as compared to Pepsi, people will now shift their consumption to Pepsi. Hence the demand for Pepsi increases and the demand curve for Pepsi shifts right from D_0 to D_1. At the same price OP, quantity demanded increases from OQ_0 to OQ_1.

Refer to Section 3 on determinants of supply.

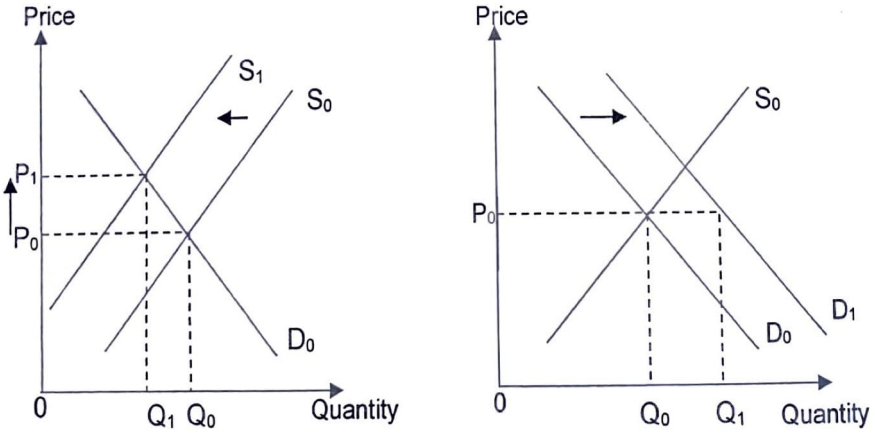


Figure 9

Market for Coca- Cola

Market for Pepsi

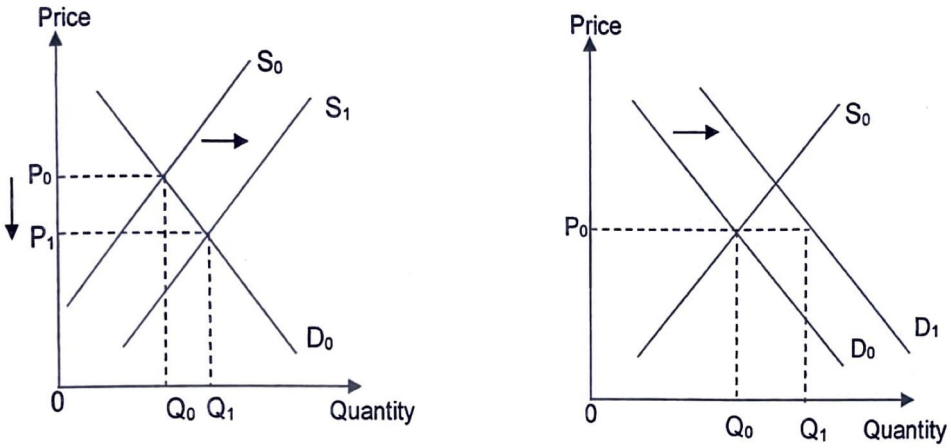
(ii) Complements

A complement is a good that is used in conjunction with another. They are jointly demanded to satisfy the same want. Complements are thus in **joint** demand, e.g. tea and sugar, car and petrol, digital camera and memory card, blue ray DVDs and blue ray DVD players, computers and computer software, etc.

Question:
What other examples can you think of?

A fall in the price of cars leads to an increase in the demand for petrol. This is because the fall in the price of cars results in a bigger quantity of cars being purchased. This leads to an increase in demand for petrol.

With reference to Figure 10, suppose the price of cars falls from $0P_0$ to $0P_1$ due a reduction in the cost of producing cars arising from technological advancement. As a result, the supply of cars increases and the supply curve shifts to the right from S_0 to S_1. With the decrease in price from $0P_0$ to $0P_1$, the quantity traded for cars increases from $0Q_0$ to $0Q_1$. As more cars are purchased and consumed, the demand for petrol (the complementary good) will increase. The demand curve for petrol shifts right from D0 to D1. At the same price OP, quantity demanded increases from OQ0 to OQ1.



Market for Cars

Market for Petrol

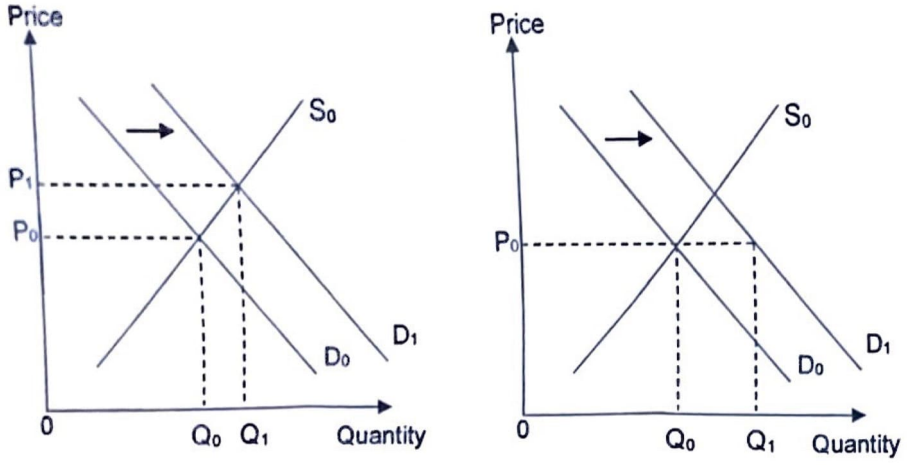
Figure 10

f. Derived Demand

Derived demand refers to demand for one good or service that occurs as a result of the demand for another intermediate/final good or service. Changes in the final product market will cause the demand for factor resources to change because the **demand for factors of production is derived from the demand for final goods and services**.

For example, the production of cars requires the use of steel. An increase in demand for cars will increase the revenue that firms can obtain from selling the cars produced by labour. Hence firms are more willing to buy more steel in order to increase their car production. Demand for steel increases. The demand for steel is thus a derived demand. From Figure 11, the demand for cars and steel both increase from D_0 to D_1.

Important:
Students often confuse complements with factors of production.
Go back to the definitions of these terms to clarify any confusion which may arise.
Complements are goods that are used in conjunction to fulfil a want, whereas factors of production are resources/intermediate goods used to produce a final good.



Market for Cars Market for Steel

Figure 11

Another common analysis will be the market for labour since workers are needed to produce goods and services. Thus, the demand for labour is also a derived demand.

g. Government Policies

(i) Direct Tax Policy

Direct tax is a tax on people's incomes. Changes in direct tax rates affect people's **disposable income** (income available for spending after payment of income tax). An increase in the income tax rate will reduce people's disposable income. This in turn reduces their ability to pay, leading to a decrease in demand for normal goods and services, and vice versa.

Question:
What is the income tax rate for different income brackets in Singapore?

(ii) Direct Subsidy Policy

Direct subsidies are payments made by the government to the consumers. For example, housing grants for married couples who stay near their parents, Edusave grants for primary to junior college students.

Question:
What other examples can you think of?

