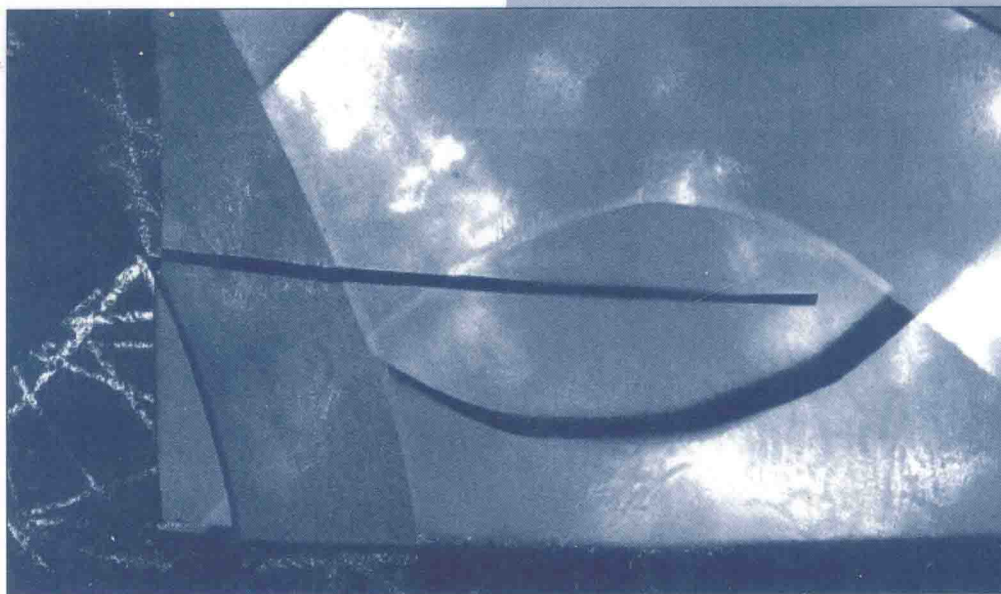


Study Guide

for use with



PRICE THEORY AND APPLICATIONS

Second Edition

B. Peter Pashigian

Prepared by
Thomas M. Carroll

Study Guide
for use with
**Price Theory
and Applications**

Second Edition

Peter Pashigian
University of Chicago



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How to Use This Book

This study guide is designed to help you succeed in your intermediate microeconomic theory class. The goal is to help you master and apply the material in *Price Theory and Applications* by B. Peter Pashigian. Just as a map gives you a sense of the land, but can never replace the experience of actually going on a trip, this guide is a complement to the textbook, not a substitute.

Economics is a mental discipline—a way of understanding the world and solving many of life's problems. Economics is neither a cookbook nor a religion; it is better understood than memorized. To remember your economics lessons first try to understand a small set of key concepts; then practice applying those concepts to a wide variety of problems. Some of these applications are provided in the textbook. More are supplied in this study guide.

A good strategy is to read each chapter of the text when your instructor assigns it. After you have read through the chapter once, refer to the Learning Objectives and Chapter Overview in this study guide. Did you catch the major points? Do you understand them well enough to try your hand at a few problems? If not, reread the textbook chapter, pausing when necessary to think about important ideas. Work through the study-guide material for each chapter, checking the answer *after* you have answered them in the guide.

After you have tackled the problems and questions in this guide, return to the chapter in the textbook. Try the Review Questions, Exercises, and Problem Sets. Develop your confidence by working through these questions and problems before you check your answers.

Chapter 1

PRICING AND THE DEMAND AND SUPPLY MODEL

• LEARNING OBJECTIVES

After completing this chapter, you should be able to

1. Define and explain the law of demand and the law of supply.
2. Understand the distinction between a change in quantity demanded and a change in demand, and between a change in quantity supplied and a change in supply.
3. Draw a graph showing market equilibrium, and describe how the equilibrium comes about.
4. Demonstrate how changes in demand or supply cause price changes, and how price changes adjust quantity to reestablish equilibrium.
5. Explain how shortages and surpluses would persist if laws or other impediments prevented price adjustments.
6. Calculate price elasticity of demand, and use this concept to predict how revenue and expenditure change in response to a price change.
7. Compute price elasticity of supply, and comprehend how the amount offered for sale reacts to a change in market price.

