

SECTION

5

SUPPLY



FIRMS' INNOVATIVE DECISION-MAKING

Supply of Goods and Services

INTRODUCTION

In section 5 you will explore the concept of supply in Economics. In Section 2, you learned about the roles of sellers and buyers in the market. Sellers offer goods for sale, and buyers purchase those goods. Sellers obtain their goods from producers and sell them to buyers, often referred to as consumers. This behaviour of sellers and buyers will help you understand the concept of supply.

Sellers aim to make a profit, while consumers seek satisfaction. Sellers aim to sell more goods and services when prices are high and less when prices are low. For example, sellers of popular products like mobile phones are eager to sell more when prices are high but are less motivated to offer more for sale when prices are low.

In this section, you will learn about the meaning, types, and the law of supply.

At the end of this section, you will be able to:

- Describe supply and identify the types of supply.
- State the law of supply

KEY IDEAS

- Supply refers to the quantity of goods and services that sellers are willing to offer to consumers at different prices over a specific period.
- There are four types of supply: derived, joint, competitive, and complementary.
- The law of supply states that 'all things being equal, an increase in the price of goods and services will increase the quantity supplied while a decrease in the price will lead to a decrease in the quantity supplied'.
- The relationship between prices and quantities supplied can be illustrated using a supply schedule, supply curve, and supply function.

THE MEANING OF SUPPLY

Supply refers to the total amount of a good or service that a producer is willing and able to offer for sale at a particular price over a specific period. Sellers want to maximise profit, so they supply more goods to the market when the price is high but supply less when the price of the goods is lower.

This example shows how price can be related to supply.

A bakery shop supplies loaves of bread to a community. Over several weeks the price of a loaf changes. At the lowest price the bakery supplies 10 loaves yet at the highest they supply 50. In this way they are maximising their profit by supplying more loaves when the price is high. The change in supply in relation to price is shown in the table below.

Table 5.1 Change in supply in relation to price

PRICES OF LOAVES OF BREAD (Gh¢)	QUANTITY SUPPLIED
10	50
8	40
6	30
4	20
2	10

Activity 5.1

These activities will need the permission of the sellers beforehand. Take along a friend and explain to sellers you are doing a project about supply in Economics and are collecting information. Be polite and remember to say thank you, even if sellers turn you away.

- 1.** Visit your school canteen, local market or shop. Make a note of the prices of three to five common goods – toothpaste, soap, bottle of water for example.
- 2.** Pick some questions and things to investigate from the ones below or make up your own. Make a note of the answers.
 - a.** Politely ask sellers about the goods you have chosen. Questions could include:
 - i.** *How do you decide on the prices?*
 - ii.** *What factors influence your decision to sell more or less of a product?*
 - b.** Check for Promotions: Look for any discounts, special offers, or promotions.
 - i.** *Ask sellers how often they run promotions and why.*

- c. Compare Different Sellers:
 - i. *Compare how different sellers price similar goods.*
 - ii. *Observe if there are any differences in the quality or quantity of products offered.*
- d. Understand Supply Sources:
 - i. *Ask sellers where they get their products from.*
 - ii. *Ask if they produce the goods themselves or buy from other sellers.*
- 3. Write up your findings and decide whether sellers offer higher quantities at higher prices and lower quantities at lower prices.
- 4. Share your findings with a friend.

Activity 5.2

Barbara set up a stand in the school to sell ice-cream by the cup. She sold each cup for Gh¢3. The quantity produced was 20 cups and all were sold during the first break time. At lunchtime, she arrived back to the stand with more ice-cream and sold a further 40 cups for the same price Gh¢3. She sold all the cups by the end of lunchtime.

1. How many cups were sold within the first break?
2. What is the total number of cups of ice cream sold for the day?
3. What motivated Barbara to sell more ice-cream at lunchtime?
4. How does Barbara's ice-cream stand relate to the law of supply?
5. Share your answers with your friend.

TYPES OF SUPPLY

In this section you will learn about four types of supply. There are different types of supply because the nature of goods and services, market conditions, and production processes vary widely.

Joint Supply

This type of supply occurs when the production of one good also results in the production of another as a by-product. For example, the supply of palm oil results in the supply of palm kernel as a by-product. The supply of beef leads to the supply of products like hides, tallow (fat) and bones.

