

## Chapter 2

1. Identify the parts of the circular-flow diagram immediately involved in the following transactions.

- a. Mary buys a car from Jaguar for £40,000.

Answer:

£40,000 of spending from households to market for goods and services. Car moves from market for goods and services to household. £40,000 of revenue from market for goods and services to firms while car moves from firm to market for goods and services.

- b. Jaguar pays Joe £2,500/month for work on the assembly line.

Answer:

£2,500 of wages from firms to market for factors of production. Inputs move from market for factors of production to firms. Labour moves from households to market for factors of production while £2,500 income moves from market for factors to households.

- c. Joe makes £10 worth of calls on his Vodafone mobile phone.

Answer:

£10 of spending from households to market for goods and services. Service moves from market for goods and services to household. Service moves from firms to market for goods and services in return for £10 revenue.

- d. Mary receives £1,000 of dividends on her Vodafone shares.

Answer:

£1,000 of profit from firms to market for factors of production. Inputs move from market for factors of production to firms. Capital services move from households to market for factors of production in return for £1,000 income.

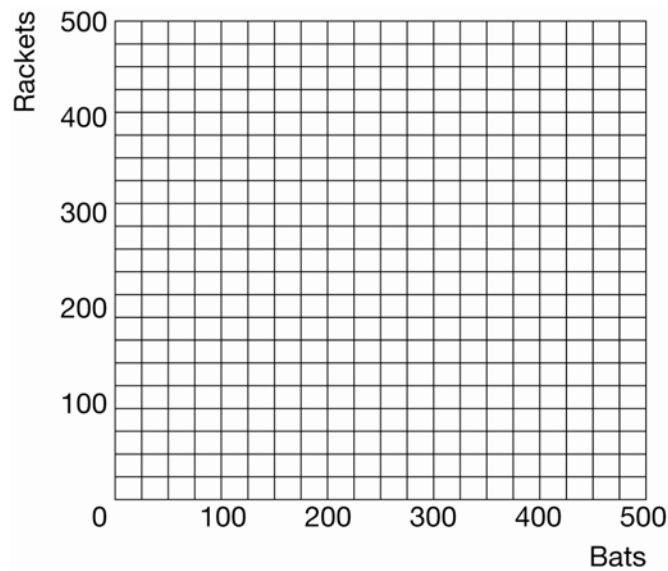
2. The following table provides information about the production possibilities frontier of Athletic Country.

Exhibit 1

Bats	Rackets
0	420
100	400
200	360
300	300
400	200
500	0

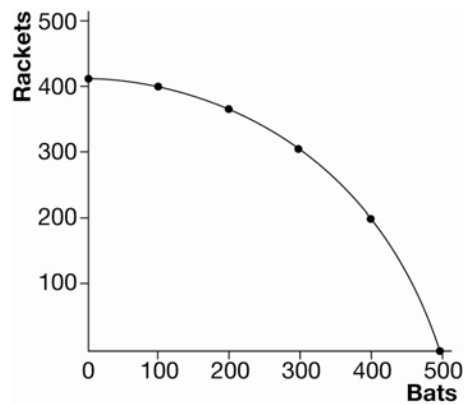
- a. In Exhibit 2, plot and connect these points to create Athletic Country's production possibilities frontier.

Exhibit 2



Answer:  
See Exhibit 7.

Exhibit 7



- b. If Athletic Country currently produces 100 bats and 400 rackets, what is the opportunity cost of an additional 100 bats?

Answer:  
40 rackets

- c. If Athletic Country currently produces 300 bats and 300 rackets, what is the opportunity cost of an additional 100 bats?

Answer:  
100 rackets

- d. Why does the additional production of 100 bats in part (c) cause a greater trade-off than the additional production of 100 bats in part (b)?

Answer:

Because as we produce more bats, the resources best suited for making bats are already being used. Therefore it takes even more resources to produce 100 bats and greater reductions in racket production.

- e. Suppose Athletic Country is currently producing 200 bats and 200 rackets. How many additional bats could they produce without giving up any rackets? How many additional rackets could they produce without giving up any bats?

Answer:

200 bats; 160 rackets

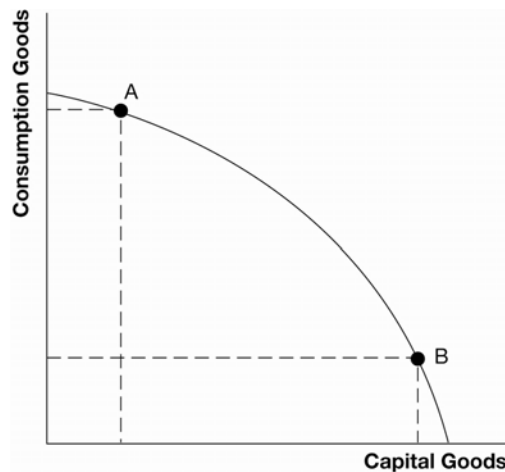
- f. Is the production of 200 bats and 200 rackets efficient? Explain.

Answer:

No. Resources were not used efficiently if production can be increased with no opportunity cost.

3. The production possibilities frontier in Exhibit 3 shows the available trade-offs between consumption goods and capital goods. Suppose two countries face this identical production possibilities frontier.

Exhibit 3



- a. Suppose Party Country chooses to produce at point A while Parsimonious Country choose to produce at point B. Which country will experience more growth in the future? Why?

Answer:

Parsimonious country. Capital (plant and equipment) is a factor of production and producing more of it now will increase future production.

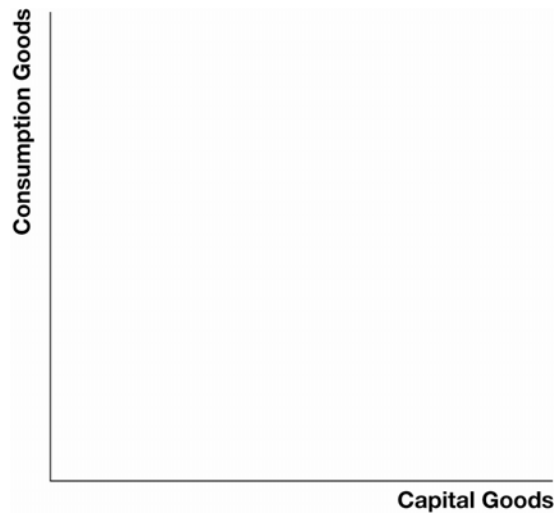
- b. In this model, what is the opportunity cost of future growth?

Answer:

Fewer consumption goods are produced now.

- c. Demonstrate in Exhibit 4 the impact of growth on a production possibilities frontier such as the one shown above. Would the production possibilities frontier for Parsimonious Country shift more or less than that for Party Country? Why?