• CHAPTER OVERVIEW

Demand

The **law of demand** states that quantity demanded varies inversely with price. If price increases, the quantity that buyers are willing and able to buy decreases. If price decreases, the quantity that buyers are willing and able to buy increases, *other factors remaining constant*. The demand curve is plotted under the condition that other influences on the amount demanders wish to buy - income, prices of related goods, tastes, number of buyers - remain constant. If the price of a good increases, the relevant point on the demand curve moves upward to the left; if the price decreases, the relevant point on the demand curve moves downward to the right. As long as a demand curve is stationary, a change in price leads to a **change in quantity demanded**.

If income, the prices of substitutes or complements, or the tastes or number of buyers change, the entire demand curve is displaced. An increase in income normally causes consumers to buy more of a good even though its price has not decreased. The only way to depict this on a diagram is if the entire graph shifts location. An **increase in demand** happens when buyers wish to purchase more of a good *at each price*; the entire demand curve shifts to the right. A **decrease in demand** occurs when buyers wish to purchase less of a good *at each price*; the entire demand curve shifts to the left.

Supply

The same distinction must be made between a **change in quantity supplied** and a **change in supply**. A *change in quantity supplied* refers to the movement of quantity along a stationary supply curve in response to a price change. Given technology, the prices of inputs, and the number of sellers, an increase in price means that suppliers desire to sell more of a good. A decrease in price means that suppliers desire to sell less of a good. A *change in supply* happens only when something besides the good's own price changes. If the prices of factors of production increase, or if firms leave the market, then the amount the (remaining) suppliers wish to sell decreases *at every price*. This is a **decrease in supply** - a leftward shift in the supply curve. If the prices of inputs fall, or if new technology enhances efficiency, or if the number of firms increases, then the supply curve will shift to the right. An **increase in supply** means that suppliers offer to sell more at each price.

Market Equilibrium

Professor Pashigian demonstrates that market prices are not arbitrary. Markets adjust prices until quantity demanded equals quantity supplied at the prevailing price. Allowed to function, a competitive market will establish the **equilibrium** price and quantity at the point where the demand curve and the supply curve intersect. At the equilibrium price, the quantity that buyers wish to purchase equals the quantity that suppliers wish to sell, so there is no tendency for price, and therefore quantity, to change.

Figure 1-1 depicts Professor Pashigian's example of the demand and supply of wood throughout American history. During America's colonial period, wood was plentiful, (supply curve S_0) and demand (D_0) was relatively modest because population was small. Price P_0 and quantity Q_0 prevailed at time 0. Due to the relatively low price of wood, most bridges, railroad ties, and even large buildings were built with wood. As the population grew, the demand for wood increased. This is shown as a shift in the demand curve from D_0 to D_1 . Had the price stayed at P_0 , a **shortage** equal to $Q' - Q_0$ would have persisted. Rather than do without, buyers of wood bid its price up, until, at P_1 , quantity demanded again equaled quantity supplied at Q_1 .

As more and more timberland was cleared to make room for farms and cities, the supply of wood decreased. The decrease in supply is depicted as a shift from supply curve S_0 to supply curve S_1 . Now, at price P_1 , there is again a shortage of wood equal to $Q_1 - Q''$. Price must again rise until, at price P_2 , quantity demanded equals quantity supplied, Q_2 .