Could you list other examples of goods which are jointly supplied and share them with your friends?



Fig 5.1 Joint Supply

Complementary Supply

This type of supply involves goods that are used together to satisfy a particular need. For example, a computer and its software are complementary supplies because although they can be bought separately, they complement each other when used together. A printer and an ink cartridge are also an example of goods that show complementary supply. They also complement each other when used together.

Can you think of any other goods that have complementary supply?



Fig 14.3 Complementary Supply

Competitive Supply

Competitive supply refers to goods that can be produced using the same resources. For example, a farmer can use a piece of land to grow either wheat or corn. The farmer decides which crop he will grow on the piece of land. Both cannot be grown at the same time. The supply of the crop he has chosen to grow increases. Factories making

clothes can switch from making cotton shirts to woollen jumpers, this will result in more supply of shirts and less supply of jumpers.

Can you think of any other examples? Discuss them with a friend.

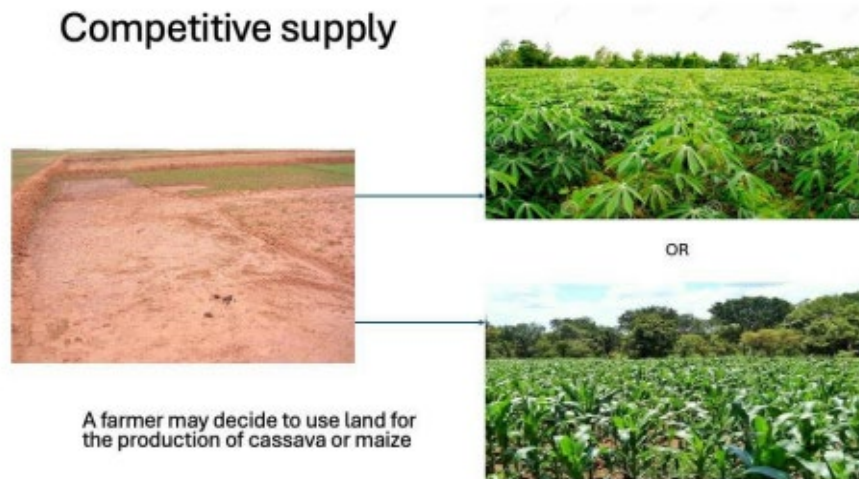


Figure 5.2 Competitive Supply

Derived Supply

This is where the supply of a good or service depends on or is derived from the supply of other related goods. The supply of cocoa beans is driven by the need to produce chocolate and other cocoa products. A good supply of cocoa beans can lead to more production of cocoa products like chocolate, so their supply increases. The manufacture of automobiles leads to an increase in the need for parts like tyres and batteries. Automobiles are the main product so when manufacturers increase production the supply of these parts increases.

Can you search the Internet for other examples?



Figure 5.3 Derived Supply

Activity 5.3

Consider the following scenarios and use them to answer the questions on different types of supply.

1. Uncle Joseph has a piece of land where he can choose to grow yams or potatoes. The price of yams is much higher than potatoes in the market, so he chooses to grow yams not potatoes.
 - Explain how this shows competitive supply.
2. Auntie Martha runs a kenkey factory using maize. Uncle Joseph grows maize on his farm and supplies her with the maize to make the kenkey.
 - How does this example show derived supply?
3. Samuel owns a small farm in Ghana where he grows maize and sells it to the market. He buys maize seed and fertiliser from two different suppliers. He plants the seed and then adds fertiliser, which is essential to help it grow better.
 - Explain how Samuel's farming activities show complementary supply.
4. Kwame has some cows on his farm which produce fresh milk to sell at the local market. He also sells some of the milk to a business that makes dairy products like cheese, butter and cream.
 - Explain how this example shows joint supply.

These are examples of products supplied in Ghana and sold internationally.

