## 1. Details of Module and its structure

| Module Detail | |
|---|---|
| Subject Name | Economics |
| Course Name | Economics 03 (Class XII, Semester - 1) |
| Module Name/Title | Equilibrium, Excess Demand and Excess Supply: Part – 1 |
| Module Id | leec_10501 |
| Pre-requisites | Knowledge about Basic Economic Principles |
| Objectives | After going through this lesson, the learners will be able to understand the following:<br>• Concept of Equilibrium<br>• Movement of demand and supply curve<br>• Changes in equilibrium price and quantity |
| Keywords | Price Ceiling, Price Floor, Equilibrium, Equilibrium Price, Equilibrium quantity |

## 2. Development Team

| Role | Name | Affiliation |
|---|---|---|
| National MOOC Coordinator (NMC) | Prof. Amarendra P. Behera | CIET, NCERT, New Delhi |
| Program Coordinator | Dr. Rejaul Karim Barbhuiya | CIET, NCERT, New Delhi |
| Course Coordinator (CC) / PI | Dr. Jaya Singh | DESS, NCERT, New Delhi |
| Course Co-Coordinator | Ms. Anjali Khurana | CIET, NCERT, New Delhi |
| Subject Matter Expert (SME) | Mr. Rajeev Sharma | AVB, Patparganj, Delhi |
| Review Team | Ms. Meeta Kumar<br><br>Dr. Shalini Saksena<br><br>Dr. Bharat Bhushan | Miranda House, Delhi University<br>Delhi College of Arts & Commerce, University of Delhi<br>Shyamlal College, University of Delhi |

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3. Summary

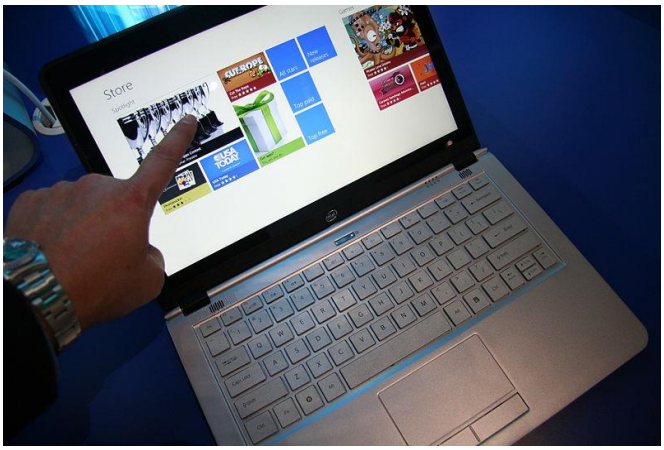

Earlier modules have discussed how consumers decide the quantity of a good they will purchase at a particular price. The quantity that consumers will purchase at a various prices is depicted through a demand schedule or a demand curve. Similarly, we have also discussed how firms decide the quantity that they sell at a particular price. The quantity that firms will sell at a various prices is depicted through a supply schedule or a supply curve. Some important questions that arise are:

How do firms know how much consumers want to buy?
How do buyers know how much the sellers are willing to sell?
What is the quantity that will be actually bought and sold in the market?
These are questions that we will attempt to answer in this module.

**The Market:** A market is a mechanism through which buyers and sellers interact.

https://commons.wikimedia.org/wiki/File:Chandni_Chowk,_2008_(19).JPG

It is common to think of markets as a cluster of shops selling various goods. But a market does not have to be a physical space.




https://commons.wikimedia.org/wiki/File:Online_Shopping_with_Touchscreen_Ultrabook.jpg

If buyers and sellers interact 'virtually' (e.g., online shopping), that is still a market. All buyers and sellers of a particular commodity together constitute the market for that commodity. The number of buyers and sellers in the market determines the 'structure' of the market. One 'structure' of a market we have already studied is Perfect Competition, in which there are many buyers and many sellers, and everybody is a price taker. We shall study more about market structures in later modules.

1. **How markets work.**

Consider the market for sugar. The table on your screen depicts the quantities of sugar demanded and supplied in a market every day.