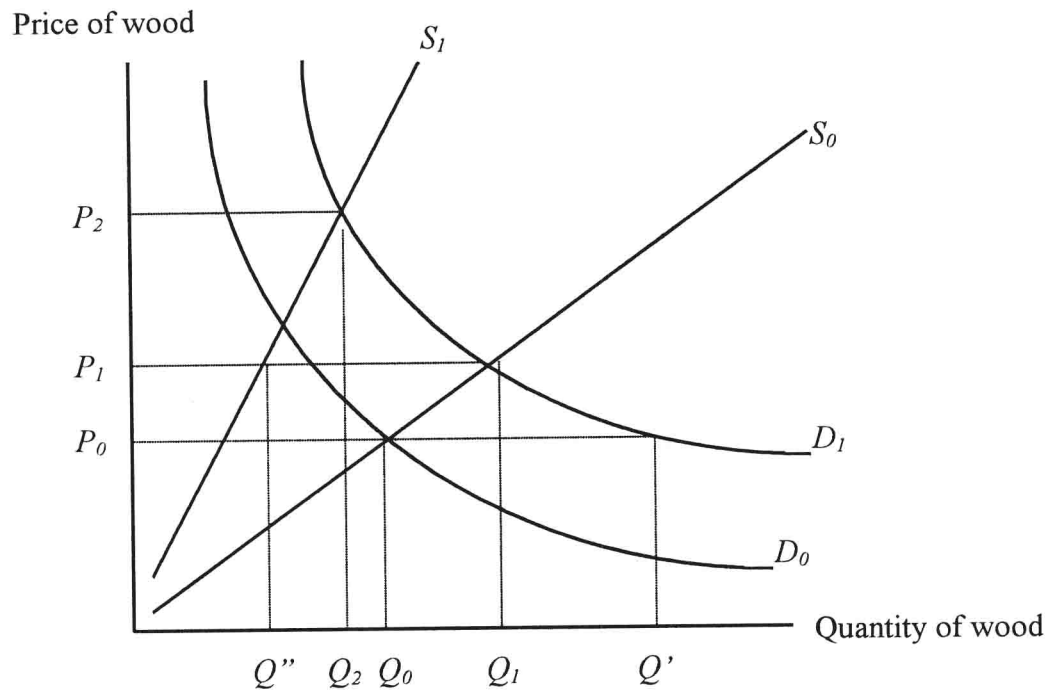


Figure 1-1

Note what happened in the above example. The market remains in equilibrium until or unless either the demand curve or the supply curve shifts. A change in demand or a change in supply occurs *before* a price change. Indeed, a change in demand or a change in supply *causes* a temporary shortage or surplus until price adjusts. If price were prevented from changing, the shortage or surplus would persist. When the demand curve shifted from D_0 to D_1 , the equilibrium quantity and the price moved along the supply curve, the curve that did not shift. When the supply curve shifted from S_0 to S_1 , the equilibrium price and quantity moved along demand curve D_1 , the curve that did not shift. Remember that an increase in demand increases equilibrium price, but an increase in price reduces quantity demanded.

Price Elasticity of Demand

The **price elasticity of demand** measures the responsiveness of quantity demanded to a price change. If demand is **price-elastic**, the percentage change in quantity is greater, in absolute value, than the percentage change in price; expenditure moves in the opposite direction to the change in price. If demand is **price-inelastic**, the percentage change in quantity is smaller, in absolute terms, than the percentage change in price; expenditure changes in the same direction as price. If demand is **unit price-elastic**, then the percentage change in price is exactly balanced by the percentage change in quantity, so that expenditure does not change.

The **price elasticity of supply** measures the sensitivity of the quantity supplied to a price change. When supply is **unit price-elastic**, the percentage change in quantity equals the percentage change in price. When supply is **price-inelastic**, a 1 percent price change will be followed by a change in quantity supplied of less than 1 percent. When supply is **price-elastic**, a 1 percent price change will be followed by a change in quantity supplied that is larger than 1 percent.

• KEY TERMS

Demand and supply model A simplified picture of market activity in which the equilibrium price is determined at the point where the quantity demanded equals the quantity supplied.

