

Chapter 5

Competitive Markets

CHAPTER SUMMARY

This chapter discusses the conditions for perfect competition. It also investigates the significance of competitive equilibrium in a perfectly competitive market. It explains the meaning of excess demand and supply.

To understand the complete effect of a shift in demand or supply, it is necessary to consider both sides of the market. Generally, the effect of any change in demand or supply depends on the elasticities with respect to price of both demand and supply.

The time horizon is a key factor affecting the elasticities of demand and supply. Prices are more volatile and quantity adjustment takes relatively longer in industries where production involves substantial sunk costs.

Finally, it is important to distinguish a receipt or payment from incidence. A payment or receipt can be shifted from one to the other side of the market. Incidence is fundamental and depends only on the elasticities of demand and supply.

KEY CONCEPTS

perfect competition	short-run market equilibrium
market equilibrium	long-run market equilibrium
excess supply	cost and freight price
excess demand	ex-works price
calculating equilibrium change	incidence

GENERAL CHAPTER OBJECTIVES

1. Introduce why the demand-supply framework is the core of managerial economics.
2. Describe the characteristics of perfect competition.
3. Determine market equilibrium, explain why it exists and how it may change.

4. Predict the impact of a change in demand and supply on market price and quantity in the short run and explain the dynamics involved in moving from an initial equilibrium to a new market equilibrium.
5. Calculate a short-run change in equilibrium price and quantity using elasticities.
6. Predict the impact of a change in demand and supply on market price and quantity in the long run and explain the dynamics involved in moving from an initial equilibrium to a new market equilibrium.
7. Calculate a long-run change in equilibrium price and quantity using elasticities.
8. Distinguish freight inclusive pricing and ex-works pricing.
9. Discuss the incidence on buyers and sellers given a shift in demand or supply.

NOTES

1. Introduction. It is important to consider both demand and supply when predicting the impact of any change on price and quantity. Even though only one side of the market may be changing initially, it is necessary to consider the interaction with the other side to obtain a complete picture.
2. Demand- supply framework (perfect competition).
 - (a) The demand- supply framework (perfect competition) is the core of managerial economics. It can be applied to address business issues in a wide range of markets, including goods and services, consumer as well as industrial products, and items sold in domestic and international markets.
 - (b) Market demand and supply.
 - i. When deriving a market demand curve, it is assumed that every buyer can purchase as much as she would like at the going price and all buyers pay the same price.
 - ii. When deriving a market supply curve, it is assumed that every seller can deliver as much as she would like at the going price and all sellers receive the same price.
 - (c) 5 assumptions/conditions for perfect competition. If a market meets the five conditions for perfect competition, we can validly apply the concepts of demand and supply.
 - i. The product is homogeneous (i.e., they are perfect substitutes).
 - (1). Competition in a market where products are differentiated (e.g., mineral water, owing to chemical and marketing differences) is not as keen as that in a market where products are homogeneous.
 - (2). Generally, prices for differentiated products are different.
 - ii. There are many buyers, each of whom purchases a quantity that is small relative to the market.
 - (1). In a market where some buyers have market power, different buyers pay different prices: The buyers with market power get lower prices.