**Market Demand and Supply Schedule of Sugar**

| **A** | **B** | **C** | **D** | **E** |
|---|---|---|---|---|
| **Price (Rs.)** | **Market Demand (Kg/day)** | **Market Supply (Kg/day)** | **Demand – Supply (Kg/day)** | **Excess demand/supply** |
| 20 | 1000 | 200 | 800 | Excess Demand |
| 40 | 800 | 400 | 400 | Excess Demand |
| **60** | **600** | **600** | **0** | **Equilibrium** |
| 80 | 400 | 800 | -400 | Excess Supply |
| 100 | 200 | 1000 | -800 | Excess Supply |

The first row of the table shows that when the price of the sugar is Rs. 20, market demand for sugar is 1000 Kg/day and the supply is 200 kg/day. Demand is more than supply at this price, and this is called 'excess demand'. In such a situation, consumers are likely to offer to pay a higher price for

the available quantity of sugar. Sellers will also want to sell to whoever is willing to pay the most. As a result, the price of sugar begins to increase.

Suppose the market price rises to Rs.100. The last row of the table shows how at this price, the quantity demanded is 200 kg/day, but the quantity supplied is now 1000 kg/day. Supply now exceeds demand, and we have a situation of excess supply. Sellers will find that they have unsold stocks. They begin to reduce prices in a bid to clear these excess stocks. Eventually the price will settle at Rs.60. At this price, consumers want to purchase 600 kg/day of sugar, which is exactly the quantity that the sellers want to sell. The plans of sellers and buyers match! Demand equals supply. This is called equilibrium**.**

**Equilibrium:** A market is said to be in equilibrium if there is no tendency for the price prevailing in the market, and the quantity bought and sold at that price, to change. This happens when market demand equals market supply.

**Equilibrium Price:** Equilibrium price is the price at which the quantity demanded exactly equals the quantity supplied. This price remains unchanged as long as there is no change in any of the variables affecting demand and supply.

**Equilibrium quantity:** The quantity of the commodity which is bought and sold at the equilibrium price is called equilibrium quantity. The table can be represented diagrammatically as in Figure 1:

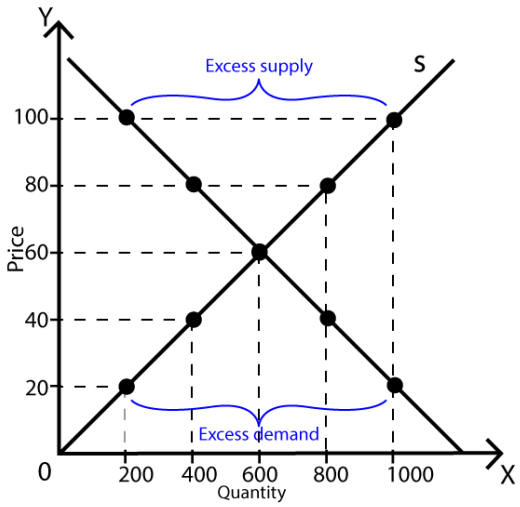



Figure 1: Excess Demand And Excess Supply

In this diagram, DD represents the demand curve and SS represents the supply curve. Market equilibrium occurs where the demand curve intersects the supply curve (at point E). E is described

by the price-quantity combination (Rs.60, 600 kg/day). At any price above Rs. 60, we have a situation of excess supply. At any price below Rs.60, we have a situation of excess demand.

It is important to understand the ROLE OF MARKET PRICES in achieving equilibrium in the market. If there is excess demand in the market, some consumers are not getting what they want to buy. The increase in price acts like a signal to sellers to raise the quantity supplied. It also acts as a signal to consumers to lower the quantity demanded. Conversely, if there is excess supply in the market, a decrease in prices signals to the producers to lower the quantity supplied. It signals the consumer to raise the quantity demanded. So sellers and buyers don't need to know each others' plans regarding how much to sell and buy. They only need to respond to price signals.

**(i) Effects of Change in demand (Shift in demand curve)**

**(ii) Effects of Change in Supply (Shift in supply curve)**

Recall that an individual's demand curve is drawn assuming that "other things remain the same" i.e., the income of the consumer, prices of other commoditites, and the consumer's preferences remain unchanged. If any of these factors change, the consumer's demand curve shifts. A shift in the individual consumer's demand curve will cause the market demand curve to shift correspondingly. Similarly, the supply curve is also drawn up assuming that "other things remain the same" i.e., technology, prices of factors of production etc. remain unchanged. If any of these factors change, the firm's supply curve shifts. A shift in the individual firm's supply curve will cause the market supply curve to shift correspondingly. In this section we explore the impact of shifts in the demand and supply curves on the market equilibrium.