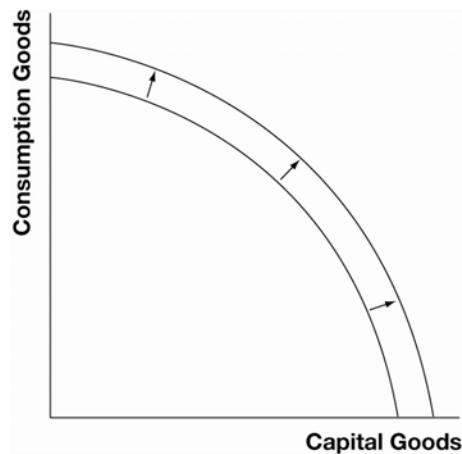
Exhibit 4



Answer:

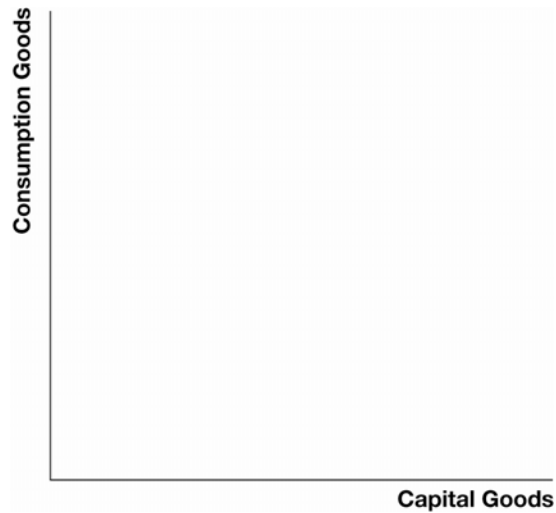
See Exhibit 8. The production possibilities curve will shift more for Parsimonious Country because they have experienced a greater increase in factors of production (capital).

Exhibit 8



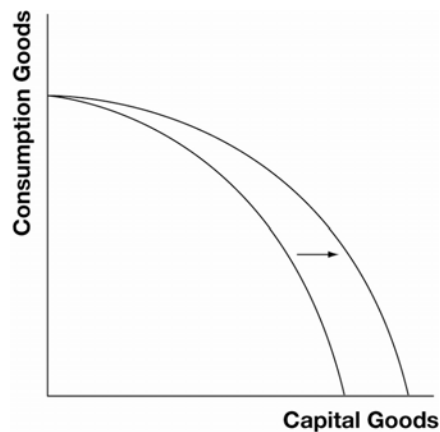
- d. On the graph in Exhibit 5, show the shift in the production possibilities curve if there was an increase in technology that only affected the production of capital goods.

Exhibit 5



Answer:  
See Exhibit 9.

Exhibit 9



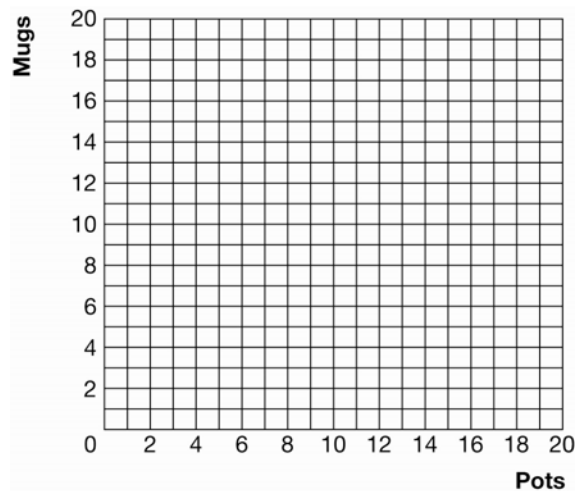
- e. Does the shift in part (d) above imply that all additional production must be in the form of capital goods? Why?

Answer:  
No, the outward shift improves choices available for both consumption and capital goods.

### Chapter 3

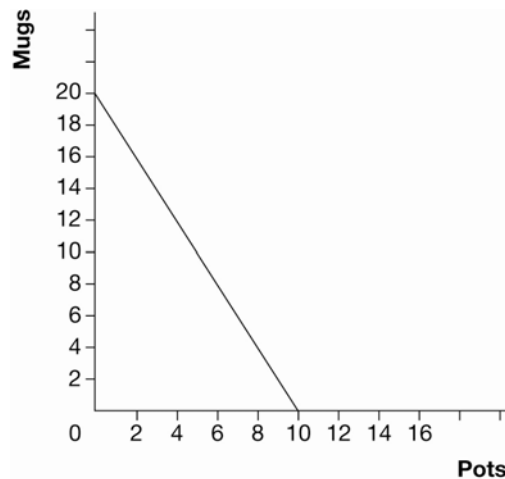
1. Angela is a college student. She takes a full load of classes and has only 5 hours per week for her hobby. Angela is artistic and can make 2 clay pots per hour or 4 coffee mugs per hour.
  - a. Draw Angela's production possibilities frontier for pots and mugs.

Exhibit 2



Answer:  
See Exhibit 5

Exhibit 5



- b. What is Angela's opportunity cost of 1 pot? 10 pots?

Answer:  
2 mugs. 20 mugs.

- c. What is Angela's opportunity cost of 1 mug? 10 mugs?

Answer:  
1/2 pot. 5 pots

- d. Why is her production possibilities frontier a straight line instead of bowedout like those presented in Chapter 2?

Answer:

Because Angela's productivity in pot and mug production is constant – it doesn't depend on how many mugs or pots she is making. Therefore the opportunity cost of mugs in terms of pots is constant (and, of course, so is the opportunity cost of pots in terms of mugs).

2. Suppose a worker in Germany can produce 15 computers or 5 tonnes of grain per month. Suppose a worker in Poland can produce 4 computers or 4 tonnes of grain per month. For simplicity, assume that each country has only one worker.