Demand function The inverse relationship between quantity demanded and price. The demand function shifts when other factors--income, prices of substitutes, prices of complements, tastes, and number of buyers--change.

Movement along a demand function The reaction of quantity demanded to a price change, other factors remaining constant.

Shift in the Demand Function The change in quantity demanded at *every price* due to a change in income, prices of substitutes, prices of complements, tastes, or the number of buyers.

Substitutes Commodities a consumer would purchase to fulfill the same desires as the good in question. Chicken is a substitute for beef, so an increase in the price of beef would increase the demand for chicken.

Complements Commodities a consumer would purchase to go with a good in question. Lemon is a complement to tea, so an increase in the price of tea would reduce the demand for lemons.

Supply function The direct relationship between quantity supplied and price. The supply function shifts when other factors--prices of inputs, technology, or the number of sellers--change.

Movement along the supply function The reaction of quantity supplied to a price change, other factors remaining constant.

Shift in the supply function The change in quantity supplied at *every price* due to a change in prices of inputs, technology, or the number of firms.

Equilibrium price and quantity The market is in equilibrium when, at the prevailing price, the quantity demanded equals the quantity supplied. At equilibrium, there is no tendency for either price or quantity to change.

Excess demand A condition that exists when, at the prevailing price, quantity demanded exceeds quantity supplied. Excess demand is also known as a **shortage** and causes market price to increase until equilibrium is restored.

Excess supply A condition when, at the prevailing price, quantity supplied exceeds quantity demanded. Excess supply is also known as a **surplus** and causes market price to decrease until equilibrium is restored.

Price Elasticity of Demand The percentage change in quantity demanded divided by the percentage change in price.

- **Price-elastic demand** The percentage change in quantity demanded is greater (in absolute value) than the percentage change in price. When demand is price-elastic, expenditure moves in the opposite direction to price.
- **Price-inelastic demand** The percentage change in quantity demanded is smaller (in absolute value) than the percentage change in price. When demand is price-inelastic, expenditure moves in the same direction as price.
- **Unitary-elastic demand** The percentage change in quantity demanded equals (in absolute value) the percentage change in price. When demand is unitary price-elastic, expenditure does not change when price changes.

Price elasticity of supply The percent change in quantity supplied divided by the percentage change in price

- **Price-elastic supply** The percentage change in quantity is greater than the percentage change in price.
- **Price-inelastic supply** The percentage change in quantity is smaller than the percentage change in price.
- **Unitary-elastic supply** The percentage change in quantity equals the percentage change in price.

- **PROBLEMS**

1. **Figure 1-2** is a supply and demand model depicting an initial equilibrium in the U. S. strawberry market. For each of the following events, indicate whether the demand curve shifts or the supply curve shifts, the direction of the shift, and what happens to equilibrium price and quantity.

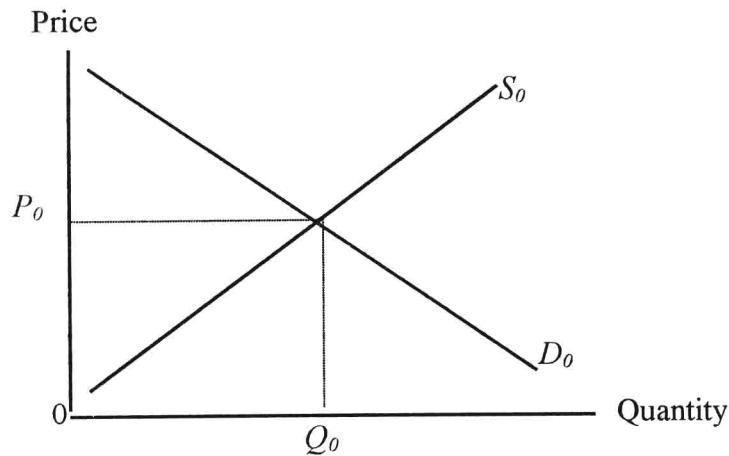


Figure 1-2

- a. The wage rate for strawberry pickers increases relative to the wage rate for workers in general. _____

 - b. The price of cream decreases; cream is a complement for strawberries.