## 1. Effect of shift of demand curve (increase in demand)

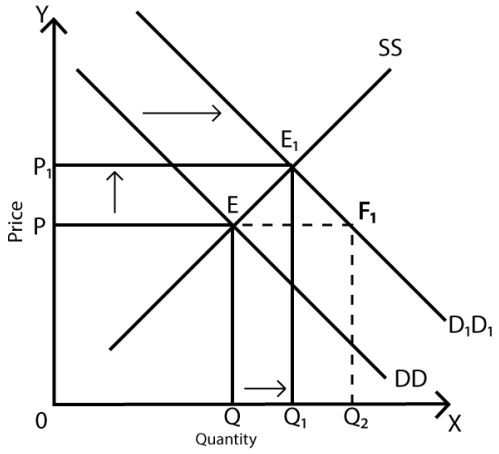



Fig-2: Effect of shift of demand curve (increase in demand)

We start with the demand curve DD and supply curve SS. DD and SS intersect at point E. The equilibrium price is OP and equilibrium quantity is OQ. Suppose incomes of consumers increase. This 'increases' the demand, and the demand curve shifts from DD to $D_1D_1$. At the price OP, the demand is now $OQ_2$. The supply has not changed, so supply remains OQ. This leads to an excess demand equal to $QQ_2$ at the given price OP. Because of this excess demand, price of the commodity rises. As price rises, law of demand comes in to effect and quantity demanded starts falling along $D_1D_1$. As price rises, law of supply also comes in to effect and quantity supplied starts rising (along SS) These changes continue till quantity demanded and quantity supplied are equal at points $E_1$. Notice that $E_1$ is the intersection of the supply curve SS, with the new demand curve $D_1D_1$ . Equilibrium price rises from OP to $OP_1$ and equilibrium quantity rises from OQ to $OQ_1$.

Thus, when demand curve shifts rightward (i.e. when demand for a commodity increases while supply remains constant), equilibrium price and quantity both increase.

**2. Effect of leftward shift of demand curve (decrease in demand)**

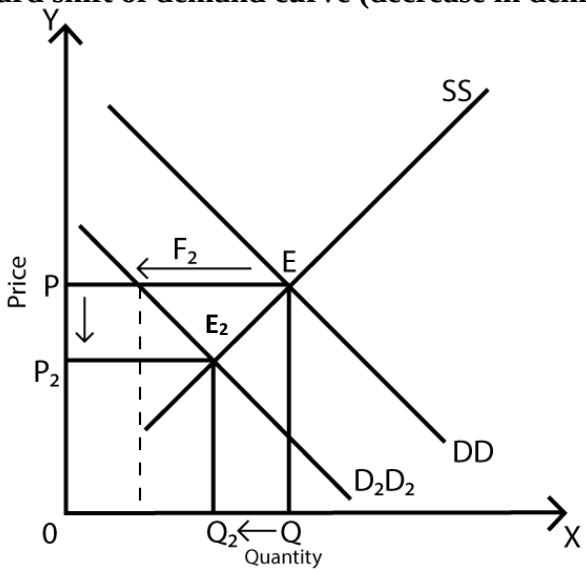



Fig 3: Effect of leftward shift of demand curve (decrease in demand)

Let us now see what happens if the demand curve shifts leftwards. Like in our previous diagram, suppose the equilibrium price is OP and equilibrium quantity is OQ, and suppose now that the income of consumers decreases. This will cause the demand to decrease. The decrease in demand shifts the demand curve from DD to $D_2D_2$ to the left. At the price OP, the demand now falls to $OQ_1$, leading to an excess supply equal to $Q_1Q_2$. Since sellers will not be able to sell all what they want to sell, there will be competition among sellers which results in the fall in price. As the price falls, law of demand comes in operation and quantity demanded starts rising along $D_2D_2$. As price falls, law of supply comes in to operation and quantity supplied starts falling (along SS). This change continues till quantity demand and quantity supplied are equal. This happens at the new equilibrium point $E_2$, which is the intersection of the supply curve SS with the new demand curve $D_2D_2$ Equilibrium price falls from OP to $OP_2$ and equilibrium quantity falls from OQ to $OQ_2$

Thus, when demand curve shifts leftward (i.e. when demand for a commodity decreases while supply remains constant.), equilibrium price and quantity will decrease.