- a. Fill out the following table:

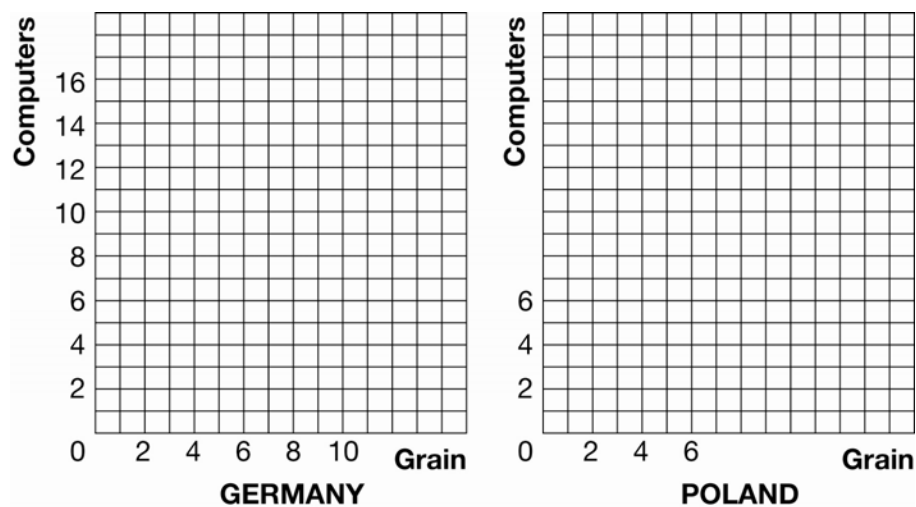
	Computers	Grain
Germany	_____	_____
Poland	_____	_____

Answer:

	Computers	Grain
Germany	15	5
Poland	4	4

- b. Graph the production possibilities frontier for each country in Exhibit 3.

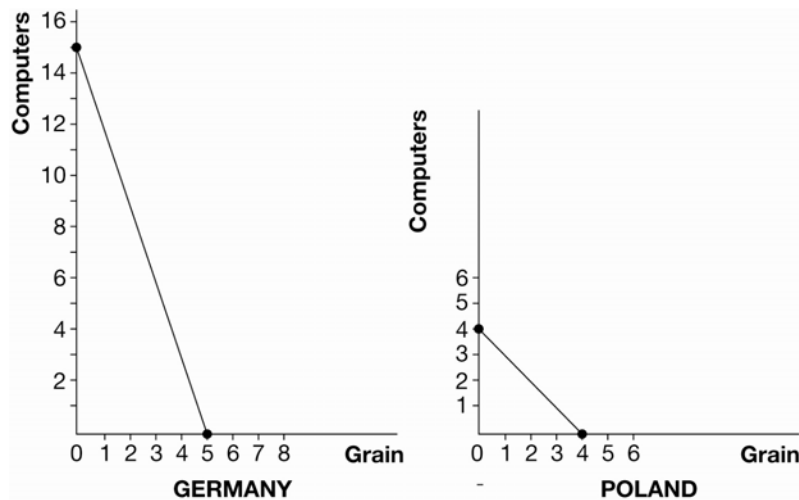
Exhibit 3



Answer:

See Exhibit 6.

## Exhibit 6



- c. What is the opportunity cost of a computer in Germany? What is the opportunity cost of a tonne of grain in Germany?

Answer:

1/3 tonne of grain. 3 computers.

- d. What is the opportunity cost of a computer in Poland? What is the opportunity cost of a ton of grain in Poland?

Answer:

1 tonne of grain. 1 computer.

- e. Which country has the absolute advantage in producing computers? Grain?

Answer:

Germany because one worker can produce 15 computers compared to 4. Germany because one worker can produce 5 tonnes of grain compared to 4.

- f. Which country has the comparative advantage in producing computers? Grain?

Answer:

Germany because a computer has the opportunity cost of only 1/3 tonne of grain compared to 1 tonne of grain in Poland. Poland because a tonne of grain has the opportunity cost of only 1 computer compared to 3 computers in Germany.

- g. Each country should tend toward specialization in the production of which good? Why?

Answer:

Germany should produce computers while Poland should produce grain because the opportunity cost of computers is lower in Germany and the opportunity cost of grain is lower in Poland. That is, each has a comparative advantage in those goods

- h. What is the range of prices for computers and grain for which both countries would benefit from trading with each other?

Answer:

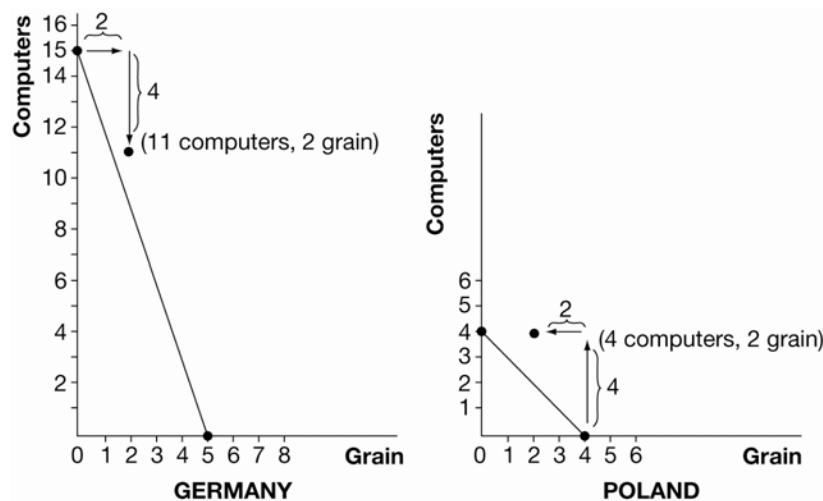
Grain must cost less than 3 computers per tonne to Germany. Computers must cost less than 1 tonne of grain per computer to Poland.

- i. Suppose Germany and Poland settle on a price of 2 computers for 1 tonne of grain or 1/2 tonne of grain for a computer. Suppose each country specializes in production and they trade 4 computers for 2 tonnes of grain. Plot the final consumption points on the graphs you made in part (b) above. Are these countries consuming inside or outside of their production possibilities frontier?

Answer:

See Exhibit 7. They are consuming outside their production possibilities frontier.

### Exhibit 7



- j. Suppose the productivity of a worker in Poland doubles so that a worker can produce 8 computers or 8 tonnes of grain per month. Which country has the absolute advantage in producing computers? Grain?

Answer:

Germany because one worker can produce 15 computers compared to 8. Poland because one worker can produce 8 tonnes of grain compared to 5.

- k. After the doubling of productivity in Poland, which country has a comparative advantage in producing computers? Grain? Has the comparative advantage changed? Has the material welfare of either country changed?

Answer:

Germany has comparative advantage in computers. Poland has comparative advantage in grain. No change in comparative advantage. Poland is better off, however, because it now has a larger set of choices.

- I. How would your analysis change if you assumed, more realistically, that each country had 10 million workers?

Answer:

It would not change absolute advantage or comparative advantage, or any of the results of the analysis. It would just change the scale in the previous two graphs by a factor of 10 million.

3. Suppose a worker in the United States can produce 4 cars or 20 computers per month while a worker in Russia can produce 1 car or 5 computers per month. Again, for simplicity, assume each country has only one worker.

- a. Fill out the following table:

	<b>Cars</b>	<b>Computers</b>
United States	_____	_____
Russia	_____	_____

Answer:

	<b>Cars</b>	<b>Computers</b>
United States	4	20
Russia	1	5

- b. Which country has the absolute advantage in the production of cars? Computers?