1. Ghana is one of the world's leading producers of cocoa beans. The supply of cocoa from Ghana is sold on international markets at different prices over time.
2. Ghana is a producer of gold. Much of the supply of gold from Ghana is sold to international buyers.
3. Ghana produces various agricultural products, including palm oil, shea butter, yams and vegetables. The supply of these products is sold on home and export markets.
4. The electricity supply in Ghana is produced by national companies for use by homes and industry.
5. The textile and garment industry in Ghana produces a range of clothing items. The supply of textiles and garments is sold on home and export markets.

Activity 5.4

1. Consider the Jubilee Oil field operated by Kosmos Energy, located in the Western Region, which is rich in hydrocarbon reserves. The extraction process yields both crude oil and natural gas as a by-product. Discuss with a friend what type of supply this is and explain your reasons.
2. In Ejura, in the Ashanti Region of Ghana, cattle raising on farms is an important activity. The main focus of this ranch is to raise cattle for the dual purposes of meat and leather. Discuss with a friend what type of supply this is and explain your reasons.

THE LAW OF SUPPLY

The rational behaviour of the producer or the supplier will be to supply more of a product when its price is high to make more profit. And when prices fall, they make less profit so supply less. This is the law of supply which states that *all other factors being equal (Ceteris Paribus), as the price of a good or service increases, the quantity of that good or service that suppliers are willing to offer also increases. Conversely, as the price decreases, the quantity supplied decreases.*

The relationship between the price of a commodity and the quantities that suppliers are willing to supply is positive because as one variable increases, so does the other and as one decreases, so does the other. In the real world this means that as price increases, so does quantity supplied and as price decreases so does quantity supplied.

The Supply Schedule

The relationship between the quantity supplied and the price of a commodity can be put in a table form. This is known as the supply schedule. An example is shown in the table below which shows the price of exercise books over time and the quantity sellers are willing to supply.

Table 5.2: Supply schedule

PRICE PER EXERCISE BOOK (Gh¢)	QUANTITY SOLD PER WEEK
15	30
12	25
10	20
8	15
5	10
3	5

Table 5.2 shows that when the price per exercise book was Gh¢ 15, the quantity supplied was 30 exercise books. At the lowest price, Gh¢ 3, the quantity supplied was 5 exercise books. This confirms the law of supply because at a higher price the quantity supplied is more than at the lower price.

Definition: A supply schedule is a table that shows the relationship between price and quantity supplied, usually over a given period.

Supply Curve

A supply curve is a graph that shows the relationship between the price of a good or service and the quantities supplied within a given period.

The data from figure 5.4 can be used to draw a supply curve.

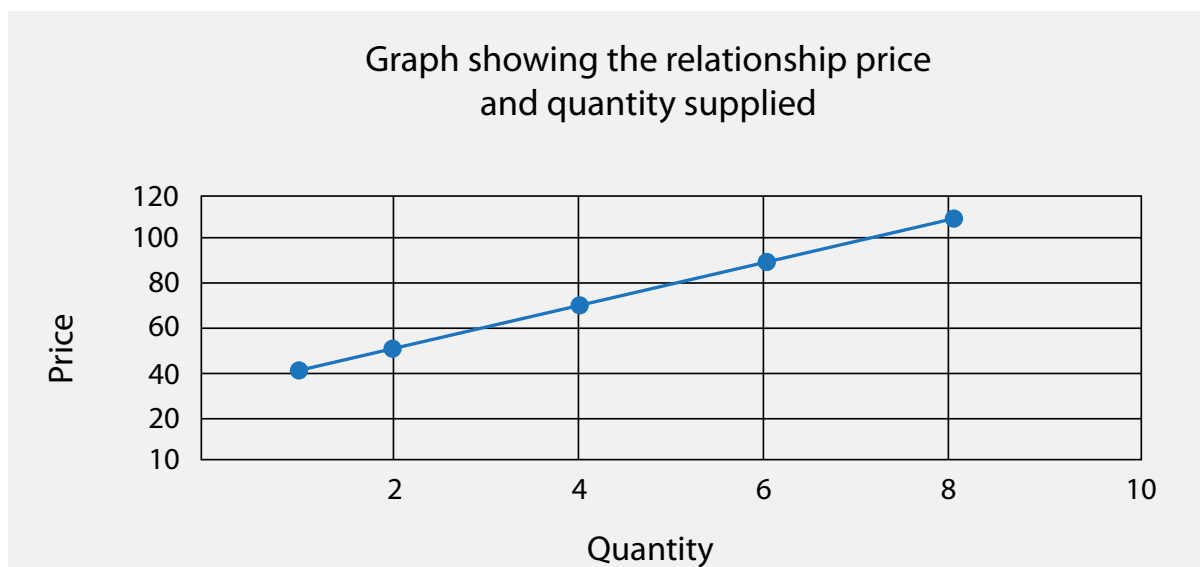


Figure 5.4 Supply curve. The curve is a visual representation of the positive relationship between price and quantity supplied over time.