### 3. Effect of Rightward Shift in Supply Curve (Increase in Supply)

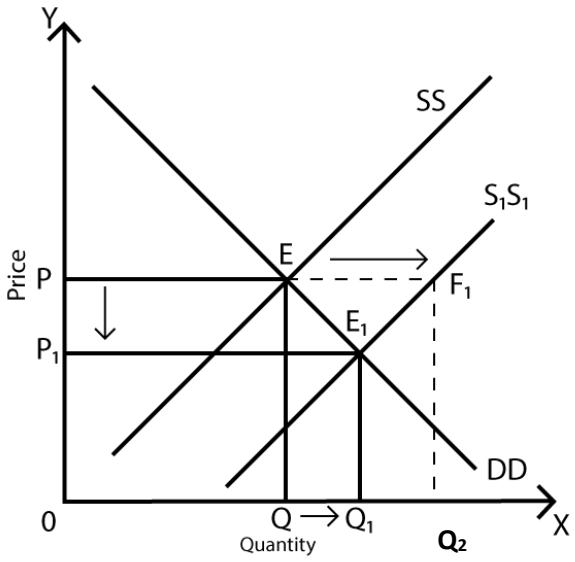



Fig-4. Effect of Rightward Shift in Supply Curve (Increase in Supply)

Suppose the supply curve shifts to the right to $S_1S_1$ say because of a drop in labour wages. As the cost of production drops, firms can supply more and hence the supply increases at every price. Given the price OP, firms are now willing to supply $OQ_2$. This leads to an excess supply equal to $QQ_2$ at the given price OP. Since the seller will not be able to sell that quantity at the initial price, there will be competition among sellers, which result in fall in price. As price falls, law of demand comes in to effect and quantity demanded starts rising. Eventually, the new equilibrium point $E_1$ is attained at the intersection of the demand curve DD with the new supply curve $S_1S_1$. Equilibrium price falls from OP to $OP_1$ and equilibrium quantity rises from OQ to $OQ_1$

So, when the supply curve shifts rightward (i.e., when supply for a commodity increases while demand remains constant), equilibrium price falls but equilibrium quantity rises.

## 4. Effects of Leftward Shift in Supply Curve (Decrease in Supply)

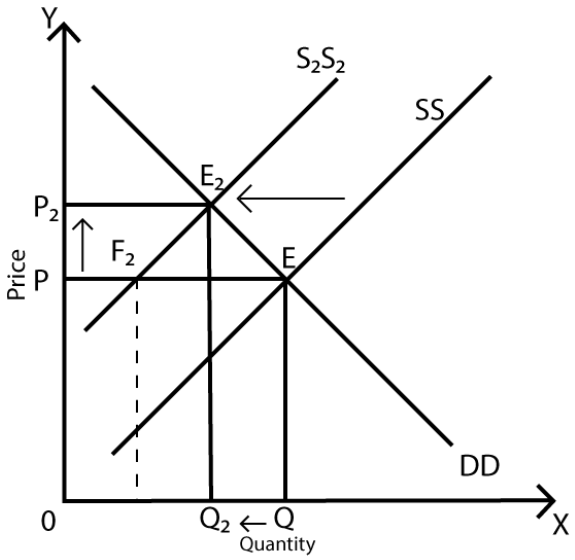



Fig-5 Effects of Leftward Shift in Supply Curve (Decrease in Supply)

Similarly, if labour wages increase, the cost of production rises. This will cause the supply to decrease from SS to $S_2S_2$. With a constant demand curve, we now have a situation of excess demand . The new equilibrium point $E_2$ is attained at the intersection of the new supply curve, $S_2S_2$ with the demand curve DD. Equilibrium price rises from OP to $OP_2$ and equilibrium quantity falls from OQ to $OQ_2$.

When supply curve shifts towards leftward (i.e., when supply for a commodity increases while demand remains constant.), equilibrium price increases, while the equilibrium quantity falls.

**Simultaneous Change in demand and Supply and Market Equilibrium and its effect on equilibrium price and quantity:**

***(a) Effect of simultaneous rightward shift (i.e. increase) in demand and supply.***

An increase in supply  increase in equilibrium quantity and decrease in equilibrium price.