Such direct subsidies increase the consumers' ability to pay and hence demand. For instance, the housing grants encourage married couples to stay near their parents and result in an increase in demand for housing in areas near to where their parents are staying.

h. Population

This affects the number of potential consumers or the size of the market. Changes in population can be due to an absolute increase or decrease in the total population or a change in the composition/demographics of the population.

For example: a change in age distribution due to

Baby boom → - increase in demand for baby products (short-run effect)
- increase in demand for schools, housing (long-run effect)

OR

Ageing population → - increase in demand for healthcare services

i. Interest Rates

The rate of interest is the price of borrowing money. Changes in the rate of interest affect the level of demand by consumers, especially those who rely on loans or hire purchase. For example, an increase in the rate of interest will reduce the demand for cars and housing as the cost of purchase (in terms of monthly payments) increases even though the prices of cars and housing stay the same. The demand curve for these goods shifts leftwards.

Think:
Interest rates also affect savings. How would an increase in interest affect your savings?

j. Exchange Rates

This refers to the rate at which a country's currency (eg. S$) exchanges for another currency (eg. US$). Changes in the rate of exchange will affect foreign demand for a country's goods and services.

If the S$ appreciates (strengthens) against the US$, ceteris paribus, Singapore goods which are sold to the USA (known as Singapore's exports) become more expensive in US$. For instance, at an exchange rate of S$1 = US$0.70, a S$100 export from Singapore will be sold in the US for US$70. If the S$ appreciates to S$1 = US$0.85, the same good will be sold for US$85.

US consumers will turn away from Singapore exports and turn to cheaper US domestic substitutes. This decreases the demand for Singapore exports and increases the demand for US goods.

Sectional Summary

- Demand for a good/service refers to the quantity of the good/service that consumers are willing and able to purchase at every given price over a given period of time.
- The demand curve is downward sloping as price and quantity demanded are inversely related.
  - The Law of Diminishing Marginal Utility influences the *individual* demand curve.
  - The Law of Demand influences the *market* demand curve.
- The list of non-price determinants of demand is not exhaustive and not all determinants are applicable to every market. The more significant determinants include tastes and preferences, income, and expectation of future prices.

3 SUPPLY THEORY

3.1 Definition of Supply

The supply of a good or service refers to the quantity of a good or service that producers are **willing** and **able** to offer for sale at each given price over a given period of time.

3.2 The Law of Supply

The quantity supplied is directly related to the price of a product. The higher the price of a good, the greater the quantity supplied and vice versa, **ceteris paribus**. Graphically, this is represented as a movement along the upward-sloping supply curve.

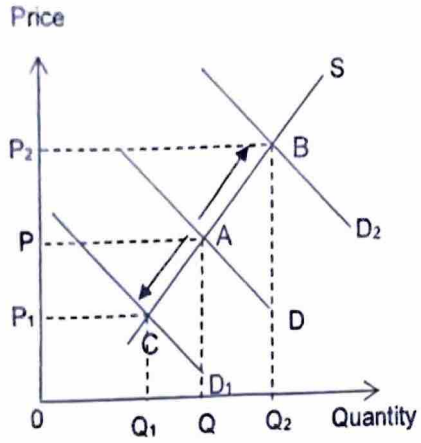
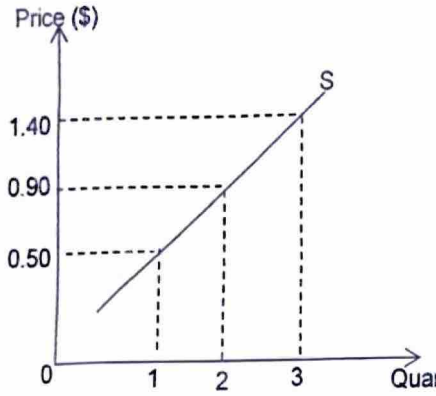


Figure 12

Note:
Movement along the supply curve is caused by shifts of the demand curve.

Supply Curve

The firm's supply curve is a graphical representation of the relationship between the price of a good and the quantity supplied by a firm over a given period of time, ceteris paribus. It shows the amount of a good that a producer is able and willing to make available for sale at each given price over a given period of time.



Price ($)	Quantity supplied
0.50	1
0.90	2
1.40	3

Figure 13

The marginal cost that a producer incurs from producing an additional unit of a good is important in determining how much he is willing to accept for producing it. Referring to the above diagram:

- From Figure 13, producer A incurs $0.50 from producing the 1st unit of good X, $$0.90 from producing the 2nd unit of good X, and $1.40 from producing the 3rd unit of good X.
- The marginal cost of producing additional units of good X is increasing due to the Law of Diminishing Marginal Returns to output. A simple illustration will be the scenario where as more and more labour works on a unit of machine, eventually there will be over-utilisation of the machine and productivity is affected. In this case, with less addition to output, the addition to cost increases. This will be covered in detail in 'Production and Cost'.
- Being a rational producer seeking to maximise its profits, Producer A will apply the Marginalist Principle in deciding how many units of good X to produce.

Recap:

LDMR states that beyond a certain point of production, adding an additional factor of production results in smaller increases in output. This essentially means an increase in marginal cost.

According to the Marginalist Principle:

- Producer A should produce an additional unit of good X if its price is equal to or more than its marginal cost of production. Doing so allows Producer A to become better-off, as its profits increases.

- Producer A should not produce an additional unit of good X if its price is less than its marginal cost of production. Doing so makes Producer A worse-off, as its profits decreases.

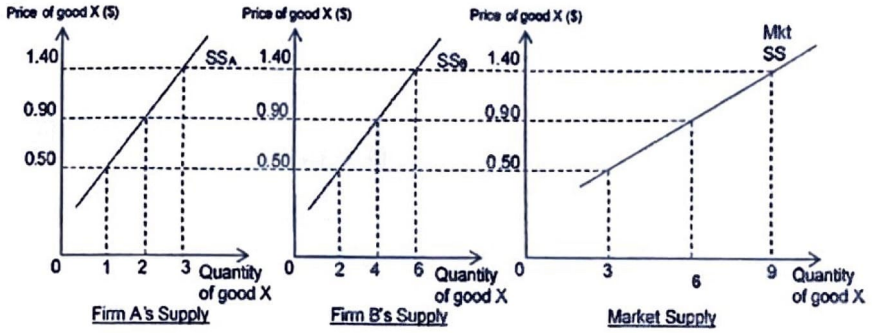
Applying the Marginalist Principle to this example:

- If P=$0.50, Producer A should produce 1 unit of good X.
- If P=$0.90, Producer A should produce 2 units of good X.
- If P=$1.40, Producer A should produce 3 units of good X.
- This constitutes the firm supply curve of good X.

In summary, a producer experiences diminishing marginal returns in producing additional units of good X. In maximising profits, the rational producer will increase the quantity supplied as price increases, and vice versa. This gives rise to an upward sloping firm supply curve. The firm's supply curve of good X indicates the increasing marginal cost that producers incur from producing each additional unit of the good.