Supply Function

This is a mathematical expression that shows the relationship between the price of a good or service and the quantity that producers are willing and able to supply. A simple supply function is linear (straight line) and is given as $Q_s = a + bP$

'Qs' represents the quantity supplied of a particular commodity, for example, the number of loaves of bread.

'P' represents price of the commodity.

(in the supply function a and b are constant)

For example, a seller's supply function for bread can be given as $Q_s = 15 + 5/2P$.

When price is Gh¢ 6 substitute this into the expression:

$$Q_s = 15 + 5/2(6)$$

So, the quantity supplied (Q_s) in this case would be = 30 loaves of bread

When price is Gh¢ 10 substitute this into the expression:

$$Q_s = 15 + 5/2(10)$$

So, the quantity supplied (Q_s) in this case would be = 40 loaves of bread

If you are wondering what use the supply function is then the answer is very valuable – to suppliers! They can use it to calculate the quantity of a good they need to supply when the market price is high or low. They can also use it to set prices that helps them make the most profit.

The Law of Supply assumes that all other factors that could influence supply, such as technology, input prices, taxes, subsidies and expectations, remain constant – this is referred to as *Ceteris Paribus*, which is Latin. In reality this is not the case but for Economics it helps to explain the behaviour of producers in response to price changes, understanding changes in supply and the interaction between producers and consumers in the market.

Considering time is important for the Law of Supply. The Law of Supply is more relevant in the short run because producers can quickly adjust their production levels in response to price changes. In the long run, factors like technology and production capacity also influence supply decisions.

Examples of how Ghanaian producers respond to changes in prices and demand by adjusting their supply levels.

- **Cocoa:** Ghanaian farmers increase cocoa production when international prices rise, boosting global supply and the money Ghana makes from selling it to other countries.
- **Oil:** Ghanaian oil companies increase production when global oil prices rise and reduce it when prices fall.
- **Shea Butter:** Producers expand operations to meet rising international demand for shea butter.
- **Gold:** Gold mining companies increase mining activities when gold prices rise to supply more to the global market.
- **Poultry:** Poultry farmers increase production of chickens and eggs to meet higher domestic demand.

Activity 5.5

1. Explain the law of supply.
2. Complete the following tasks 'a' to 'c'. Use a pencil and ruler to draw your supply schedule and graph. Make sure you label the axes and give your graph a title.
 - a. A commodity has a supply function of $Q_s = 20 + 1/2P$. The lowest price (P) of this commodity is Gh¢20 which gives a quantity supplied (Q_s) of 30. Increase the price by Gh¢20 five times and calculate the quantities supplied at each price.

Draw a supply schedule showing the prices and quantities you have calculated for this commodity.

- b. From your **supply schedule**, plot the supply curve using a graph sheet where the y-axis (vertical) represents the price, and the x-axis (horizontal) represents the quantity supplied.
 - c. Use your schedule and curve to explain the law of supply.
3. Explain the value of the supply function to producers.

REVIEW QUESTIONS ON SUPPLY

1. Explain what is meant by supply.
2. Read the following sentences carefully. Each one is a type of supply.
 - When cows are raised for beef, their hides can also be used to produce leather.
 - The supply of cocoa beans results from the need to produce chocolate.
 - A car manufacturer can produce either electric cars or petrol cars. More production of electric cars means fewer petrol cars are produced.
 - Printers and ink cartridges are used together. Printers need ink cartridges.
 - Extracting crude oil often results in the production of natural gas as a by-product.
 - A farmer can only use the same land to grow either wheat or barley but not at the same time.

Increasing the supply of one crop reduces the supply of the other.