 - c. Blight wipes out half the European strawberry plants; strawberry plants in the United States are unaffected.

 - d. The price of blueberries, a substitute for strawberries, declines.

2. The demand equation for strawberries has been estimated as $Q_D = 500 - 100P$. Where Q_D is the quantity of strawberries demanded, in quarts, and P is the price per quart. For each of the following prices, compute the quantity of strawberries demanded, the expenditure on strawberries, and the point price elasticity of demand.

Price	Quantity Demanded	Total Expenditure	Point Price Elasticity
\$5.00	_____	_____	_____
\$4.00	_____	_____	_____
\$3.00	_____	_____	_____
\$2.00	_____	_____	_____
\$1.00	_____	_____	_____
\$0.00	_____	_____	_____

3. The demand equation for blueberries is unknown, but below are some observed price/quantity pairs (\$ per quart, and number of quarts demanded). Calculate the arc price elasticity over each pair of prices

Price per quart	Number of Quarts Demanded	Arc Price Elasticity
\$5.00	100	
\$4.00	200	_____
\$3.00	400	_____
\$2.00	750	_____
\$1.00	1200	_____

4. A more extensive investigation of the strawberry market reveals that the quantity of strawberries demanded (Q_D) depends on the price of strawberries (P_s), the price of blueberries (P_b), and the price of cream (P_c) $Q_D = 500 - 100P_s + 50P_b - 20P_c$
- a. If $P_b = \$2.00$ and $P_c = \$1.00$, indicate the quantity of strawberries demanded, total expenditure, and the point elasticity of demand for strawberries at each of the following prices.

Price	Quantity Demanded	Total Expenditure	Point Price Elasticity
\$5.00	_____	_____	_____
\$4.00	_____	_____	_____
\$3.00	_____	_____	_____
\$2.00	_____	_____	_____
\$1.00	_____	_____	_____
\$0.00	_____	_____	_____

- b. If P_c increases to \$1.50 while $P_b = \$2.00$, indicate the quantity of strawberries demanded, total expenditure, and the point elasticity of demand for strawberries, at each of the following prices

Price	Quantity Demanded	Total Expenditure	Point Price Elasticity
\$5.00	_____	_____	_____
\$4.00	_____	_____	_____
\$3.00	_____	_____	_____
\$2.00	_____	_____	_____
\$1.00	_____	_____	_____
\$0.00	_____	_____	_____

- c. If $P_c = \$1.50$, and $P_b = \$1.00$, indicate the quantity of strawberries demanded, total expenditure, and the point elasticity of demand for strawberries, at of the following prices

Price	Quantity Demanded	Total Expenditure	Point Price Elasticity
\$5.00	_____	_____	_____
\$4.00	_____	_____	_____
\$3.00	_____	_____	_____
\$2.00	_____	_____	_____
\$1.00	_____	_____	_____
\$0.00	_____	_____	_____

5. Suppose that the demand equation for strawberries is $Q_D = 600 - 100P$ and that the supply equation for strawberries is $Q_S = 100P$. For each of the following prices, determine the quantity demanded, the quantity supplied, and whether there would be a surplus, a shortage, or equilibrium in the strawberry market.