- A higher price is required to incentivise firms to increase quantity supplied and vice versa. The firm's supply curve is upward sloping.
- The supply curve of good X indicates the marginal costs incurred from the production of each additional unit of the good.
- The upward sloping firm's supply curve is explained by the Law of Diminishing Marginal Returns.

The market supply is the **horizontal** summation of firms' supply curves as seen in Figure 14.



Question:

Are firms able to quantify their supply? Why or why not?

Figure 14

3.3 Factors influencing market supply

There are many non-price determinants of supply. A change in the non-price determinants of supply changes the quantity that producers are willing and able to sell at every given price. Graphically, this is represented by a shift in the supply curve. Any change in non-price determinants of supply which lowers the quantity supplied by producers at every given price is a fall in market supply. This is represented by a shift of the supply curve to the left. Similarly, any change in non-price determinants of supply that increases the quantity supplied by producers at every given price is an increase in market supply. This is represented by a shift of the supply curve to the right.

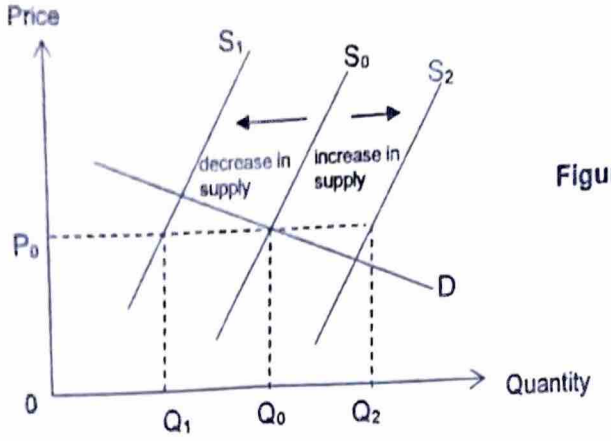


Figure 15

Note:

Shifts of supply curve causes movement along the demand curve.

a. Costs of production / Prices of factors of production

Changes in the price of factor inputs such as raw materials, fuel and power, cost of labour (wage rates) and the cost of capital will change the cost of production, causing changes in the level of profits. This in turn affects the supply of the good.

For example, if the price of steel increases, the cost of producing cars will rise, causing production to be less profitable. Firms will be only willing to supply fewer cars at each and every price. The supply of cars will fall and the supply curve shifts leftwards from S_0 to S_1 as shown in Figure 16. At the same price OP, quantity demanded decreases from OQ_0 to OQ_1.

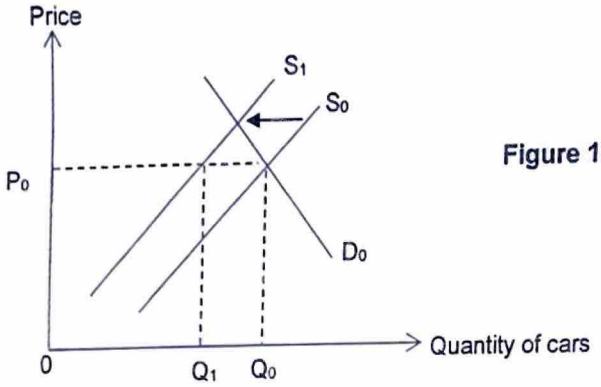


Figure 16

b. Innovation / State of Technology

The state of technology represents the economy's stock of knowledge about how resources can be combined most efficiently. Over time, technology changes as a result of new discoveries and innovations. Supply of a good will change with technological change.

Is technology change and productivity change more likely to happen in the long run or the short run?

Improvements in the techniques of production, resulting from new inventions or technological advances within the industry, will **increase the productivity of the factors of production**. Each unit of a factor will be able to produce more now. With the same factor price, **cost per unit of output will be lower.**

Definition:

Productivity is measured by output per unit of input.

Producers are willing and able to supply more of the good at each and every given price. This will increase the supply of the good and cause the supply curve to shift to the right from S_0 to S_2 in Figure 17.

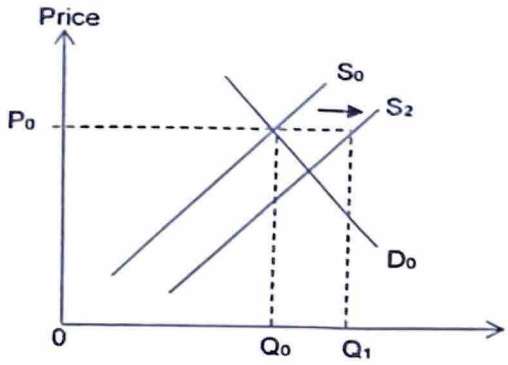


Figure 17

c. Natural Factors

Favourable climatic conditions such as abundant and reliable rainfall as well as absence of pests increase the supply of agricultural products. This will shift the supply curve to the right, assuming no change in cost of production. Occurrence of natural disasters such as droughts, floods, earthquakes, severe haze will reduce the supply of agricultural produce, leading to a leftward shift in the supply curve.

Think:
How does this affect markets in Singapore?

d. Number of firms

The number of firms producing the good can increase due to entry of new firms into the industry. This increases supply and gives rise to a rightward shift in the market supply curve and vice versa.

e. Government Policies

Government policies on *indirect* taxation and subsidies affect the cost of production of firms and therefore the supply of a good.

Indirect taxes are taxes imposed on expenditure of goods and services. An example is the Goods & Services Tax (GST). Such a tax is levied on the firms and added on to their cost of production. Since cost has increased because of the tax, firms will only be willing to supply fewer goods at every price, leading to a fall in supply and a leftward shift of the supply curve.

Think:
What other examples of indirect taxes/subsidies can you think of?

Indirect subsidy is a payment made by the government to firms to produce a particular good. This will reduce the firms' cost of production and increases the firms' willingness and ability to supply more goods at every price. Supply increases leading to a rightward shift of the supply curve.

f. Prices of Related Goods

(i) Joint Supply

Joint supply of two or more products refers to the production of goods that are **derived from a single product**. It is not possible to produce more of one without producing more of the other. This means that an increase in the price of one leads to an increase in supply of the other joint product. For example, butter and skimmed milk are both produced from whole milk, petrol and diesel are produced from crude oil, beef and leather from cattle.

Think:
What other examples can you think of?

With reference to Figure 18, an increase in the demand for beef (demand curve shifts right from D_0 to D_1) will result in an increase in its price. Producers will be encouraged

to increase quantity supplied to $0Q_1$. The increase in quantity supplied of beef results in more leather being offered for sale on the market. Hence the supply of leather increases and the supply curve of leather shifts right from S_0 to S_1. At the same price OP, quantity supplied increases from OQ_0 to OQ_1.