Answer:

United States because one worker can produce 4 cars compared to 1. The United States because one worker can produce 20 computers compared to 5.

- c. Which country has the comparative advantage in the production of cars? Computers?

Answer:

In both, the opportunity cost of 1 car is 5 computers. In both, the opportunity cost of 1 computer is 1/5 of a car. Therefore, neither has a comparative advantage in either good.

- d. Are there any gains to be made from trade? Why?

Answer:

No. Each can get the same trade-off between goods domestically.

- e. Does your answer in (d) above help you pinpoint a source for gains from trade?

Answer:

Yes. There needs to be differences in opportunity costs of producing goods across countries for there to be gains from trade.

- f. What might make two countries have different opportunity costs of production? (Use your imagination. This was not directly discussed in Chapter 3.)

Answer:

The availability of resources or technology might be different across countries. That is, workers could have different levels of education, land could be of different quality, capital could be of different quality, or the available technology might be different.

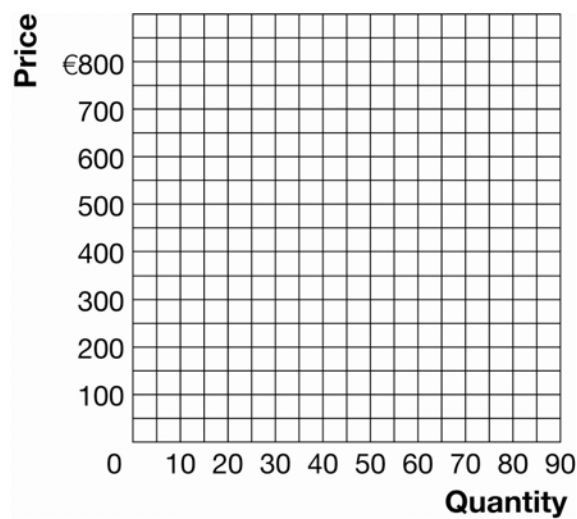
## Chapter 4

1. Suppose we have the following market supply and demand schedules for bicycles:

Price	Quantity Demanded	Quantity Supplied
€100	70	30
200	60	40
300	50	50
400	40	60
500	30	70
600	20	80

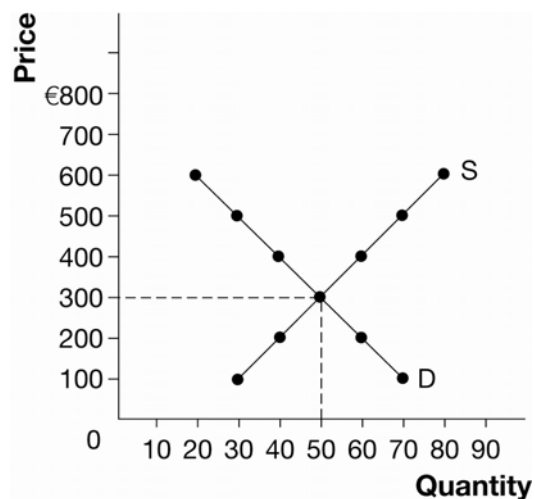
- a. Plot the supply curve and the demand curve for bicycles in Exhibit 1.

Exhibit 1



Answer:  
See Exhibit 3.

Exhibit 3



b. What is the equilibrium price of bicycles?

Answer:  
€300

c. What is the equilibrium quantity of bicycles?

Answer:  
50 bicycles

d. If the price of bicycles were €100, is there a surplus or a shortage?  
How many units of surplus or shortage are there? Will this cause the price to rise or fall?

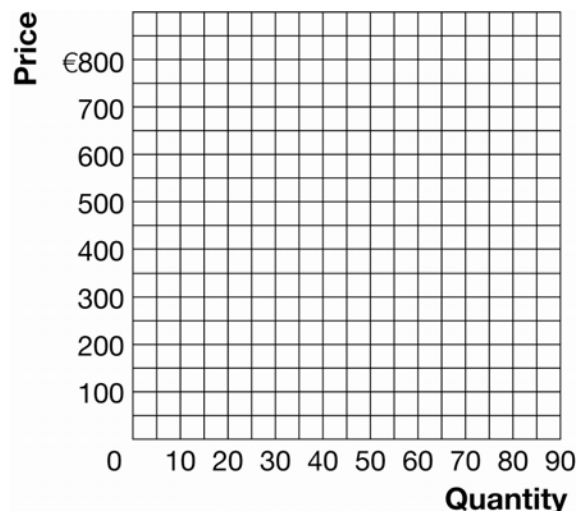
Answer:  
Shortage,  $70 - 30 = 40$  units, the price will rise

e. If the price of bicycles were €400, is there a surplus or a shortage?  
How many units of surplus or shortage are there? Will this cause the price to rise or fall?

Answer:  
Surplus,  $60 - 40 = 20$  units, the price will fall

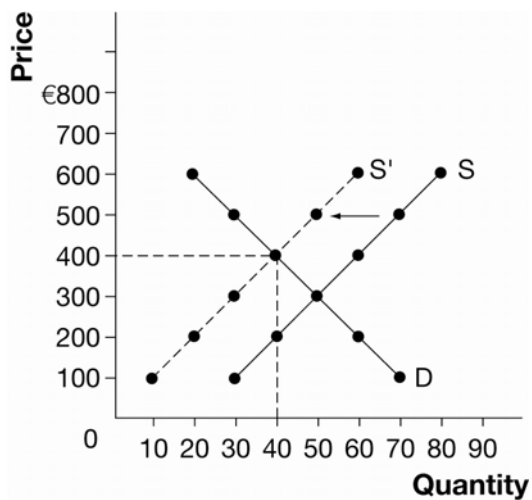
f. Suppose that the bicycle maker's labour union bargains for an increase in its wages. Further, suppose this event raises the cost of production, makes bicycle manufacturing less profitable, and reduces the quantity supplied of bicycles by 20 units at each price of bicycles. Plot the new supply curve and the original supply and demand curves in Exhibit 2. What is the new equilibrium price and quantity in the market for bicycles?

Exhibit 2



Answer:  
See Exhibit 4. equilibrium price = €400, equilibrium quantity = 40 bicycles

#### Exhibit 4



2. Each of the events listed below has an impact on the market for bicycles. For each event, which curve is affected (supply or demand for bicycles), what direction is it shifted, and what is the resulting impact on equilibrium price and quantity of bicycles?

- a. The price of cars increases.

Answer:

demand, shifts right, equilibrium price and quantity rise

- b. Consumers' incomes decrease, if bicycles are a normal good.

Answer:

demand, shifts left, equilibrium price and quantity fall

- c. The price of steel used to make bicycle frames increases.