An increase in demand increase in both equilibrium quantity and equilibrium price.

What happens when both demand and supply increase simultaneously? Clearly, equilibrium quantity will rise. What about the price?

That will depend on which is the larger effect on price: the effect of the change in demand or the effect of the change in supply. Accordingly, three possibilities may occur. Price may increase, decrease or remain unchanged.

**1. When *effect of the increase in demand on equilibrium price is equal to effect on increase in supply:***

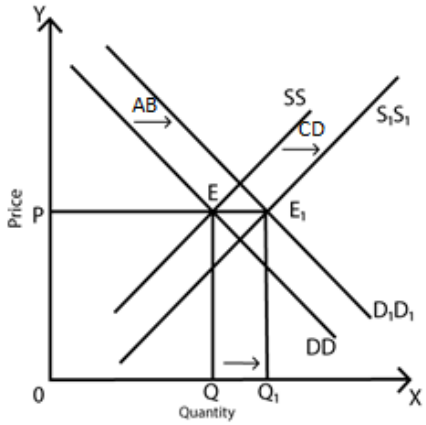



Fig-6: E*ffect of the increase in demand on price equals effect of increase in supply*

Consider the figure where the original demand and supply curves DD and SS intersect each other at the initial equilibrium point E, with equilibrium price = OP and equilibrium quantity = OQ. An increase in demand and supply result in rightward shifts to $D_1D_1$ and $S_1S_1$. Increase in demand (AB) is equal to increase in supply (CD)**.** The new demand and supply curve intersect at point $E_1$. The equilibrium price remains the same at OP but equilibrium quantity rises from OQ to $OQ_1$.

**2. When the effect of increase in demand on equilibrium price is less than the effect of the increase in supply**

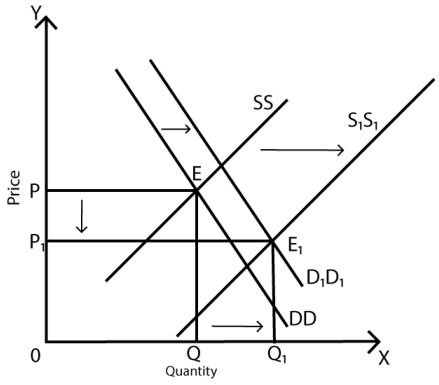



Fig-7: E*ffect of the increase in demand is less than effect of increase in supply*

Starting with initial equilibrium at point E, if the increase in demand from DD to D1D1 is smaller than the increase in supply from SS to $S_1S_1$, i.e Increase in demand depicted by AB is less than increase in supply CD, then the new equilibrium is attained at point E1. We can see that the new equilibrium price falls from OP to $OP_1$ while the new equilibrium quantity rises from OQ to $OQ_1$.

**3. When the effect of the increase in demand on equilibrium price is more than effect of the increase in supply:**

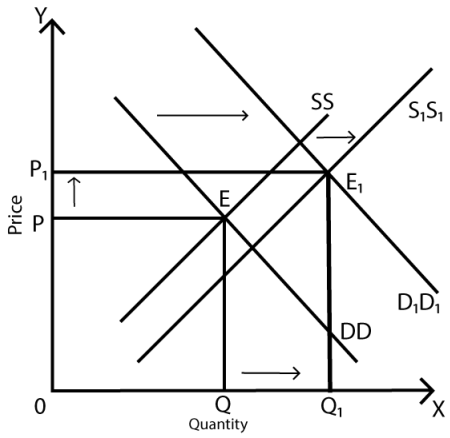



Fig-8: E*ffect of the increase in demand is more than effect of increase in supply*

Starting with initial equilibrium at point E, if the increase in demand from DD to D1D1 is greater than the increase in supply from SS to $S_1S_1$, i.e Increase in demand depicted by AB is more than increase in supply= CD, then the new equilibrium is attained at point E1. We can see that the new equilibrium price rises from OP to $OP_1$ . Also the new equilibrium quantity rises from OQ to $OQ_1$.

***Effect of simultaneous leftward shift (i.e. decrease) in demand and supply.***

Recall again from above that a decrease in supply tends to drive down the equilibrium quantity but drive up the price.

An decrease in supply decrease in equilibrium quantity and increase in equilibrium price.
An decrease in demand decrease in both equilibrium quantity and equilibrium price.