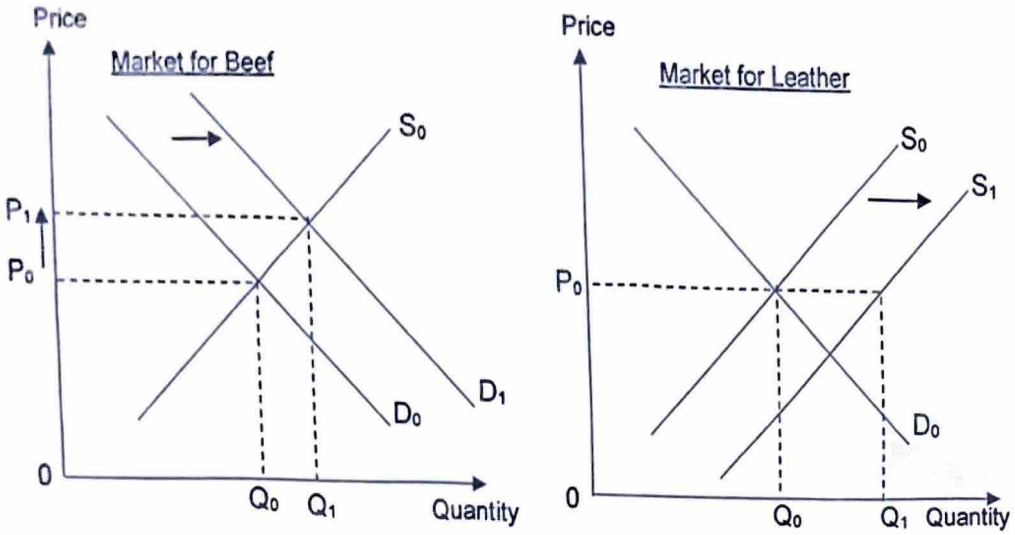


Figure 18

(ii) Competitive Supply

Competitive supply of two or more products refers to production of one **OR** the other by a firm. The goods **compete for the use of the same resources**, and producing more of one means producing less of the other.

An example would be corn which can be used as food for consumption or for the production of biofuel. They are thus in competitive supply. As seen in Figure 19, an increase in the demand for biofuel (demand curve shifts right from D_0 to D_1) causes the price of biofuel to increase from $0P_0$ to $0P_1$, and farmers will choose to produce corn for biofuel production as this is more profitable. As a result, the supply of corn for consumption will decrease and the supply curve of corn as food shifts to the left from S_0 to S_1. At the same price OP, quantity supplied decreases from OQ0 to OQ1.

Question:
What other examples can you think of? Do you think this applies to your 4 factors of production such as land and labour?

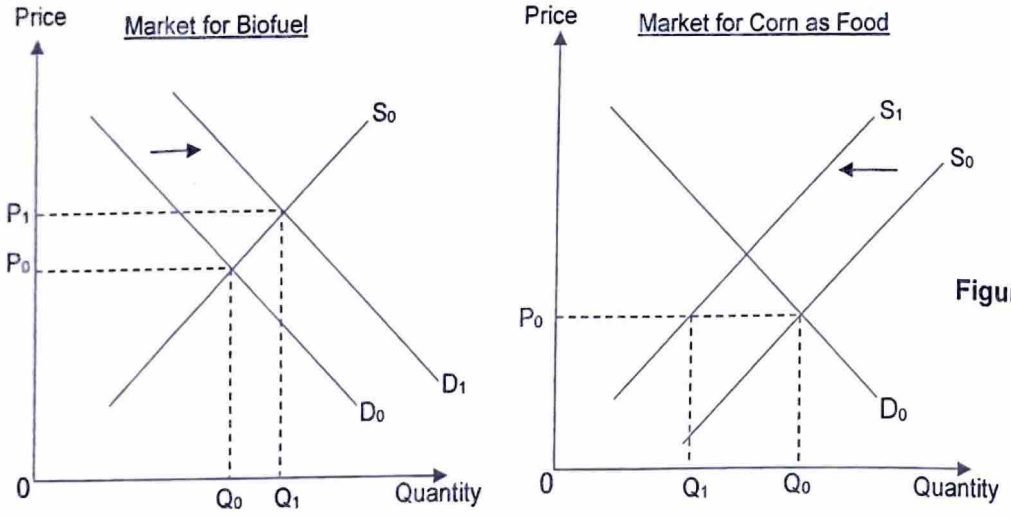


Figure 19

g. Expectations of future price changes

If price is expected to rise, producers may temporarily reduce the amount they sell in the market. They are likely to build up stocks and only release them on to the market when the price does rise.

At current prices, producers are willing to supply less than they otherwise would. This is represented by a leftward shift of the supply curve. The opposite would be true if producers expect prices to fall.

Sectional Summary

- Supply of a good/service refers to the quantity of the good/service that producers are willing and able to offer for sale at every given price over a given period of time.
- The supply curve is upward sloping as price and quantity supplied is directly related according to the Law of Supply.
- There are many non-price determinants of supply. The more significant non-price determinants of supply include cost of production/prices of factors of production, innovation/state of technology, and government policies.

4. DEMAND-SUPPLY MODEL

4.1 Changes in Demand and Supply

The equilibrium price and quantity is stable and does not change until demand and/or supply conditions changes. When that happens, the market is said to be in market disequilibrium, which is a situation of having shortages or surpluses since quantity demanded does not equal to quantity supplied. The market adjustment process occurs. A change in price would result in a change in equilibrium quantity, and therefore the amount of resources allocated to the production of a good in a market. This is why price is the "invisible hand" that allocates resources.

Effect of Demand Shifts on Equilibrium Price and Quantity

When **demand increases**, a **shortage** is created at the initial equilibrium price as the current equilibrium quantity would be insufficient and price adjusts upwards in order to reach a new equilibrium price and quantity. Conversely, if **demand falls**, a **surplus** is created such that price adjusts downwards to reach a new equilibrium price and quantity.

Strategy: Use the 3-step analysis

1. Decide whether demand or supply is affected given the scenario.

2. Decide direction of shift in demand or supply curve and the demand / supply factor causing the change.

3. Explain how the market adjust to new equilibrium price and quantity given shifts in demand and supply curves.

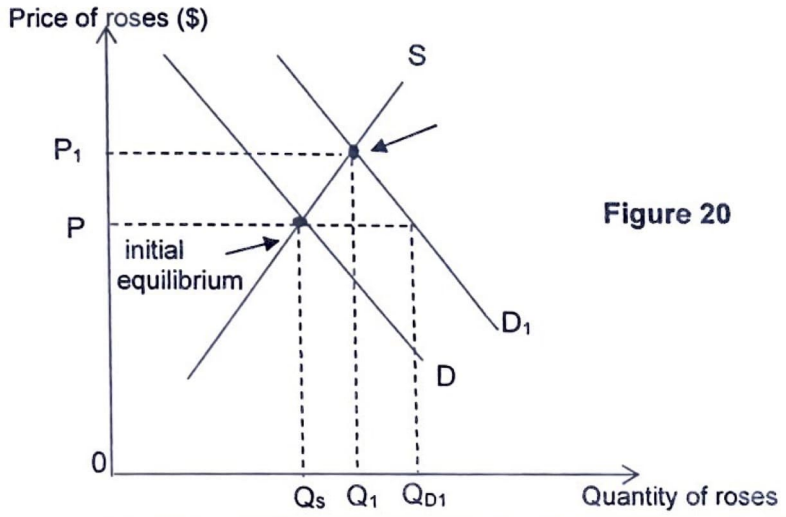


Figure 20

During Valentine's Day, there is greater willingness to buy roses as gifts for friends and loved ones, leading to an increase in seasonal demand for roses. Figure 20 shows a rightward shift of the demand curve from D to D_1. With the increase of quantity demanded at every given price level, ceteris paribus, a shortage of $Q_{D1} - Q_s$ occurs at the original price OP as quantity demanded (QD_1) exceeds quantity supplied (Q_s). There will thus be an upward pressure exerted on the price as consumers try to outbid one another for the limited quantity of the good.