Price	Quantity Demanded	Quantity Supplied	State of Market
\$5.00	_____	_____	_____
\$4.00	_____	_____	_____
\$3.00	_____	_____	_____
\$2.00	_____	_____	_____
\$1.00	_____	_____	_____
\$0.00	_____	_____	_____

6. Suppose that the strawberry market in question #5 was subjected to price controls. Answer the following questions assuming that the demand equation is $Q_D = 600 - 100P$ and the supply equation is $Q_S = 100P$:
- If a price ceiling of \$2 were placed on strawberries, what would be the quantity demanded? _____ At this ceiling price, what would be the quantity supplied? _____ Would there be a shortage or a surplus of strawberries at this price? _____
 - If lucky buyers could resell their strawberries to disappointed buyers, what is the market clearing price of the quantity of strawberries supplied in your answer to part a? _____
 - From your analysis in parts a and b, does the ceiling price on strawberries actually make strawberry consumers better off or worse off? Explain: _____

• TRUE - FALSE QUESTIONS

For each of the following statements, indicate whether the statement is true (agrees with economic theory), false (is contradicted by economic theory), or uncertain (could be true or false; not enough information is given), and briefly explain your answer.

- According to the law of demand, consumers purchase more at lower prices than they would at higher prices.

- If the price of strawberries increases from \$3 to \$4 per quart, and the quantity of strawberries purchased increased from 2,000 to 3,000, the demand curve for strawberries must have shifted to the right.

3. If demand for a good increases while the supply of that good decreases, equilibrium price must increase, but equilibrium quantity might increase or decrease.

4. Inelastic demand means that the quantity of a good demanded is constant at all prices.

5. For a linear demand curve, the point of unit elasticity occurs at one-half of that price where quantity demanded becomes zero.

• **MULTIPLE-CHOICE QUESTIONS**

1. A rise in the price of tomatoes due to poor growing conditions will cause
- an increase in the demand for tomatoes.
 - a decrease in the demand for tomatoes.
 - an increase in the quantity of tomatoes demanded.
 - a decrease in the quantity of tomatoes demanded.

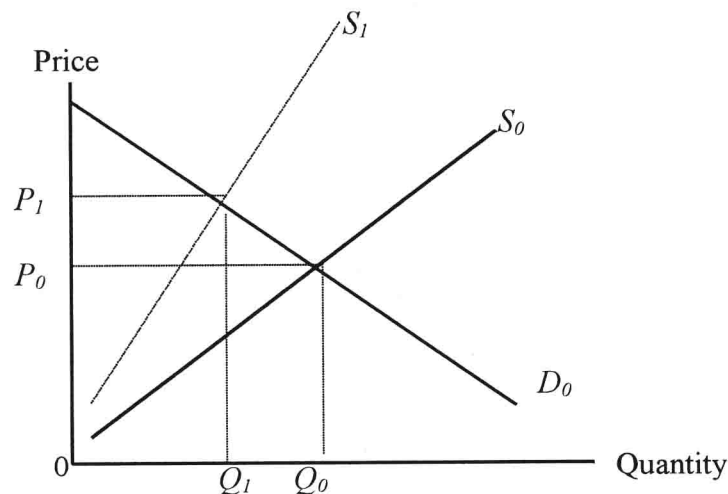
2. If the government were to abolish child labor laws, the effect on the market for men's shirts would be to
 - a. increase demand and raise price.
 - b. increase demand and lower price.
 - c. increase supply and lower price.
 - d. decrease supply and raise price.
3. A rise in the wages of all workers in the economy will cause
 - a. an increase in the demand for haircuts.
 - b. a decrease in the supply of haircuts.
 - c. an increase in the demand for haircuts and a decrease in the supply of haircuts.
 - d. a decrease in the demand for haircuts and an increase in the supply of haircuts.
4. A fall in the demand for drugs will cause
 - a. a decrease in the price of drugs.
 - b. an increase in the price of drugs.
 - c. a decrease in the supply of drugs.
 - d. an increase in the supply of drugs.
5. If the price of good X rises and, as a result, the demand for good Y falls, then goods X and Y must be
 - a. complements.
 - b. substitutes.
 - c. inferior.
 - d. normal.
6. If we observe a fall in the price of cars accompanied by an increase in car sales, we would suspect
 - a. an increase in demand.
 - b. a decrease in demand.
 - c. an increase in supply.
 - d. a decrease in supply.
7. The introduction of rent controls in a previously unregulated rental market would
 - a. create a shortage of rental units.
 - b. create a surplus of rental units.
 - c. shift the demand curve for rental units outward.
 - d. shift the demand curve for rental units inward.