- (2). Where some buyers have market power, it is not possible to construct the market demand curve as the buyers with market power can affect the going price.
 - iii. There are many sellers, each of whom supplies a quantity that is small relative to the market.
 - (1). Where some sellers have market power, it is not possible to construct market supply curve as the sellers with market power can affect the going price.
 - iv. New buyers and sellers can enter freely, and existing buyers and sellers can exit freely. There are no technological, regulatory or legal barriers.
 - (1). With free entry and exit, the market price cannot stay above a seller's average cost for very long.
 - (2). If the market price is above a seller's average cost, new sellers will enter, add to the market supply, and bring down the price.
 - v. All buyers and all sellers have equal information about market conditions (e.g., prices, substitutes, and technology).
 - (1). Markets where there are differences in information among buyers, among sellers, or between buyers and sellers, are not as competitive as those where all buyers and sellers have equal information.
- 3. Market equilibrium.
 - (a) Definition of market equilibrium: the price at which the quantity demanded equals the quantity supplied (a price in which there is neither a surplus nor a shortage).
 - i. The price will not tend to change: the quantity demanded just balances the quantity supplied.
 - ii. Purchases will not tend to change: buyers maximize benefits less expenditure.
 - iii. Sales will not tend to change: sellers maximize profits.
 - (b) Excess supply: the amount by which the quantity supplied exceeds the quantity demanded.
 - i. If the market price is above equilibrium, buyers will cut back purchases.
 - ii. Sellers will compete to clear their extra capacity, and market price will drop back toward the equilibrium level.
 - (c) Excess demand (a shortage): the amount by which the quantity demanded exceeds the quantity supplied.
 - i. The lower is the market price below equilibrium, the larger will be the excess demand.
 - ii. Buyers will compete for the limited capacity: the market price will tend to rise to the equilibrium level.

- (d) If a market is not in equilibrium, buyers or sellers will push the market toward equilibrium. Applying the concept of market equilibrium, we can predict the impact on price and quantity given changes in demand or supply (where there is a change in economic variable, e.g., the price of a related product, the cost of inputs, or government policy).
 - (e) Very few markets exactly satisfy all five conditions for perfect competition. We can still apply the demand – supply analysis but must check the implications against the unsatisfied conditions.
4. Supply shift.
- (a) Changes that shift the supply curve.
 - i. E.g., Changes in the cost of inputs, or government policy.
 - ii. Increase in supply at every price: a downward (rightward) shift in the supply curve of the output.
 - iii. Decrease in supply at every price: upward (leftward) shift in the supply curve of the output.
 - (b) Change in the equilibrium price. To understand the impact of a supply shift, we need to consider the interaction between supply and demand. Given a change in the cost of an input, and a change in demand or supply, the change in the equilibrium price depends on the price elasticities of both demand and supply.
 - i. Extremely elastic demand or extremely inelastic supply.
 - (1). When demand is extremely elastic, buyers are extremely sensitive to price. When the supply curve shifts, buyers soak up all the additional quantity supplied (or give up all reduction in quantity supplied), and the equilibrium price remains unchanged.
 - (2). When supply is extremely inelastic, sellers are completely insensitive to price (they provide the same quantity regardless of the price of the output or costs of inputs). When the cost of inputs changes, sellers provide the same quantity, and the equilibrium price remains unchanged.
 - ii. If demand is more elastic than supply, then the change in the equilibrium price resulting from a shift in supply will be smaller.
 - iii. If demand is less elastic than supply, then the change in the equilibrium price resulting from a shift in supply will be larger.
 - iv. Extremely inelastic demand or extremely elastic supply.
 - (1). When demand is extremely inelastic, buyers are completely insensitive to price (they purchase the same quantity regardless of the price). When the supply curve shifts, buyers purchase the same quantity, and the equilibrium price changes by the same amount as the supply shift.
 - (2). When supply is extremely elastic (i.e., the marginal cost of production is constant). If an input cost changes, the

marginal cost changes by the same amount at all production levels. When the supply curve shifts, the equilibrium price changes by the same amount as the supply shift.

- v. A downward or upward shift in the supply curve will change the equilibrium price (to the new equilibrium price) by no more than the amount of the supply shift.
- vi. Note: There is a common misconception is that, if seller's costs fall by some amount, then the market price will fall by the same amount. In the real world:
 - (1). Market demand is somewhat but not extremely sensitive to price. When the supply shifts down, the price would fall by less than the downward shift. When the supply shifts up, the price would rise by less than the upward shift.
 - (2). Supply is somewhat elastic and sensitive to price. A seller can generally increase supply with more capacity and higher costs. When the supply shifts down, the price would fall. When the supply shifts up, the price would rise.