As the price rises, it becomes more profitable for firms to increase the amount of roses supplied, while consumers' ability and willingness to purchase roses fall due to the income and substitution effect. Quantity supplied increases while quantity demanded falls until the shortage is eliminated. The new equilibrium price is reached at $0P_1$ and equilibrium quantity increases to $0Q_1$.

In contrast, a decrease in demand will lower the equilibrium price and quantity, ceteris paribus.

Effect of Supply Shifts on Equilibrium Price and Quantity

When **supply increases**, represented by a rightward shift in the supply curve, a **surplus** is created at the prevailing price, as quantity supplied is greater than the quantity demanded. To eliminate the surplus, firms reduce their price, exerting a downward pressure on the market price. Conversely, if **supply falls**, a **shortage** is created such that price adjusts upwards to reach a new equilibrium price and quantity.

Tip:

It is important to learn the full explanation of the market adjustment process well, which include the explanation of the income and substitution effect

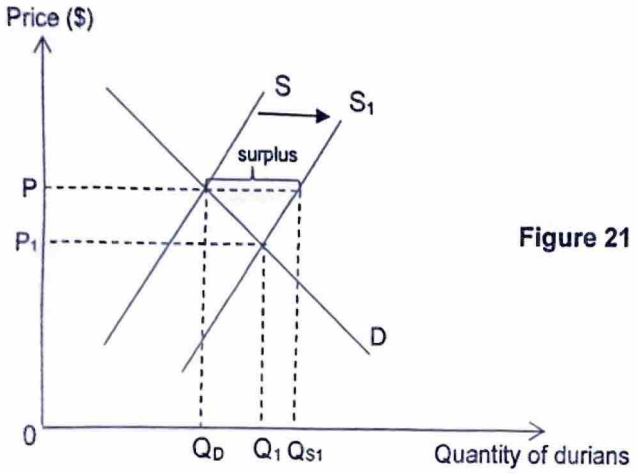


Figure 21

Suppose the harvest for durians increases due to favourable weather conditions in Malaysia. The supply of durians increases, leading to a rightward shift in the supply curve from S to S_1 as seen in Figure 21. With the increase of quantity supplied at every given price level, ceteris paribus, a surplus of $Q_{S1} - Q_D$ occurs at the original price OP as quantity supplied (Q_{S1}) exceeds quantity supplied (Q_s). This will cause a downward pressure on price as producers offer lower price to sell their surplus durians.

As the price begins to fall, more consumers are now willing and able to buy more durians due to the income and substitution effect. The quantity demanded would increase, while quantity supplied would decrease until the surplus is eliminated. The new equilibrium price falls to $0P_1$ and the new equilibrium quantity increases to $0Q_1$.

In contrast, a decrease in supply will result in a lower equilibrium quantity but higher equilibrium price ceteris paribus.

Effects of Simultaneous Shifts in Demand and Supply

In the dynamic world, both supply and demand conditions are constantly changing, therefore both supply and demand curves are likely to shift simultaneously. Given simultaneous shift of demand and supply, final effects on equilibrium price and quantity depends on the **relative magnitude** of change in demand and supply.

An Increase in Both Demand and Supply

In a situation of increasing preference for smartphones by consumers increases its demand. At the same time, technological improvements have allowed smartphones to be produced at a lower cost such that supply increases as well. The **effect on market equilibrium price is indeterminate.**

From Figure 22, although the new equilibrium point will be to the right of E, the new price could be **above or below** P_0, depending on the **relative shifts** of the demand and supply curves.

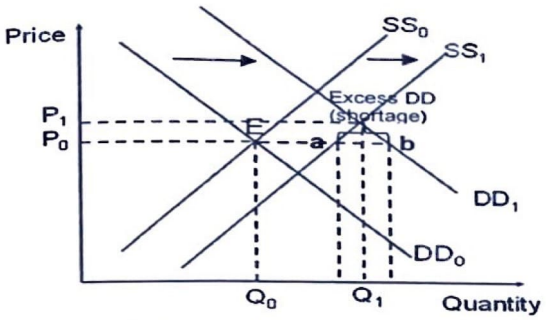


Figure 22

Assuming the increase in demand is greater than the increase in supply as reflected by the larger extent of shift in demand curve from DD_0 to DD_1 than the shift in supply curve from SS_0 to SS_1. At the initial equilibrium price P_0, a shortage (ab) will occur. There will be an upward pressure on price as consumers try to outbid one another for the existing supplies.

As the price rises, it becomes more profitable for firms to increase their output. Quantity supplied increases as reflected by an upward movement along the new supply curve SS_1. The higher price also reduces consumers' ability to pay and willingness to pay as substitutes become relatively cheaper and their disposable income falls. This leads to fall in quantity demanded as reflected by an upward movement along the new demand curve DD_1.

The process continues until the shortage is eliminated. At the new equilibrium, price has risen to $0P_1$ and quantity increased to $0Q_1$.

Recap:
Use 3-steps analysis

1. Decide whether demand or supply is affected given the scenario.

2. Decide direction of shift in demand or supply curve and the demand / supply factor causing the change.

3. Explain how the market adjust to new equilibrium price and quantity given shifts in demand and supply curves.

Lecture exercise:
Attempt the exercises in Appendix A on Pg. 28 to analyse the different scenarios of simultaneous changes in demand and supply on equilibrium price and quantity.

Sectional Summary

- Changes in demand and supply would put the market in disequilibrium, and prices adjust to return markets to a state of equilibrium (i.e. market adjustment process).

5. ECONOMIC WELFARE

5.1 Consumers' Surplus

Consumers' surplus is the **difference** between the **maximum amount** that consumers are willing and able to pay for a given quantity of a good and what they **actually pay**. Consumers' surplus is also a measure of consumer welfare. The bigger the surplus, the higher the level of consumer welfare / satisfaction.