What happens when both demand and supply increase simultaneously? Clearly, equilibrium quantity will fall. What about the price?

That will depend on which the larger effect on price is: the effect of the change in demand or the

effect of the change in supply. Accordingly, three possibilities may occur. Price may remain unchanged, or increase or decrease.

**The analysis remains similar to the possibilities just covered.**

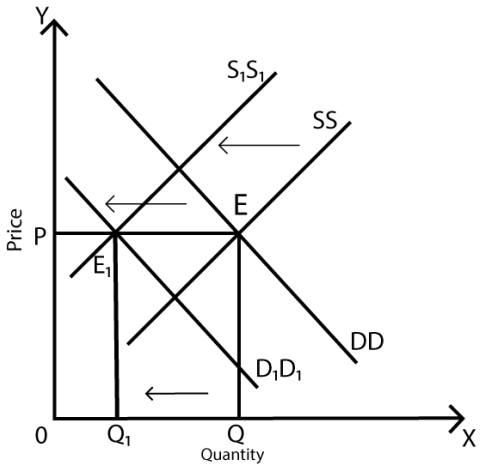



Fig-9: Effect of decrease in demand equals effect of decrease in supply

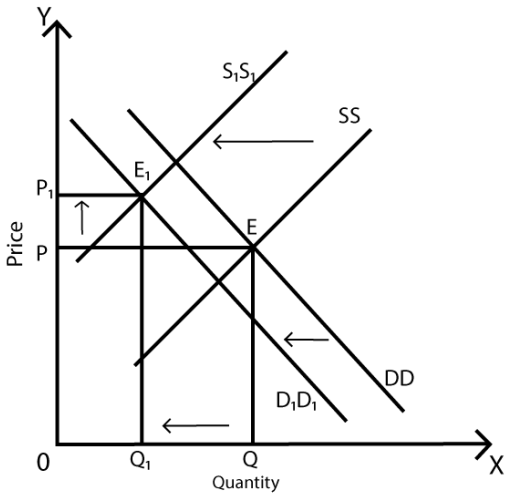



Fig-10: Effect of decrease in demand is less than effect of decrease in supply

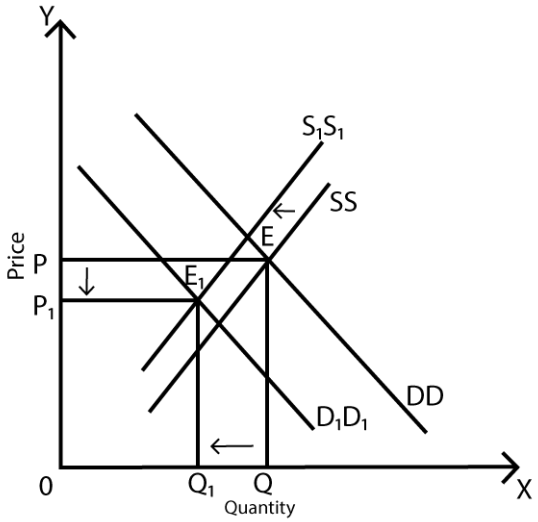



Fig-11: Effect of decrease in demand is more than effect of decrease in supply

Figure 9 shows the case when the ***effect of the decrease in demand on equilibrium price is equal to effect of the decrease in supply. In such cases, the*** equilibrium price does not change but the equilibrium quantity falls.

Figure 10 shows the case when the ***effect of the decrease in demand on equilibrium price is less than the effect of the decrease in supply. In such cases, the*** *equilibrium price rises but equilibrium quantity falls.*

*Figure 11 shows the case when the* ***effect of the decrease in demand on equilibrium price is more than the effect of the decrease in supply. In such cases,*** equilibrium price and equilibrium quantity, both fall.

In the cases we have discussed so far, both supply and demand shifted in the same direction. We can use similar logic to analyze cases where demand and supply shift in opposite directions. Consider the situation when demand decreases and supply increases. This is discussed below:

## Effect of Simultaneous Decrease in Demand and Increase in Supply

A decrease in demand leads to decrease in both equilibrium quantity and equilibrium price.

An increase in supply leads to increase in equilibrium quantity and decrease in equilibrium price.

So we know that price will definitely decrease. What happens to the equilibrium quantity will depend on which effect dominates: the effect of the decrease in demand or the effect of the increase in supply.