5. Demand shift.

- (a) Changes that shift the demand curve.
 - i. E.g., Changes in prices of compliments or substitutes, or government policy.
 - ii. Increase in demand at every price: an upward (rightward) shift in the demand curve of the output.
 - iii. Decrease in demand at every price: downward (leftward) shift in the demand curve of the output.
- (b) Change in the equilibrium price. To understand the impact of a demand shift, we need to consider the interaction between supply and demand. The change in the equilibrium price depends on the (output) price elasticities of both demand and supply.
 - i. Note: There is a common misconception is that, if demand increases by some amount, then the market quantity will increase by the same amount. This overlooks:
 - (1). The impact of a demand shift on sellers: the marginal cost of producing an additional unit of output might change.
 - (2). The price sensitivity of buyers: the amount buyers are willing to pay for an additional unit of output.

6. Calculating equilibrium changes.

- (a) To obtain a precise estimate of the effect of a supply or demand shift on the market price and quantity, we need to know either the entire demand and supply curves or the relevant elasticities. Information on elasticities is often more readily available than the entire demand and supply curves.
- (b) Formula to calculate changes in the market equilibrium:

- i. Calculate the percentage change in the quantity demanded;
 - ii. Calculate the percentage change in the quantity supplied;
 - iii. Equate these percentage changes to solve for the percentage change in price; and
 - iv. Calculate the percentage change in quantity.
7. Adjustment time.
 - (a) As the elasticities of demand and supply vary with the time horizon under consideration, shifts in demand and supply may have different short-run and long-run effects.
 - (b) When a market is in both short-run and long-run equilibrium:
 - i. For each individual buyer: the quantity purchased where marginal benefit equals price.
 - ii. For each individual seller: the quantity provided where marginal cost equals price.
 - iii. At the equilibrium price, the market demand curve (horizontal summation of individual demand curves) crosses the market supply curve (horizontal summation of individual supply curves).
 - iv. The equilibrium price signals to each buyer and seller the amount to purchase and provide, respectively.
 - (c) Short-run market equilibrium.
 - i. Definition: the price at which the short-run quantity demanded equals the short-run quantity supplied.
 - ii. For each individual seller: short-run marginal cost equals market price.
 - (d) Long-run market equilibrium.
 - i. Definition: the price at which the long-run quantity demanded equals the long-run quantity supplied.
 - ii. For each individual seller: long-run marginal cost equals market price.
 - (e) Demand increase.
 - i. Assumptions:
 - (1). Starting from short and long-run equilibria.
 - (2). Short and long-run demand curves are the same.
 - ii. Upon a demand increase:
 - (1). New short-run equilibrium.
 - a. Higher price.
 - b. Seller expands its operations.
 - i. If the short-run marginal cost curve is steep, the price increase will not lead to a large expansion of operations; and vice versa.
 - ii. The steepness of the short-run marginal cost curve depends on factors like availability of excess production capacity and over time costs.
 - (2). New long-run equilibrium.
 - a. Higher price.

- b. Seller expands its operations.
 - i. The market supply curve tends to be more elastic in the long run (all costs become avoidable, freedom of entry and exit) than in the short run.
 - ii. Every seller breaks even: No more new entry or exit.
- (3). When supply is more elastic in the long-run than in the short-run and demand increases:
- a. The price in the long-run equilibrium is lower than in the new short-run equilibrium but higher than in the original equilibrium.
 - b. The quantity in the new long-run equilibrium is higher than in the new short-run equilibrium, which in turn is higher than in the original equilibrium.
 - c. Sunk costs. In an industry involving substantial sunk costs, price will be relatively volatile. The short run price will exceed the long run price. Also, adjustment of production will be concentrated in the long run.
- (4). Short vis-à-vis long run.
- a. The market price will be more volatile in the short run than the long run; i.e., the market price will change more in the short run than in the long run.
 - b. There is a greater change in the market quantity over the long run than in the short run; i.e., the quantity will change more in the long run than in the short run.
- (f) Demand reduction.
- i. Upon a demand reduction:
 - (1). New short-run equilibrium.
 - a. Lower price.
 - b. Seller cuts its operations.
 - i. Sellers whose average variable cost exceeds the price will shut down.
 - ii. Sellers whose average variable cost is covered by the price will remain in business.
 - iii. Extent of cut back in operations depends on two factors:
 - 1. In the short run (as opposed to the long run), some costs are sunk (prior commitments by sellers).
 - 2. Slope of the seller's short-run marginal cost curve.
 - (2). New long-run equilibrium.
 - a. Lower price.