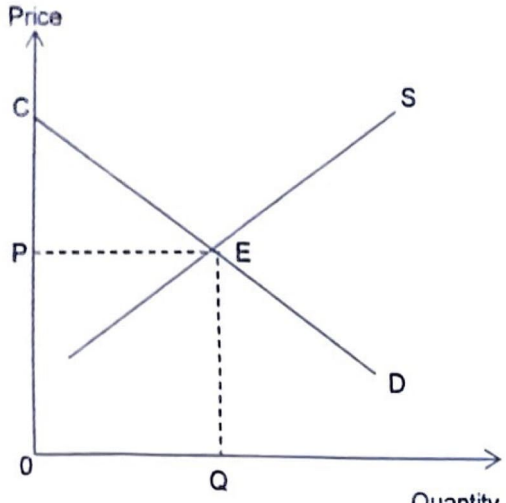


Figure 23

CD represents the DD curve for a particular good. Suppose the market price is 0P and quantity demanded is 0Q.
The total amount that consumers pay for 0Q units
= price x quantity
= 0PEQ

The amount that consumers are willing to pay for 0Q units
= 0CEQ
= the area under the DD curve up to the level of quantity consumed, ie. 0Q
= value of total satisfaction/benefits from consuming 0Q units

Consumer Surplus
= total satisfaction/benefits consumers receive from buying 0Q units – the amount paid for 0Q units
= 0CEQ – 0PEQ
= CPE

5.2 Producers' Surplus

Producers' surplus refers to the **difference** between the **amount received** by producers for selling their good and the **minimum prices** that they are willing and able to accept for supplying additional units of the good.

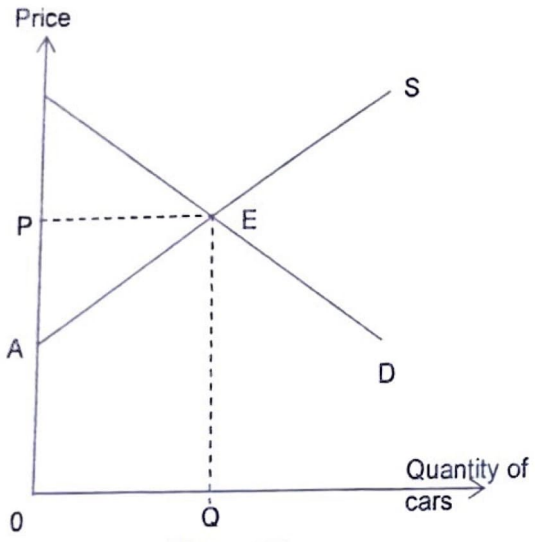


Figure 24

Given the supply curve in the diagram, suppose 0P is the market price and quantity supplied is 0Q.

At 0P, the total amount that the producers actually receive for producing 0Q units
= price x quantity
= 0PEQ

The minimum amount that the producers are willing to accept for 0Q units of the good
= 0AEQ
= the area below the supply curve up to the quantity supplied at 0P, i.e, 0Q.

Producer Surplus
= 0PEQ – 0AEQ
= APE
= area above the supply curve and below the price line up to the last unit produced, ie. 0Q.

5.3 Society's welfare

Society's welfare is the **sum of consumers' and producers' surplus**.

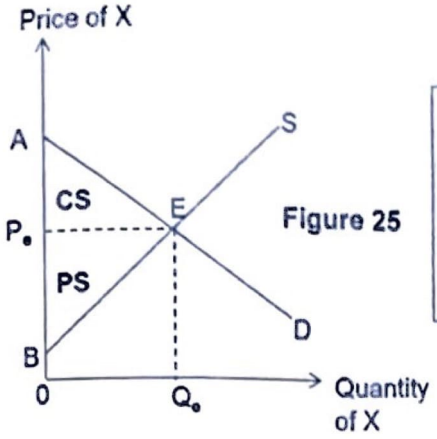


Figure 25

At the equilibrium Q_e,
societal welfare
= Consumer Surplus + Producer Surplus
= $P_eAE + P_eBE$
= ABE

Significance of the concepts of consumers' & producers' surplus

When the sum of consumers' and producers' surpluses is maximised at the market equilibrium point, society will also maximise its total economic welfare and achieve economic efficiency (*to be taught in greater detail in Section 6*).

Free market decisions/actions of firms, households as well as government intervention will cause ***welfare effects*** on society, which can be measured in terms of the gains and losses in the consumers' and producers' surpluses.

6. ROLE OF THE PRICE MECHANISM IN EFFICIENT ALLOCATION OF RESOURCES IN A FREE MARKET

6.1 Functions of the Price Mechanism

The condition of scarcity forces societies to make choices about the resource allocation questions of **what and how much to produce, how to produce and for whom to produce**.

3 main functions of prices in the free market:

- **The signalling (allocative) function**

As signals, prices communicate information to decision-makers. Rising prices give a signal to consumers to cut back on the buying or even withdraw from a market completely. However, the higher price gives a signal to potential producers to enter a market. Resources move or reallocate to different industries due to this signalling function. The signalling function is associated with changes in demand and supply.

- **The rationing (distributive) function**

Prices will ration the good/resource to consumers/producers who are willing and able to pay for it. Whenever there is a shortage, the market price will increase and the effect is to discourage consumption and conserve resources. Consumers or producers who are not willing and/or unable to pay for the good/resource will be rationed out of the market.

- **The incentive function**

An incentive is something that motivates a consumer or producer to change his behaviour. Higher market prices of a good motivate existing producers to increase output due to the possibility of more revenue and higher profits (assuming firms maximise profits) while a fall in price of a good provide an incentive to consumers to increase their quantity of the good demanded as they seek to maximise their utility.

In performing these functions, the price mechanism seeks to address the resource allocation questions of **what and how much to produce**, **how to produce** and **for whom to produce**.

The ***what and how much to produce*** question of resource allocation question is answered when firms produce only those goods consumers are willing and able to buy, while consumers buy only those goods producers are willing and able to supply.

The ***how to produce*** question of resource allocation is answered because for given resource prices, firms will use the best combination of resources to produce a given output at the lowest possible average cost.

As cconsumers' dollar votes determine what is actually produced, it will also determine what consumers can actually buy. Those with more money will be able to consume more of the goods produced and this answers the ***'for whom to produce'*** question of resource allocation under the price mechanism.

6.2 How does the Price Mechanism achieve Economic Efficiency?

Economic efficiency broadly means the best possible use of resources and it exists when **both allocative and productive efficiencies are achieved in an economy**.

6.2.1 Allocative efficiency

Allocative efficiency is the situation in which the society produces and consumes a combination of goods and services that maximises its welfare. It is achieved when goods and services wanted by the economy are produced in the right quantities.

The price mechanism achieves allocative efficiency by clearing shortages or surpluses in markets through **signalling**.

Suppose consumers decide they would like to eat more strawberries because of its health benefits (a change in tastes and preferences), demand for strawberries increases and its demand curve shifts to the right from D_0 to D_1 in Figure 26. At the initial price, $0P_0$, there is a shortage equal to the difference between Q_2 and Q_0 (or AB) as quantity demanded (Q_2) is larger than quantity supplied (Q_0). The price of strawberries therefore begins to rise, which signals to producers that a shortage in the strawberry market had emerged.

Recall: Signalling function of prices

The increase in price is also an incentive for producers to increase the quantity of strawberries supplied. At the higher price, strawberry production is more profitable, so producers move along the supply curve from point A to point C, increasing quantity supplied. But the new, higher price is a disincentive for consumers. It signals that strawberries are now more expensive and, being utility maximisers, they would buy fewer strawberries. They therefore move along the new demand curve from point B to point C, buying fewer strawberries than at the original price $0P_0$. The process of price adjustment will stop when quantity demanded is equal to quantity supplied at the new equilibrium $0P_1$ and $0Q_1$.