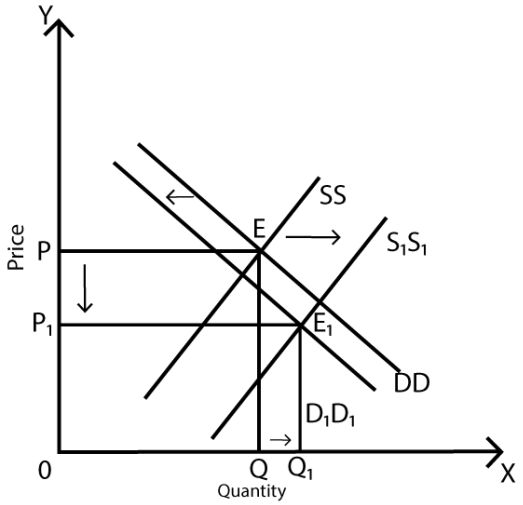



Figure 12. Effect of increase in Supply is more than effect of decrease in Demand

Figure 12 illustrates a case where the effect of the increase in supply on equilibrium quantity exceeds the effect of the decrease in demand: Demand drops by AB while supply increases by CD. The new equilibrium point is $E_1$ and the equilibrium price falls from OP to $OP_1$ while the equilibrium quantity increases from OQ to $OQ_1$. Likewise, several possibilities of simultaneous shifts in demand and supply curves can be analysed. Figure 13 presents the very special case.

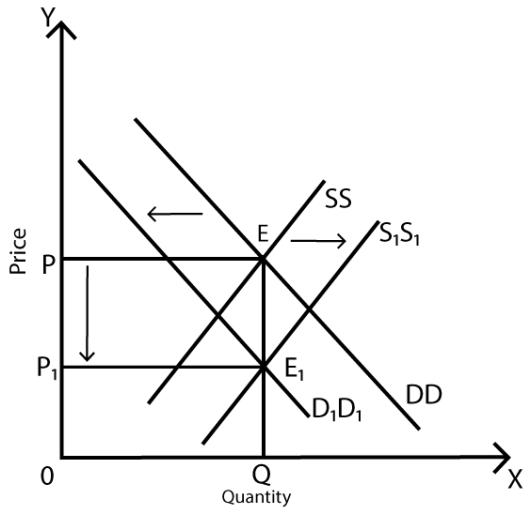



Figure 13. Effects of Supply and Demand are equal but in opposite directions

Here the increase in supply causes quantity to increase by exactly as much as the decrease in demand causes it to fall. In this case the quantity effects of the shifts in demand and supply offset each other exactly, and the equilibrium quantity remains unchanged. But as both the forces of 'Decrease in Demand' and 'Increase in Supply' pull price downwards, we notice in the figure that price falls from OP to OP1.

Is it possible for the equilibrium quantity to fall in the same scenario – i.e., the demand decreases and supply increases simultaneously? Satisfy yourself that this can be the case by drawing a suitable diagram.

**Applications of Tools of Demand and Supply**

Equilibrium price can be influenced by change in the forces of demand and supply in the market. It can also be influenced by various government policies. Under some special circumstances, it becomes necessary for the government to control or regulate the price of some goods and services when their prices are either too high or too low in comparison to some desired levels. Sometimes prices are fixed directly by the government, through direct interventions like Price Ceiling (Maximum Price Fixation) or Price Floor (Minimum Price Fixation).

**Price Ceiling (Maximum Price Fixation)**

In some situation, government finds it necessary to fix a maximum market price for certain goods in public interest. In such case, government fixes an upper (maximum) limit on the price of a certain good which is known as price ceiling. The sellers are not supposed to charge a price higher than the ceiling price. A price ceiling makes sense only if it fixed below the equilibrium price. If it is greater

than the equilibrium price, the commodity will sell at the equilibrium price and the ceiling will be meaningless. A price ceiling is generally implemented on necessary commodities like wheat, rice, life-saving drugs etc. House rents have also been commonly been regulated by governments across the world in this manner.