- b. Entire industry contracts along the long-run market supply curve. Smaller number of sellers.
 - i. The market supply curve tends to be more elastic in the long run (all costs become avoidable, freedom of entry and exit) than in the short run. Note: Sellers whose long-run price is below their average total cost will exit the industry.
 - ii. Every seller breaks even: with average total cost equal to the market price.
 - (3). When supply is more elastic in the long-run than in the short-run and there is a demand reduction:
 - a. The price in the long-run equilibrium is higher than in the new short-run equilibrium but lower than in the original equilibrium, and
 - b. The quantity in the new long-run equilibrium is less than in the new short-run equilibrium, which in turn is less than in the original equilibrium.
 - c. Sunk costs.
 - i. In an industry involving substantial sunk costs, price will be relatively volatile. The demand reduction will translate into a relatively large drop in price. The short run price will be less than the long run price. Also, adjustment of production will be concentrated in the long run.
 - ii. The market price is less volatile in industries where sunk costs are minor. Also, adjustment of production will be spread throughout the short run and the long run.
 - d. Two general points.
 - i. The market price will be more volatile in the short run than the long run; i.e., the market price will fall more in the short run than in the long run.
 - ii. There is a greater change in the market quantity over the long run than in the short run; i.e., the quantity will drop more in the long run than in the short run.
 - (g) Long run demand may be more or less elastic than short run demand.
 - (h) Use short-run elasticities to estimate the short-run impact of shifts in demand and supply and long-run elasticities to estimate the long-run impact.
8. Receipts vis a vis incidence.
- (a) Generally, the price and sales are the same.
 - i. "Cost and freight (CF) price": a price that includes the cost of delivery to the buyer.

- ii. "Ex-works price": a price that does not include the cost of delivery to the buyer.
- (b) "Incidence": the change in the price for a buyer or seller resulting from a shift in demand or supply. The incidence of freight charges, brokerage fees and government taxes depends not on whether the sellers do or do not include the freight cost in their prices, only on the price elasticities of demand and supply.

ANSWERS TO PROGRESS CHECKS

- 5A. If some sellers have market power and get lower prices, then different buyers pay different prices. Moreover, a seller with market power could affect the selling price; hence, it could not answer the question, "How much would you sell assuming that you could sell as much as you would like at the going price?" Thus, it is not possible to construct a market supply curve.
- 5B. See Figure 5B on page 532 of the textbook.
- 5C. (1) False
(2) True
- 5D. See Figure 5D on page 532 of the textbook.
- 5E. See Figure 5E on page 533 of the textbook.
- 5F. The price will be 1.33% lower at \$19.73, and the quantity will be 2.66% higher at 10.27 million.
- 5G. See Figure 5G on page 534 of the textbook.
- 5H. See Figure 5H on page 535 of the textbook.

ANSWERS TO REVIEW QUESTIONS

- 1. The market that better fits the model of perfect competition is:
 - (a) for entertainment, video rentals;
 - (b) for energy, gasoline;
 - (c) for investments, publicly listed shares.
- 2. True.