Recall: Incentive function of prices

The increase in price of strawberries has resulted in a *reallocation of resources* as indicated by the increase in quantity of strawberries supplied. More resources are now allocated to strawberry production. The market is now in equilibrium again, and allocative efficiency is achieved. This answers the '***what and how much to produce***' question of resource allocation. With the increase in price of strawberries, consumers with more money will be able to consume more of the strawberries produced and this answers the '***for whom to produce***' question of resource allocation.

Recall:
Rationing function of prices

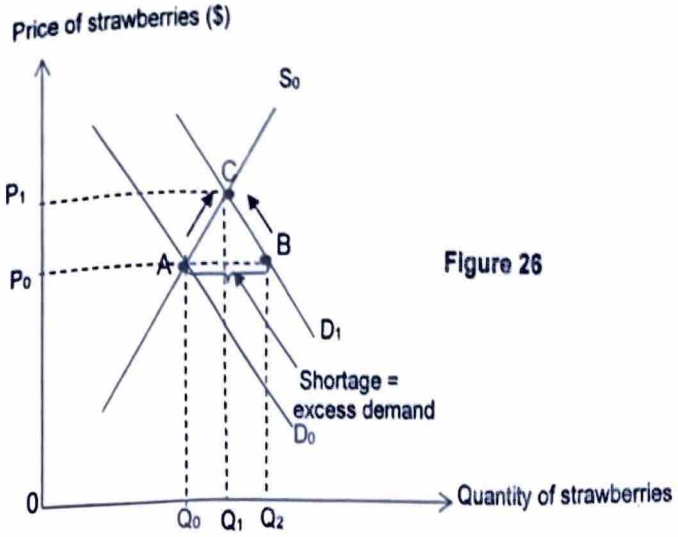


Figure 26

6.2.2 Productive efficiency

Productive efficiency is achieved when all resources are fully and efficiently utilised.

This gives rise to firms using the least cost method of production for a given amount of output. When all industries achieve productive efficiency, the economy will be producing on its production possibility frontier where it is impossible to produce more of one good without producing less of another. The price mechanism allows for productive efficiency to be achieved in competitive markets as the adjustment of factor prices in the factor markets act as a signal and incentive for producers to adjust their production methods in deciding how to produce with the least cost method of production. For example, when capital becomes relatively more expensive, firms can adjust their production methods to replace capital with more labour to reduce their cost of production.

Recall:
Incentive function of prices

6.3 How desirable is the free market equilibrium?

The success of the competitive market in achieving allocative and productive efficiency seems to suggest that there should not be government intervention in markets, as the price mechanism works very well on its own. However, there are two important issues that arise.

The first is that efficiency can only be achieved under a number of very strict conditions that are unlikely/difficult to be met in the real world, for instance, perfectly competitive markets, absence of externalities and public goods. In the real world, markets may fail with respect to achieving both allocative and productive efficiency. Market failure is thus often an important justification for government intervention.

Note:
Different sources of market failure will be taught in detail under 'Microeconomic Objectives and Policies'.

The second is that the competitive market is unable to provide a satisfactory answer to the '*for whom to produce*' question. This is because those with more dollar votes will be able to consume more of the goods produced, resulting in unfair distribution of goods

with the wealthy consuming a disproportionately large share of what is produced. This thus invites some government intervention due to the problem of inequity.

Sectional Summary

- The price mechanism achieves allocative efficiency by clearing shortages or surpluses in markets through signalling.
- The price mechanism allows for productive efficiency to be achieved in competitive markets as the adjustment of factor prices in the factor markets act as a signal and incentive for producers to adjust their production methods.

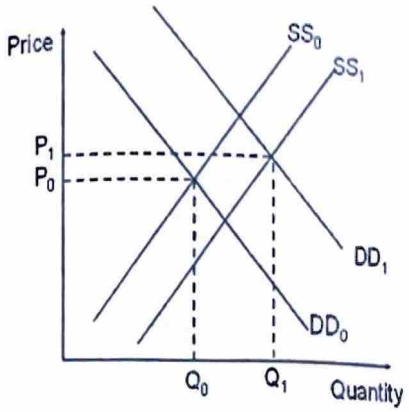
Appendix A

Self - directed learning: *Draw diagrams for the 2 cases in each of the 4 scenarios (a to d) below and arrive at conclusions on the impact of the shifts in demand and supply on equilibrium price and quantity.*

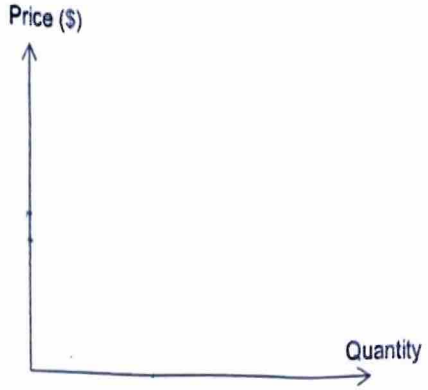
a. Increases in Both Demand and Supply

In a situation of rising incomes (demand increases) and increases in productivity (supply increases) the **effect on market equilibrium price is indeterminate**. In the diagram below, although the new equilibrium point will be to the right of E, the new price could be **above or below** P_0, depending on the **relative shifts** of the demand and supply curves.

Case 1: ↑DD > ↑SS
Price: Increases
Quantity: Increases



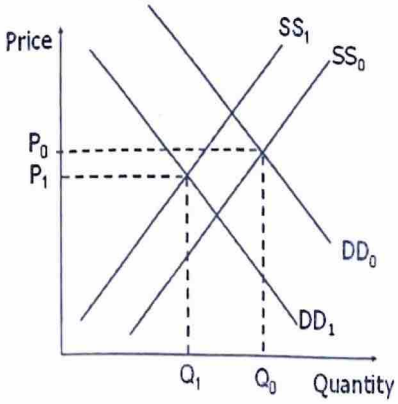
Case 2: ↑DD < ↑SS
Price: Decreases
Quantity: Increases



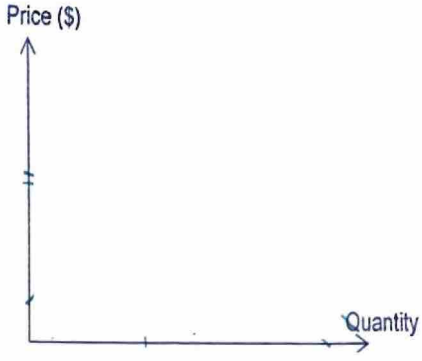
b. Decreases in both Demand and Supply

A situation of falling demand which result in a leftward shift of the demand curve, coupled with rising business costs leading to a decrease in supply. The combination of leftward shifts in both the demand and supply curves will cause the quantity exchanged in the market to decline. However, the **effect of this on the equilibrium price is indeterminate**, depending on the **relative shifts** of the demand and supply curves.

