

- Market Equilibrium
- Market Equilibrium: Fixed Number of Firms
- Shifts in Demand and Supply
- Market Equilibrium: Free Entry and Exit
- Applications
- Summary
- Key Concepts

Market Equilibrium

This chapter builds on the foundation laid in previous chapters where consumer and firm behaviour as price takers were studied. The individual demand curve shows the quantity a consumer is willing to buy at different prices, while the market demand curve aggregates this for all consumers. Similarly, the individual firm's supply curve shows the quantity a profit-maximising firm wishes to sell at different prices, and the market supply curve aggregates this for all firms.

Market equilibrium is the point where the quantity demanded by consumers equals the quantity supplied by firms, clearing the market. The equilibrium price is the price at which this occurs, and the equilibrium quantity is the quantity bought and sold at this price.

Key Definitions:

- **Equilibrium Price (p^*):** The price at which market demand equals market supply.
- **Equilibrium Quantity (q^*):** The quantity bought and sold at the equilibrium price.
- **Excess Demand:** When quantity demanded exceeds quantity supplied at a given price.
- **Excess Supply:** When quantity supplied exceeds quantity demanded at a given price.

Illustrative Example:

At price p^* , $q^D(p^*) = q_s(p^*)$, meaning the market clears. If price is above p^* , excess supply exists; if below p^* , excess demand exists.

Out-of-equilibrium Behaviour: The 'Invisible Hand' mechanism adjusts prices: prices rise when there is excess demand and fall when there is excess supply, moving the market towards equilibrium.

Practice Set:

- Explain the concept of market equilibrium with an example.
- What happens when there is excess demand in the market?
- Describe the role of the 'Invisible Hand' in market equilibrium.

Answer Key:

- Market equilibrium occurs where quantity demanded equals quantity supplied at price p^* .
- Excess demand leads to upward pressure on prices.
- The 'Invisible Hand' adjusts prices to restore equilibrium.

Quick Reference: Equilibrium: $q^D(p^*) = q_s(p^*)$; Excess demand: $q^D > q_s$; Excess supply: $q_s > q^D$.

Glossary: Equilibrium, Excess Demand, Excess Supply, Invisible Hand.

Market Equilibrium: Fixed Number of Firms

When the number of firms is fixed, the market demand and supply curves determine the equilibrium price and quantity. The demand curve slopes downward, indicating higher quantity demanded at lower prices, while the supply curve slopes upward, indicating higher quantity supplied at higher prices.

Graph Explanation: The intersection of demand (DD) and supply (SS) curves determines equilibrium price (p^*) and quantity (q^*). Prices above p^* cause excess supply; prices below p^* cause excess demand.

Example 5.1:

Market demand: $q^D = 200 - p$ for $0 \leq p \leq 200$, zero otherwise.

Market supply: $q^S = 120 + p$ for $p \geq 10$, zero otherwise.

Equating demand and supply for equilibrium:

$$200 - p^* = 120 + p^*$$

$$2p^* = 80$$

$$p^* = 40$$

Equilibrium quantity:

$$q^* = 200 - 40 = 160$$

At prices below 40, excess demand exists; above 40, excess supply exists.

Wage Determination in Labour Market:

Labour market equilibrium is determined by the intersection of labour demand and supply curves. Firms demand labour up to the point where wage equals the marginal revenue product of labour ($MRP^L = MR \times MPL$). The demand curve for labour slopes downward due to diminishing marginal productivity.

Labour supply is influenced by the trade-off between income and leisure, resulting in a backward bending individual supply curve but an upward sloping market supply curve.

Practice Set:

- Calculate equilibrium price and quantity given demand and supply functions.
- Explain why the labour demand curve slopes downward.
- Describe the factors affecting labour supply.

Answer Key:

- Equilibrium price is Rs 40; quantity is 160 units.
- Labour demand slopes downward due to diminishing marginal productivity.
- Labour supply depends on wage rate, income effect, and substitution effect.

Quick Reference: Equilibrium price and quantity found by equating demand and supply; $MRP^L = MR \times MPL$; Labour supply curve shape.

Glossary: Marginal Revenue Product of Labour, Marginal Product of Labour, Labour Supply Curve.

Shifts in Demand and Supply

Changes in factors like consumer preferences, income, technology, or input prices can shift demand or supply curves, affecting equilibrium price and quantity.

Demand Shift: A rightward shift increases demand, raising equilibrium price and quantity; a leftward shift decreases demand, lowering both.

Supply Shift: A rightward shift increases supply, lowering price and increasing quantity; a leftward shift decreases supply, raising price and lowering quantity.