Imposition of ceiling and its effects can be explained with the following diagram:

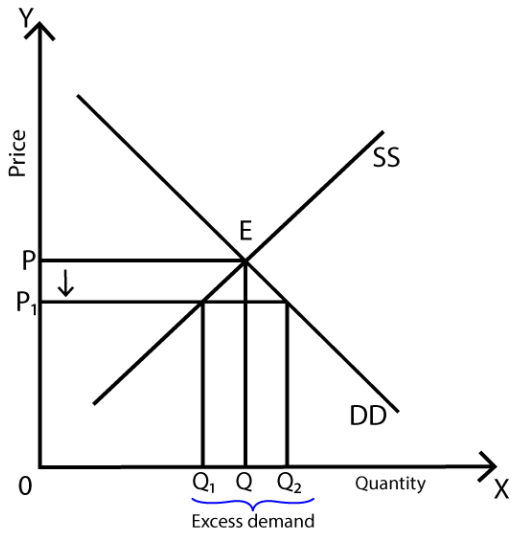



Figure 14: Effect of imposition of Price Ceiling

Market demand and market supply curves of wheat, represented by DD and SS, intersect at point E. At this equilibrium point E, equilibrium price is OP and equilibrium quantity OQ. When government intervenes in the market and reduces the price from OP to $OP_1$, the market demand expands from OQ to $OQ_2$ and market supply contracts from OQ to $OQ_1$. This will result in excess demand = $Q_1Q_2$ at the prevailing price $OP_1$ which leads to shortage of wheat in the market.

Excess demand for wheat has some implications too. To solve the problem of shortage of wheat, govt. may apply a system of rationing. Under rationing, government fixes a maximum limit on the quantity of the commodity that can be purchased by a consumer at the ceiling price. Wheat is available through the fair price shops (public distribution system) run by the government. This system tries to make sure that the needy section gets some minimum quantity of necessary goods at the controlled price.

**Price Floor or Minimum Support Price**

For certain goods, a fall in the market price below a particular level may not be desirable. For example, from a wheat farmers' point of view, low wheat prices will mean low revenue for the farmers and some of them may even make significant losses. Similarly, if the price of labour (i.e., wages) falls very low, workers will get very low incomes. In such cases, the government decides to intervene in the market and set a price 'floor' for such commodities. Price floor refers to the minimum price to be paid in the market. The market price cannot legally be lower than this. The effect of Price Floor can be shown by following figure:

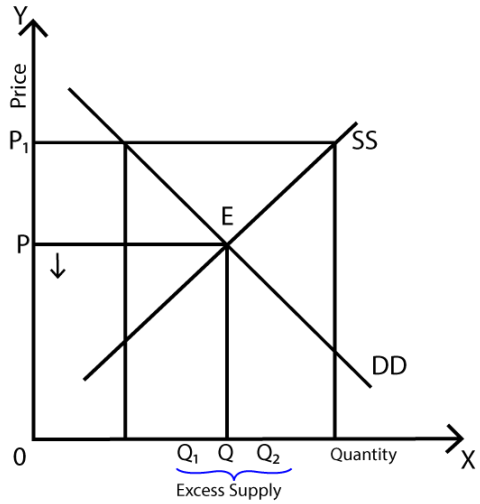



Fig- 15: Effect of imposition of Price Floor

Market demand and market supply curves of wheat, represented by DD and SS, intersect at point E. At this equilibrium point E, equilibrium price is OP and equilibrium quantity OQ. If the equilibrium price OP seems to be too 'low', then the government intervenes and fixes $OP_1$ as the minimum price. When price is fixed higher than OP, the market demand contracts from OQ to $OQ_1$ and the market supply expands from OQ to $OQ_2$. As a result, there will be excess supply for wheat in the market at $OP_1$ equal to $Q_1Q_2$.

Excess supply for wheat has some implications too. What happens to the excess wheat in the market? The government must buy the unsold surplus at floor price if the farmers fail to sell their produce in the open market. This procured surplus may be used for buffer stock. Government may also use this buffer for free distribution during natural calamities, for distribution through its Fair Price shops, for giving as remuneration to worker working under 'Food for Work' program etc. In simple words, government needs to buy the surplus at the predetermined price to ensure the success of this policy.

**Summary**

The market is where buyers and sellers interact. Market Equilibrium: When the quantity demanded equals the quantity supplied ; there is no excess demand or excess supply. Any shift in the supply curve or the demand curve (or both) will cause the equilibrium to change. Sometimes, the government chooses to intervene and keep the market in disequilibrium by enforcing price floors or price ceilings.