Answer:

supply, shifts left, equilibrium price rises, equilibrium quantity falls

- d. An environmental movement shifts tastes toward bicycling.

Answer:

demand, shifts right, equilibrium price and quantity rise

- e. Consumers expect the price of bicycles to fall in the future.

Answer:

demand, shifts left, equilibrium price and quantity fall

- f. A technological advance in the manufacture of bicycles occurs.

Answer:

supply, shifts right, equilibrium price falls, equilibrium quantity rises

- g. The price of bicycle helmets and shoes is reduced.

Answer:

demand, shifts right, equilibrium price and quantity rise

- h. Consumers' incomes decrease, if bicycles are an inferior good

Answer:

demand, shifts right, equilibrium price and quantity rise

3. The following questions address a market when both supply and demand shift.

- a. What would happen to the equilibrium price and quantity in the bicycle market if there were an increase in both the supply and the demand for bicycles?

Answer:

equilibrium quantity will rise; the effect on the equilibrium price is ambiguous

- b. What would happen to the equilibrium price and quantity in the bicycle market if the demand for bicycles increases more than the increase in the supply of bicycles?

Answer:

equilibrium price and quantity will rise

## Chapter 5

1. For each pair of goods listed below, which good would you expect to have the more elastic demand? Why?

a. cigarettes; a trip to Florida

Answer:

a trip to Florida because it is a luxury while cigarettes are a necessity (to smokers)

b. an AIDS vaccine over the next month; an AIDS vaccine over the next five years

Answer:

An AIDS vaccine over the next five years because there are likely to be more substitutes (alternative medications) developed over this time period and consumers' behaviour may be modified over longer time periods.

c. beer; Budweiser

Answer:

Budweiser because it is a more narrowly defined market than beer so there are more substitutes for Budweiser than for beer

d. insulin; aspirin

Answer:

aspirin because there are many substitutes for aspirin but few substitutes for insulin

2. Suppose the Daily News estimates that if it raises the price of its newspaper from €1.00 to €1.50 then the number of subscribers will fall from 50,000 to 40,000.

a. What is the price elasticity of demand for the Daily Newspaper when elasticity is calculated using the midpoint method?

Answer:

$$(10,000/45,000)/(\text{€}0.50/\text{€}1.25) = 0.56$$

b. What is the advantage of using the midpoint method?

Answer:

With the midpoint method, the value of the elasticity is the same whether you begin at a price of €1.00 and raise it to €1.50 or begin at a price of €1.50 and reduce it to €1.00.

c. If the Daily News's only concern is to maximize total revenue, should it raise the price of a newspaper from €1.00 to €1.50? Why or why not?

Answer:

Yes. Since the price elasticity of demand is less than one (inelastic), an increase in price will increase total revenue.

3. The table below provides the demand schedule for motel rooms at Small Town Motel. Use the information provided to complete the table. Answer the following questions based on your responses in the table. Use the midpoint method to calculate the percentage changes used to generate the elasticities.

Price	Quantity Demanded	Total Revenue	% Change in Price	% Change in Quantity	Elasticity
€20	24	_____	_____	_____	_____
40	20	_____	_____	_____	_____
60	16	_____	_____	_____	_____
80	12	_____	_____	_____	_____
100	8	_____	_____	_____	_____
120	4	_____	_____	_____	_____

Answer:

Price	Quantity Demanded	Total Revenue	% Change in Price	% Change in Quantity
€20	24	480	0.67	0.18
40	20	800	0.40	0.22
60	16	960	0.29	0.29
80	12	960	0.22	0.40
100	8	800	0.18	0.67
120	4	480		

- a. Over what range of prices is the demand for motel rooms elastic? To maximize total revenue, should Small Town Motel raise or lower the price within this range?

Answer:

€80 to €120; lower its prices

- b. Over what range of prices is the demand for motel rooms inelastic? To maximize total revenue, should Small Town Motel raise or lower the price within this range?

Answer:

€20 to €60; raise its prices

- c. Over what range of prices is the demand for motel rooms unit elastic? To maximize total revenue, should Small Town Motel raise or lower the price within this range?

Answer:

€60 to €80; it doesn't matter. For prices in this range, a change in price proportionately changes the quantity demanded so total revenue is unchanged.

4. The demand schedule from question 3 above is reproduced below along with another demand schedule when consumer incomes have risen to €60,000 from €50,000. Use this information to answer the following questions. Use the midpoint method to calculate the percentage changes used to generate the elasticities.

Price	Quantity Demanded When Income is €50,000	Quantity Demanded When Income is €60,000
€20	24	34
40	20	30
60	16	26
80	12	22
100	8	18
120	4	14

- a. What is the income elasticity of demand when motel rooms rent for €40?

Answer:

$$(10/25)/(\text{€}10,000/\text{€}55,000) = 2.2$$

- b. What is the income elasticity of demand when motel rooms rent for €100?

Answer:

$$(10/13)/(\text{€}10,000/\text{€}55,000) = 4.2$$

- c. Are motel rooms normal or inferior goods? Why?

Answer:

Normal goods, because the income elasticity of demand is positive.

- d. Are motel rooms likely to be necessities or luxuries? Why?

Answer:

Luxuries, because the income elasticity of demand is large (greater than 1). In each case, an 18 percent increase in income caused a much larger increase in quantity demanded.

5. For each pair of goods listed below, which good would you expect to have the more elastic supply? Why?

a. televisions; beach front property

Answer:

Televisions because the production of televisions can be increased in response to an increase in the price of televisions while the quantity of beach front property is fixed.

b. crude oil over the next week; crude oil over the next year

Answer:

Crude oil over the next year because production of oil over the next year can more easily be increased than the production of oil over the next week.

c. a painting by van Gogh; a print of the same painting by van Gogh  
Top of Form

Answer:

A van Gogh print because more of them can be created in response to an increase in price while the quantity of an original work is fixed.

## Chapter 6

1. Use the following supply and demand schedules for bicycles to answer the questions below.

Price	Quantity demanded	Quantity supplied
€300	60	30
400	55	40
500	50	50
600	45	60
700	40	70
800	35	80

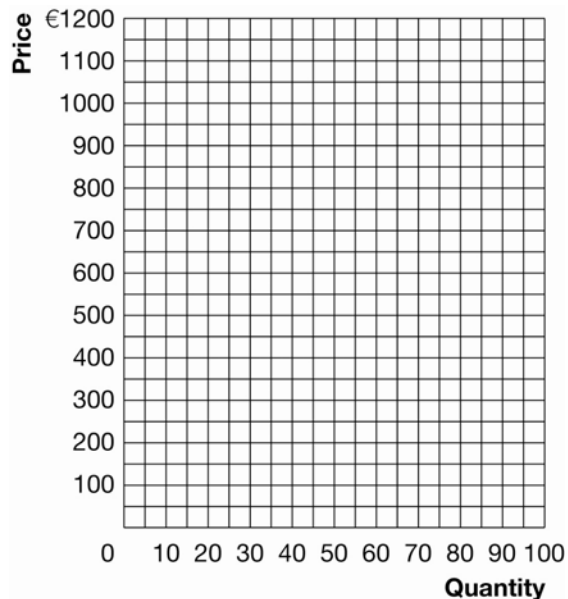
- a. In response to lobbying by the Bicycle Riders Association, the government places a price ceiling of €700 on bicycles. What effect will this have on the market for bicycles? Why?