Simultaneous Shifts: When both demand and supply shift, the effect on price and quantity depends on the direction and magnitude of shifts. For example:

- Both shift right: quantity increases; price effect ambiguous.
- Both shift left: quantity decreases; price effect ambiguous.
- Demand right, supply left: price increases; quantity ambiguous.
- Demand left, supply right: price decreases; quantity ambiguous.

Practice Set:

- Explain the effect of a rightward shift in demand on equilibrium.
- What happens to equilibrium when supply shifts leftward?
- Analyze the impact of simultaneous rightward shifts in demand and supply.

Answer Key:

- Price and quantity both increase.
- Price rises; quantity falls.
- Quantity increases; price may remain unchanged.

Quick Reference: Demand and supply shifts affect equilibrium price and quantity; direction depends on shift patterns.

Glossary: Demand Shift, Supply Shift, Equilibrium Price, Equilibrium Quantity.

Market Equilibrium: Free Entry and Exit

When firms can freely enter or exit the market, the equilibrium price equals the minimum average cost (min AC) of production. Firms earn normal profit in the long run, with no supernormal profits or losses.

If firms earn supernormal profits, new firms enter, increasing supply and lowering price to min AC. If firms incur losses, some exit, reducing supply and raising price to min AC.

Example 5.2:

Market demand: $q^D = 200 - p$ for $0 \leq p \leq 200$.

Single firm supply: $q_f^S = 10 + p$ for $p \geq 20$.

Equilibrium price $p_0 = 20 = \min AC$.

Equilibrium quantity:

$$q_0 = 200 - 20 = 180$$

Quantity supplied by each firm:

$$q_f^S = 10 + 20 = 30$$

Number of firms:

$$n_0 = \frac{q_0}{q_f^S} = \frac{180}{30} = 6$$

Shifts in Demand with Free Entry and Exit:

Demand shifts change equilibrium quantity and number of firms but not the equilibrium price, which remains at min AC.

Practice Set:

- Explain why equilibrium price equals minimum average cost with free entry and exit.
- Calculate equilibrium number of firms given demand and supply functions.
- Describe the effect of a rightward demand shift on equilibrium quantity and number of firms.

Answer Key:

- Free entry and exit eliminate supernormal profits, setting price at min AC.
- Number of firms is total quantity divided by quantity per firm.
- Quantity and number of firms increase; price remains unchanged.

Quick Reference: Equilibrium price = min AC; $n_0 = \frac{q_0}{q_f^S}$; Demand shifts affect quantity and firms.

Glossary: Free Entry, Free Exit, Minimum Average Cost, Normal Profit.

Applications

Government often intervenes in markets by imposing price controls to regulate prices that are too high or too low.

Price Ceiling: A government-imposed maximum price, usually set below equilibrium price to make essential goods affordable. This leads to excess demand (shortage).

Example: In the wheat market, a price ceiling below equilibrium price increases quantity demanded but decreases quantity supplied, causing shortage.

Price Floor: A government-imposed minimum price, usually set above equilibrium price to protect producers or workers. This leads to excess supply (surplus).

Example: Agricultural price supports or minimum wage laws set price floors above equilibrium, causing surplus of goods or labour.

Practice Set:

- Explain the effects of a price ceiling below equilibrium price.
- What happens when a price floor is set above equilibrium price?
- Discuss the consequences of price controls on market efficiency.

Answer Key:

- Price ceiling causes shortage due to excess demand.
- Price floor causes surplus due to excess supply.

- Price controls can lead to inefficiencies like black markets or unsold goods.

Quick Reference: Price ceiling $<$ equilibrium price \rightarrow shortage; Price floor $>$ equilibrium price \rightarrow surplus.

Glossary: Price Ceiling, Price Floor, Shortage, Surplus.

Summary

- Market equilibrium occurs where market demand equals market supply.
- Equilibrium price and quantity are determined by the intersection of demand and supply curves.
- Labour is employed up to the point where marginal revenue product equals wage rate.
- Shifts in demand or supply affect equilibrium price and quantity depending on the direction and magnitude of shifts.
- With free entry and exit, equilibrium price equals minimum average cost; demand shifts affect quantity and number of firms but not price.
- Price ceilings below equilibrium cause shortages; price floors above equilibrium cause surpluses.

Key Concepts

- Equilibrium
- Excess Demand
- Excess Supply
- Marginal Revenue Product of Labour
- Value of Marginal Product of Labour
- Price Ceiling
- Price Floor