8. If the price of shoes rose 10 percent and the quantity of shoes purchased fell by 12 percent, then
 - a. the demand for shoes is price elastic.
 - b. the demand for shoes is price inelastic.
 - c. the demand for shoes is unitary elastic.
 - d. any of the above may be true; it is impossible to tell without additional information.
9. If a price of \$90 is associated with a quantity of 600 and a price of \$110 is associated with a quantity of 400, arc price elasticity of demand over this range is
 - a. -0.1.
 - b. -1.
 - c. -2.
 - d. -10.
10. If Jean, the barber, raised the price of his nose hair clippers and total revenue is unchanged, then
 - a. demand is price elastic.
 - b. demand is price inelastic.
 - c. demand is unitary elastic.
 - d. any of the above may be true; it is impossible to tell without additional information.

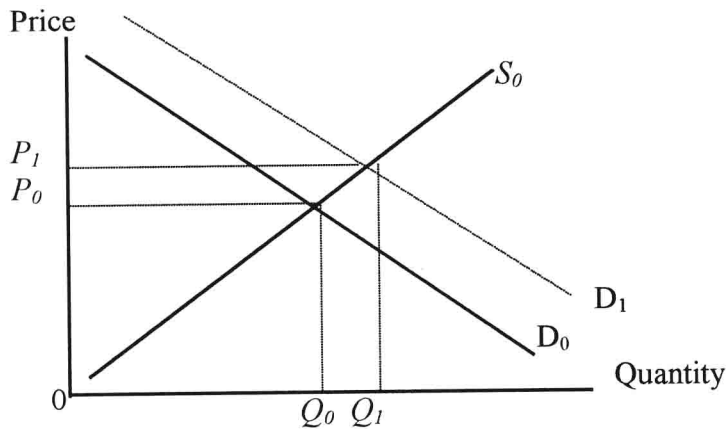
• **ANSWERS TO PROBLEMS, TRUE-FALSE QUESTIONS, AND MULTIPLE-CHOICE QUESTIONS**

Answers to Problems

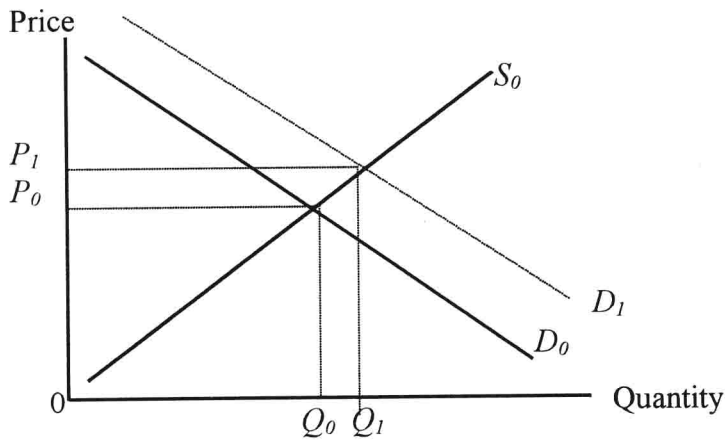
1. a. A rise in the wage of strawberry pickers would shift the supply curve to the left, equilibrium price would increase and equilibrium quantity would decrease.



- b. A reduction in the price of a complement will increase demand, increasing both equilibrium price and equilibrium quantity.



- c. Blight in Europe would cause European countries to import strawberries from the United States. This increase in demand causes the quantity exchanged and price to both rise.



- d. A reduction in the price of blueberries, a substitute for strawberries, would reduce the demand for strawberries, reducing the equilibrium price and quantity exchanged.