- Cars and petrol are used together. Cars will not run without petrol.
- The supply of cotton comes from the need to produce textiles and clothing.

Copy the table below and place the statements above in the correct column.

Joint Supply	Derived Supply	Complementary Supply	Competitive Supply

3. Joeboy is a supplier of sandals for children. In January 2022, he offered 50 pairs of sandals to buyers when the price was Gh¢25. He sold all the pairs and used the money to buy more from his supplier. In March 2022, he offered 70 pairs to buyers at a price of Gh¢30 and all were sold. Following his business success he bought more sandals and sold 100 pairs at a price of Gh¢35, 120 pairs at a price of Gh¢40 and 150 pairs at a price of Gh¢50 in June, September and December 2022 respectively.
 - a. Prepare Joeboy's supply schedule for the year 2022.
 - b. Use the supply schedule to plot a supply curve for the sandals.
 - c. Use Joeboy's supply schedule and curve to explain the law of supply.

- 4.** A supply function for a commodity is $Q_s = 30 + 10P$
- a.** Prepare a supply schedule for this function when the quantity supplied is 40 units, 50 units, 70 units, 90 units and 110 unit

You must first calculate the various prices using the quantity supplied in the supply function.

You will have to apply the rules of algebra to work out what P is for each quantity.

- b.** From your supply schedule, plot the supply curve using a graph sheet where the y-axis represents the price, and the x-axis represents the quantity supplied.
- 5.** Explain using examples how producers of goods in Ghana respond to changes in prices and demand by adjusting their supply levels.

ANSWERS TO REVIEW QUESTIONS

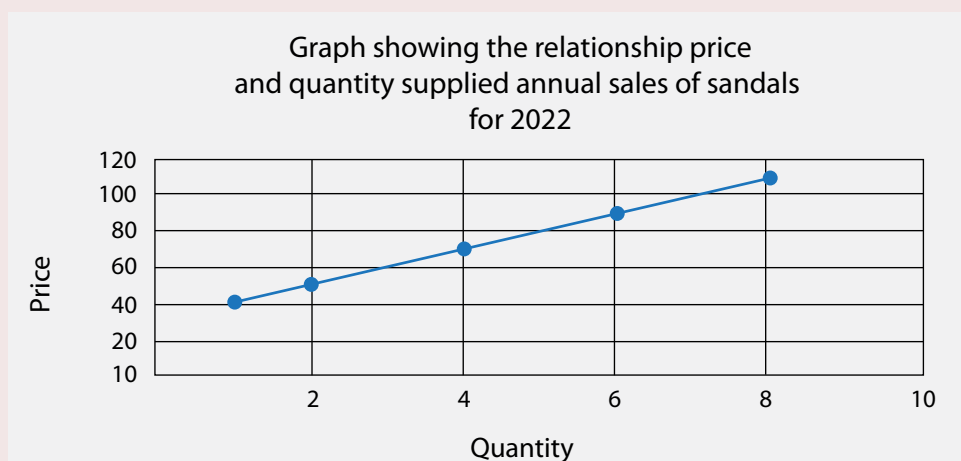
- Supply refers to the total amount of a good or service that producers are willing and able to sell at various prices over a given period. It represents the relationship between the price of a good or service and the quantity that producers are prepared to offer in the market.
-

Joint Supply	Derived Supply	Complementary Supply	Competitive Supply
When cows are raised for beef, their hides can also be used to produce leather.	The supply of cocoa beans results from the need to produce chocolate.	Printers and ink cartridges are used together. Printers need ink cartridges.	A farmer can only use the same land to grow either wheat or barley but not at the same time. Increasing the supply of one reduces the supply of the other.
Extracting crude oil often results in the production of natural gas as a by-product	The supply of cotton comes from the need to produce textiles and clothing.	Cars and petrol are used together. Cars will not run without petrol.	A car manufacturer can produce either electric cars or petrol cars. More production of electric cars means fewer petrol cars are produced.

- a. Supply schedule for Joeboy in 2022

Price Gh¢	Quantity supplied (pairs of sandals)
50	150
40	120
35	100
30	70
25	50

b. Supply curve for Joeboy's sandals over 2022



- c.** Joeboy's supply curve shows he is motivated by profit. The sandals sell well so he increases the price and the supply over the months in 2022. The graph shows a positive relationship, and this aligns with the law of supply which states as the price of a good or service increases, the quantity of that good or service that suppliers are willing to offer also increases.