Answer:

It will have no effect. The price ceiling is not binding because the equilibrium price is €500 and the price ceiling is set at €700.

- b. In response to lobbying by the Bicycle Riders Association, the government places a price ceiling of €400 on bicycles. Use the information provided above to plot the supply and demand curves for bicycles in Exhibit 1. Impose the price ceiling. What is the result of a price ceiling of €400 on bicycles?

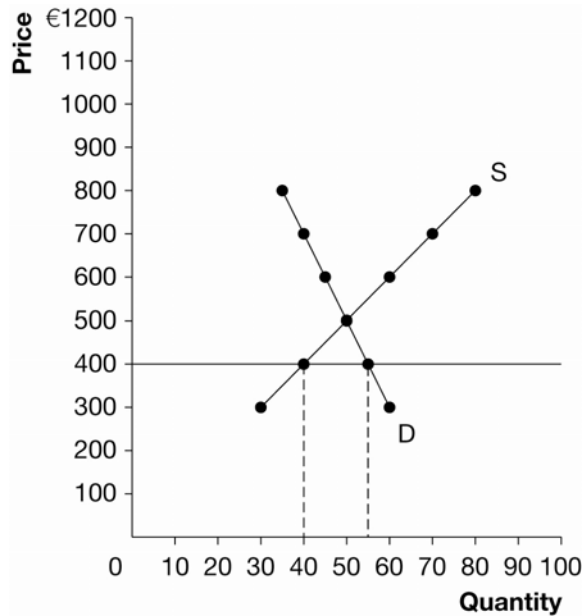
Exhibit 1



Answer:

See Exhibit 5. The quantity demanded rises to 55 units, the quantity supplied falls to 40 units, and there is a shortage of 15 units.

### Exhibit 5



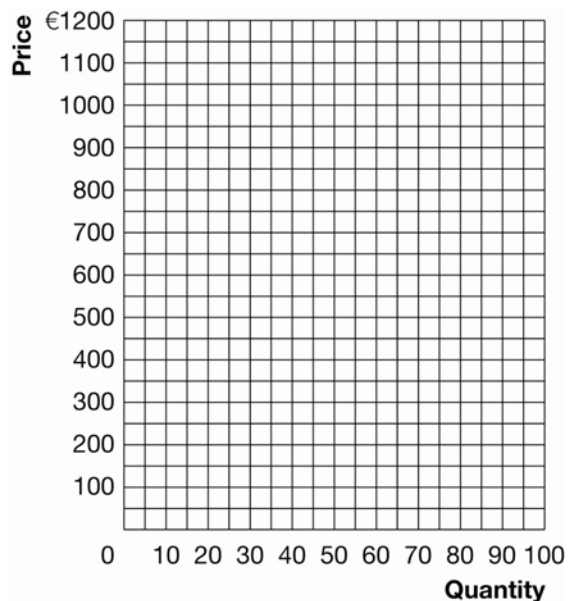
- c. Does a price ceiling of €400 on bicycles make all bicycle buyers better off? Why or why not?

Answer:

No. It may make those bicycle buyers better off that actually get a bicycle. However, some buyers are unable to get a bike, must wait in line, pay a bribe, or accept a lower quality bicycle.

- d. Suppose instead, in response to lobbying by the Bicycle Manufacturers Association, the government imposes a price floor on bicycles of €700. Use the information provided above to plot the supply and demand curves for bicycles in Exhibit 2. Impose the €700 price floor. What is the result of the €700 price floor?

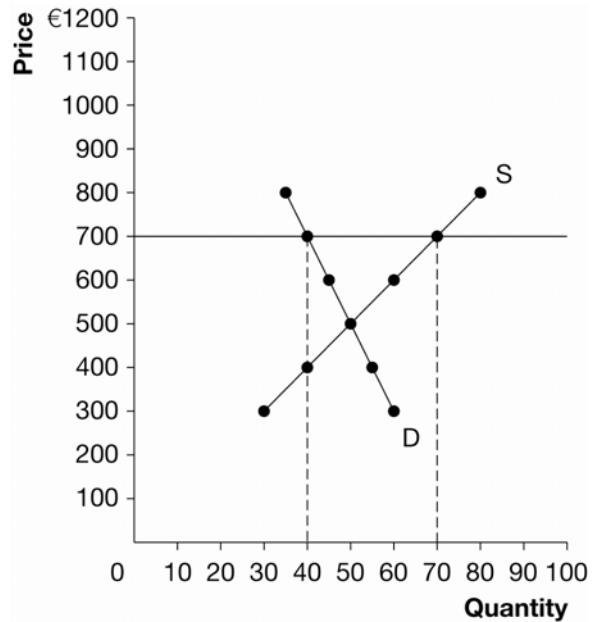
### Exhibit 2



Answer:

See Exhibit 6. The quantity supplied rises to 70 units, the quantity demanded falls to 40 units, and there is a surplus of 30 units.

**Exhibit 6**

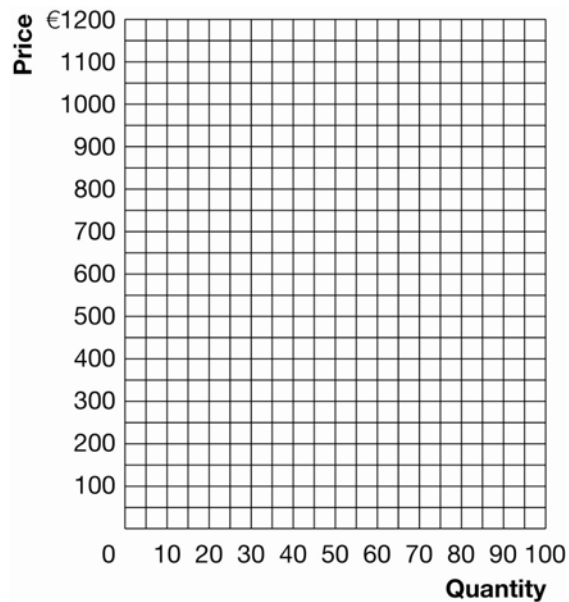


2. Use the following supply and demand schedules for bicycles to answer the questions below.

Price	Quantity demanded	Quantity supplied
€300	60	30
400	55	40
500	50	50
600	45	60
700	40	70
800	35	80

- a. Plot the supply and demand curves for bicycles in Exhibit 3. On the graph, impose a tax of €300 per bicycle to be collected from the sellers. After the tax, what has happened to the price paid by the buyers, the price received by the sellers, and the quantity sold when compared to the free market equilibrium?