Case 1: ↓DD > ↓SS
Price: Decreases
Quantity: Decreases



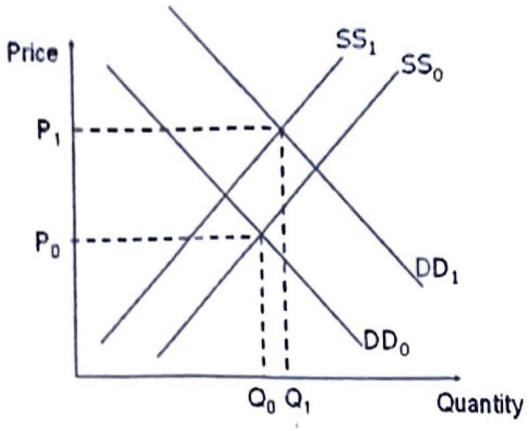
Case 2: ↓DD < ↓SS
Price: Increases
Quantity: Decreases



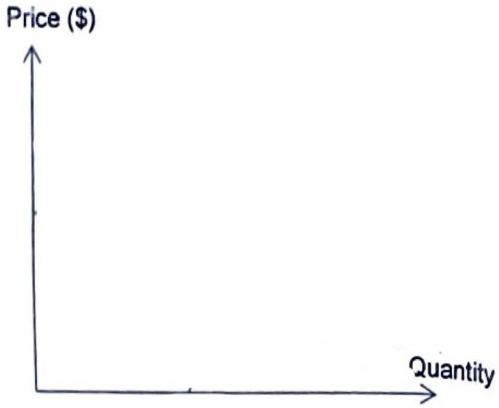
c. An Increase in Demand coupled with a Decrease in Supply

This will cause the equilibrium price to rise. These changes reinforce each other, leading to a higher price. However, the increase in demand due to rising incomes, while the decrease in supply due to increasing cost of production result in the **equilibrium quantity** to be **indeterminate.** It depends on the relative magnitude of the two changes.

Case 1: ↑DD > ↓SS
Price: Increases
Quantity: Increases



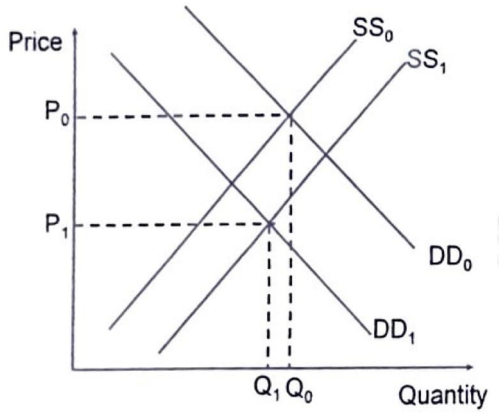
Case 2: ↑DD < ↓SS
Price: Increases
Quantity: Decreases



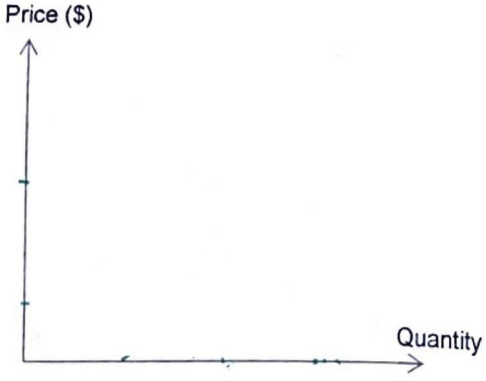
d. A Decrease in Demand coupled with an Increase in Supply

A decrease in demand coupled with an increase in supply will both cause equilibrium price to fall. However, the **effect on the equilibrium quantity exchanged** in the market **is indeterminate.** It depends on the relative magnitude of the two changes.

Case 1: ↓DD > SS↑
Price: Decreases
Quantity: Decreases



Case 2: ↓DD < ↓SS↑
Price: Decreases
Quantity: Increases

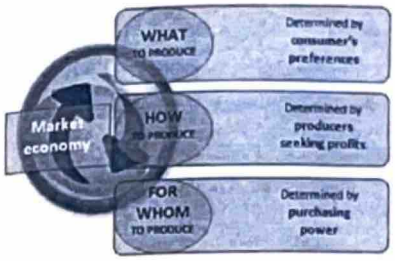


Appendix B – *Economic Systems*

There are two basic solutions to the economic problem as described by Paul Samuelson, namely free markets and central panning.

Free market economies

Markets enable mutually beneficial exchange between producers and consumers, and systems that rely on markets to solve the economic problem are called market economies. In a free market economy, resources are allocated through the interaction of free and self-directed market forces. This means that what to produce is determined consumers, how to produce is determined by producers, and who gets the products depends upon the purchasing power of consumers. Market economies work by allowing the direct interaction of consumers and producers who are pursuing their own self-interest. The pursuit of self-interest is at the heart of free market economics.

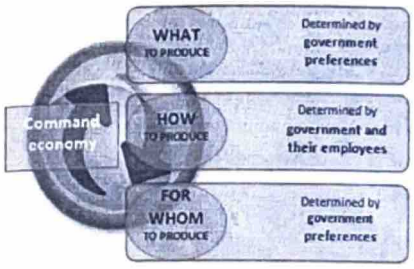


Command economies

The second solution to the economic problem is the allocation of scarce resources by government, or an agency appointed by the government. This method is referred to as central planning, and economies that exclusively use central planning are called command economies. In other words governments direct or command resources to be used in particular ways. For example, governments can force citizens to pay taxes and decide how many roads or hospitals are built.

However examples of full command economies no longer exist – China in the 1970s, and the USSR can be considered command economies.

Command economies have certain advantages over free market economies, especially in terms of the coordination of scarce resources at times of crisis, such as a war or following a natural disaster. Free markets also fail at times to allocate resources efficiently, so remedies often involve the allocation of resources by government to compensate for these failures.



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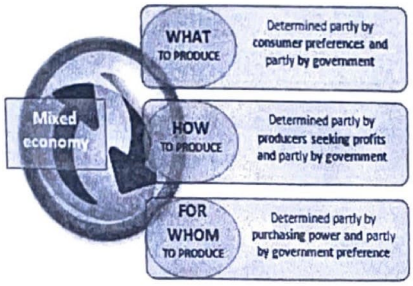
remedies often involve the allocation of resources by government to compensate for these failures.

Mixed economies

There is a third type of economy involving a combination of market forces and central planning, called mixed economies.

Mixed economies may have a distinct private sector, where resources are allocated primarily by market forces, such as the grocery sector of the UK economy. Mixed economies may also have a distinct public sector, where resources are allocated mainly by government, such as defence, police, and fire services. In many sectors, resources are allocated by a combination of markets and panning, such as healthcare and, which have both public and private provision.



In reality, all economies are mixed, though there are wide variations in the amount of mix and the balance between public and private sectors. The key differentiation is the level of government intervention in the economy, and this exists on a spectrum. For example, in Cuba the government allocates the vast majority of resources, while in Europe most economies have an even mix between markets and planning. Economic systems can be evaluated in terms of how efficient they are in achieving economic objectives.

Reference
Economic Systems. (n.d). Retrieved January 25, 2016, from Economics Online: http://www.economicsonline.co.uk/Competitive_markets/Economic