4.

- a.** Supply function is $Q_s = 30 + 10P$

Using the quantity supplied to calculate for the various price

When $Q_s = 40$ units,

$$40 = 30 + 10P, 40 - 30 = 10P, 10 = 10P, P = \text{Gh}\text{¢}1$$

When $Q_s = 50$ units,

$$50 = 30 + 10P, 50 - 30 = 10P, 20 = 10P, P = \text{Gh}\text{¢}2$$

When $Q_s = 70$ units,

$$70 = 30 + 10P, 70 - 30 = 10P, 40 = 10P, P = \text{Gh}\text{¢}4$$

When $Q_s = 90$ units,

$$90 = 30 + 10P, 90 - 30 = 10P, 60 = 10P, P = \text{Gh}\text{¢}6$$

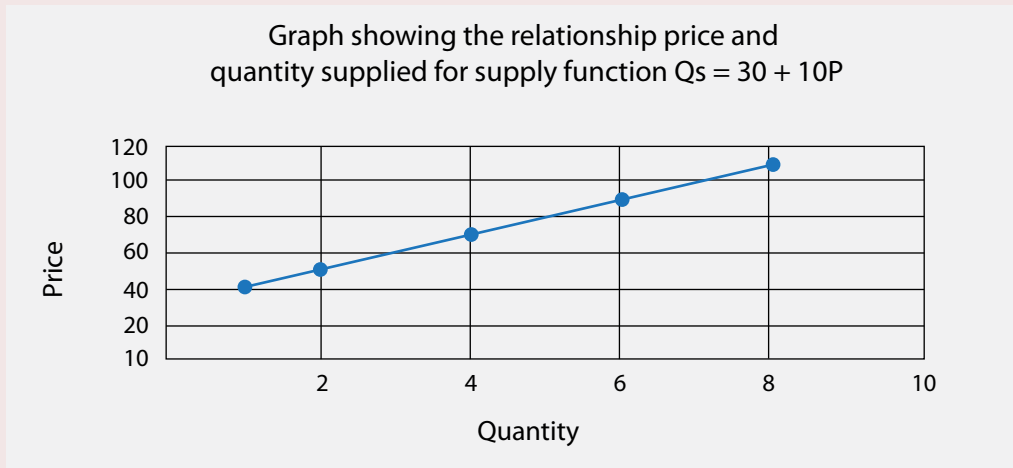
When $Q_s = 110$ units,

$$110 = 30 + 10P, 110 - 30 = 10P, 80 = 10P, P = \text{Gh}\text{¢}8$$

Therefore, the supply schedule for is as follows.

Price (Gh¢)	Quantity supplied
8	110
6	90
4	70
2	50
1	40

b. Supply curve for the schedule in 4a.



5.

- **Cocoa:** Ghanaian farmers increase cocoa production when international prices rise, boosting global supply and the money Ghana makes from selling it to other countries.
- **Oil:** Ghanaian oil companies increase production when global oil prices rise and reduce it when prices fall.
- **Shea Butter:** Producers expand operations to meet rising international demand for shea butter.
- **Gold:** Gold mining companies increase mining activities when gold prices rise to supply more to the global market.
- **Poultry:** Poultry farmers increase production of chickens and eggs to meet higher domestic demand.

EXTENDED READING

Follow the links below to learn more about supply

- Supply ([investopedia.com](https://www.investopedia.com))
- Law of Supply Explained, With the Curve, Types, and Examples ([investopedia.com](https://www.investopedia.com))
- Law of Supply & Types of Supply ([youtube.com](https://www.youtube.com))

GLOSSARY

- **Graph:** A visual representation of the relationship between two or more variables on an x and y-axis. X = horizontal axis, Y = vertical axis.
- **Slope of supply:** This represents the change that occurs in quantity supplied when price changes by one unit.
- **Commodities:** A basic raw material or good that is available and can be exchanged with other goods.
- **By-product:** An output that results from the production of a main product or service.

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