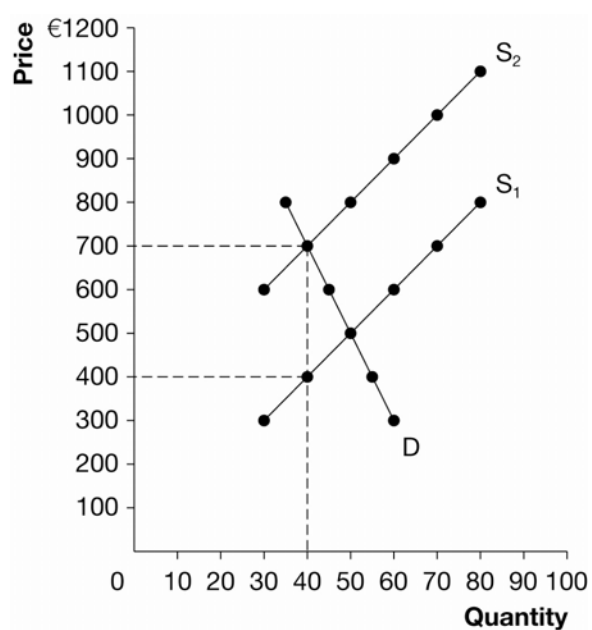
Exhibit 3



Answer:

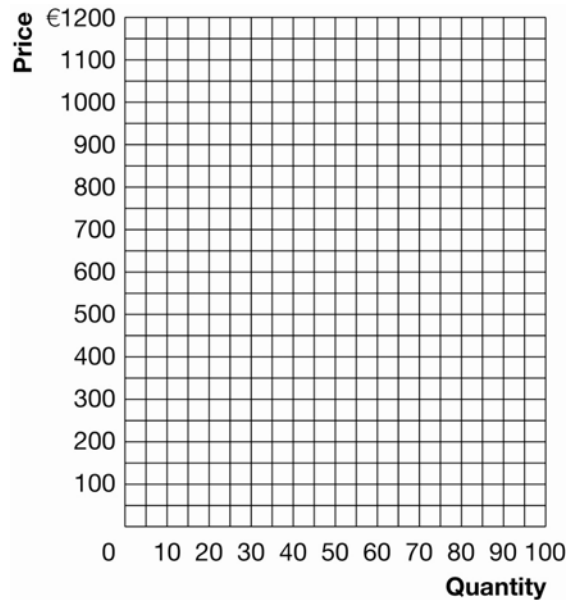
See Exhibit 7. The price buyers pay rises to €700, the price sellers receive falls to €400, and the quantity sold falls to 40 units.

Exhibit 7



- b. Again, plot the supply and demand curves for bicycles in Exhibit 4. On the graph, impose a tax of €300 per bicycle to be collected from the buyers. After the tax, what has happened to the price paid by the buyers, the price received by the sellers, and the quantity sold when compared to the free market equilibrium?

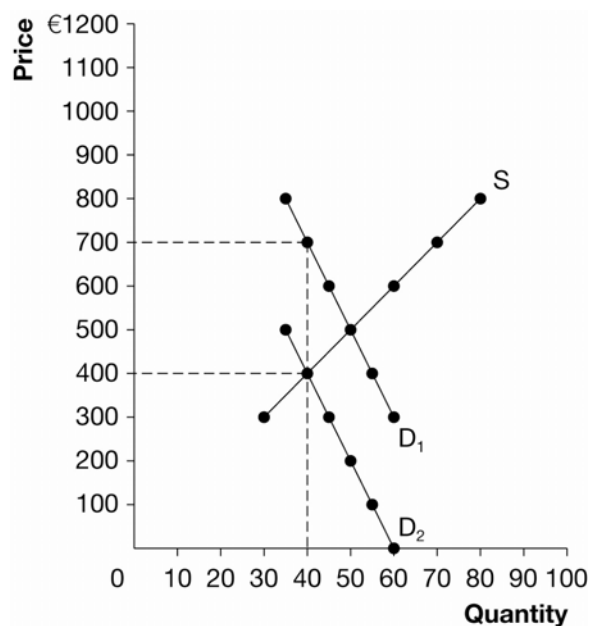
Exhibit 4



Answer:

See Exhibit 8. The price buyers pay rises to €700, the price sellers receive falls to €400, and the quantity sold falls to 40 units.

Exhibit 8



- c. Compare your answers to questions (a) and (b) above. What conclusion do you draw from this comparison?

Answer:

The impact of a tax collected from sellers is equivalent to the impact of a tax collected from buyers.

- d. Who bears the greater burden of this tax, the buyers or the sellers? Why?

Answer:

The greater burden of the tax has fallen on the buyers. The free market equilibrium price was €500. After the tax, the price the buyers pay has risen €200 while the price the sellers receive has fallen €100. This is because demand is less elastic than supply.

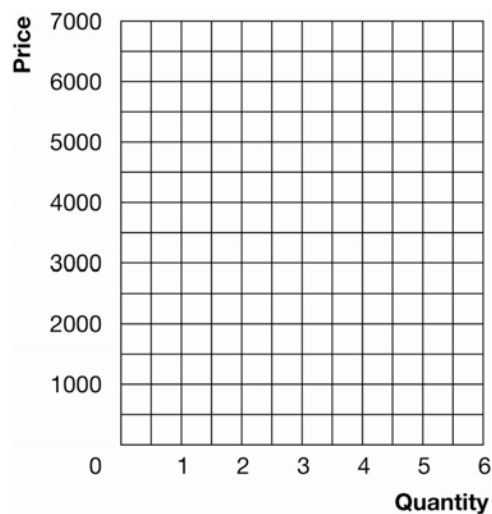
## Chapter 7

1. The following information describes the value Lauren Landlord places on having her five houses repainted. She values the repainting of each house at a different amount depending on how badly it needs repainting.