3. These regulations raise barriers to entry, and hence reduce the degree of competition.
4. False.
5. (a) New zero-calorie sweetener would shift the demand for sugar to the left; (b) Increase in demand for milk might have little effect on the sugar market; (c) Cut in farm wages would shift the supply of sugar to the right.
6. The quantity supplied will exceed the quantity demanded.
7. (a) Reduce the supply; (b) Increase the supply; (c) Reduce the demand; (d) Increase the demand; (e) No effect.
8. If the demand is extremely elastic or the supply is extremely elastic.
9. (c)
10. The market price would rise by $1.17/1.03 = 1.14\%$.
11. The supply of new housing is more elastic in the long run than the short run. Hence, the price will rise further in the short run than in the long run, while the quantity will increase more in the long run than in the short run.
12. False. If sunk costs are substantial, sellers will quit production only if the price drops by a large amount. Hence, prices will be more volatile.
13. When there is a fall in long-run demand, suppliers whose average cost exceeds the long-run equilibrium price will exit. Older tankers have relatively higher average costs, and hence are more likely to be scrapped.
14. (b) The wholesale price cut would increase the retail supply. If the retail demand is more inelastic, the reduction in the retail price would be larger.
15. The retailers receive the wholesale price cut. In a competitive retail market, however, the wholesale price cut would increase the supply. The new equilibrium will have a lower retail price. Consumers benefit from a lower retail price, so part of the wholesale price cut will be incident on consumers.

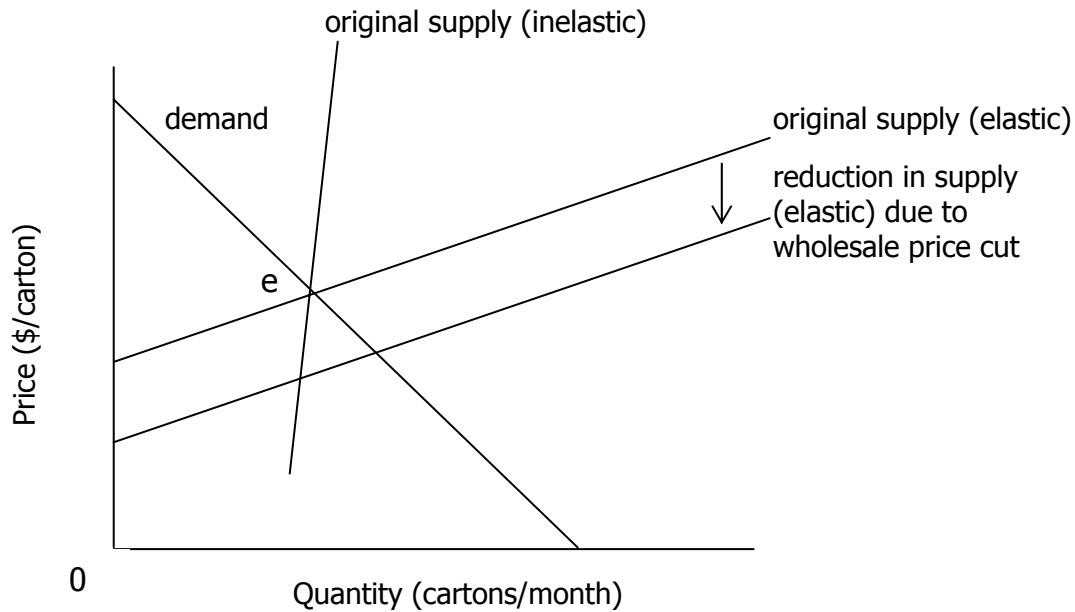
WORKED ANSWER TO DISCUSSION QUESTION

Suppose that Campbell's Soup is planning to cut the wholesale price of its tomato juice by \$1 per carton. Consider the retail market where supermarkets and grocery stores

sell tomato juice and consumers buy the product. Under what circumstances would the wholesale price cut have the *least* effect on the retail price? Please state conditions in terms of the price elasticities of retail demand and supply. Illustrate your answer with suitable graphs.

Answer: The following figures depict the retail market for tomato juice. We represent the \$1 wholesale price cut by shifting down the retail supply by \$1. Let the original equilibrium be at point e. From the analysis below, the impact of the wholesale price cut on the retail price will be least if the retail supply is extremely inelastic and the retail demand is extremely elastic.

- (a) Price elasticity of supply. Referring to the figure below, if supply is extremely inelastic, then the impact of the wholesale price cut on the retail price will be much smaller than if the supply is elastic.



- (b) Price elasticity of demand. Referring to the figure below, if demand is extremely elastic, then the impact of the wholesale price cut on the retail price will be much smaller than if the demand is inelastic.