Value of new paint on first apartment house	€5000
Value of new paint on second apartment house	€4000
Value of new paint on third apartment house	€3000
Value of new paint on fourth apartment house	€2000
Value of new paint on fifth apartment house	€1000

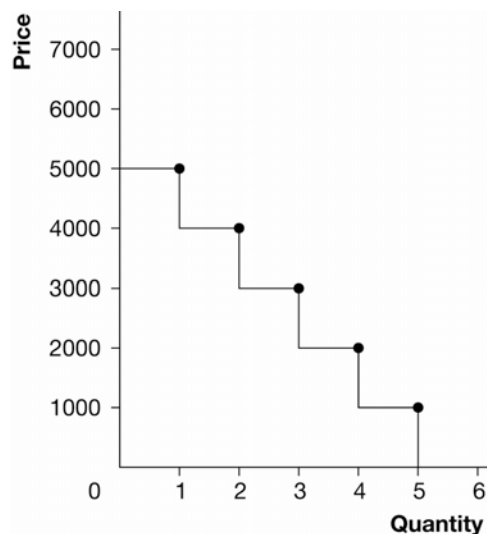
- a. Plot Lauren Landlord's willingness to pay in Exhibit 1.

Exhibit 1



Answer:  
See Exhibit 6.

Exhibit 6



- b. If the price to repaint her apartments is €5000 each, how many will she repaint? What is the value of her consumer surplus?

Answer:

One apartment painted.  $€5000 - €5000 = 0$ , therefore she has no consumer surplus.

- c. Suppose the price to repaint her apartments falls to €2000 each. How many apartments will Lauren choose to have repainted? What is the value of her consumer surplus?

Answer:

Four apartments painted.  $(€5000 - €2000) + (€4000 - €2000) + (€3000 - €2000) + (€2000 - €2000) = €6000$  of consumer surplus.

- d. What happened to Ms. Landlord's consumer surplus when the price of having her apartments repainted fell? Why?

Answer:

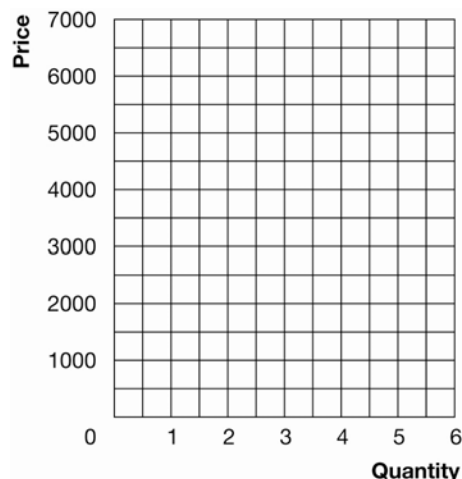
Her consumer surplus rose because she gains surplus on the unit she would have already purchased at the old price plus she gains surplus on the new units she now purchases due to the lower price.

2. The following information shows the costs incurred by Peter Painter when he paints apartments. Because painting is back breaking work, the more he paints, the higher the costs he incurs in both pain and chiropractic bills.

Cost of painting first apartment house	€1000
Cost of painting second apartment house	€2000
Cost of painting third apartment house	€3000
Cost of painting fourth apartment house	€4000
Cost of painting fifth apartment house	€5000

- a. Plot Peter Painter's cost in Exhibit 2.

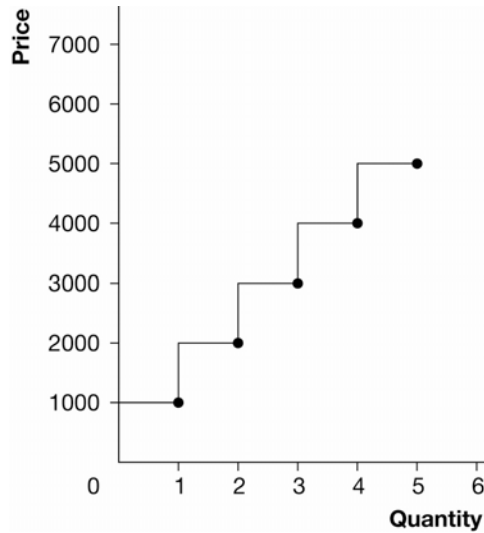
Exhibit 2



Answer:

See Exhibit 7.

## Exhibit 7



- b. If the price of painting apartment houses is €2000 each, how many will he paint? What is the value of his producer surplus?

Answer:

Two.  $(€2000 - €1000) + (€2000 - €2000) = €1000$  of producer surplus.

- c. Suppose the price to paint apartments rises to €4000 each. How many apartments will Peter choose to repaint? What is the value of his producer surplus?

Answer:

Four apartments.  $(€4000 - €1000) + (€4000 - €2000) + (€4000 - €3000) + (€4000 - €4000) = €6000$  of producer surplus.

- d. What happened to Mr. Painter's producer surplus when the price to paint apartments rose? Why?

Answer:

He received greater producer surplus on the units he would have produced anyway plus additional surplus on the units he now chooses to produce due to the increase in price.

3. Use the information about willingness to pay and cost from (1) and (2) above to answer the following questions.

- a. If a benevolent social planner sets the price for painting apartment houses at €5000, what is the value of consumer surplus? Producer surplus? Total surplus?

Answer:

Only one unit will be purchased so consumer surplus =  $(€5000 - €5000) = €0$ , producer surplus =  $(€5000 - €1000) = €4000$ , and total surplus =  $€0 + €4000 = €4000$ .

- b. If a benevolent social planner sets the price for painting apartment houses at €1000, what is the value of consumer surplus? Producer surplus? Total surplus?

Answer:

Only one unit will be produced so consumer surplus =  $(€5000 - €1000) = €4000$ , producer surplus =  $(€1000 - €1000) = €0$ , and total surplus =  $€4000 + €0 = €4000$ .

- c. If the price for painting apartment houses is allowed to move to its free market equilibrium price of €3000, what is the value of consumer surplus, producer surplus, and total surplus in the market? How does total surplus in the free market compare to the total surplus generated by the social planner?

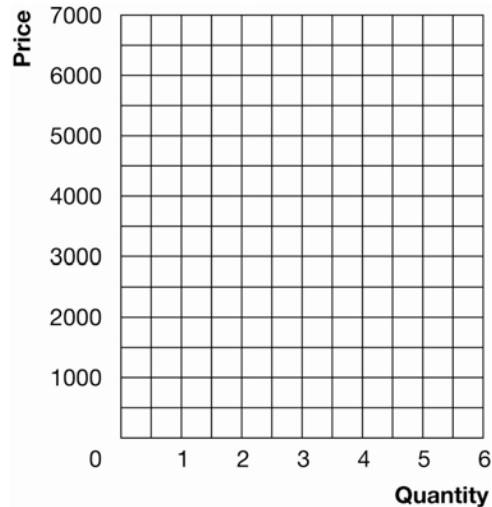
Answer:

Consumer surplus =  $(€5000 - €3000) + (€4000 - €3000) + (€3000 - €3000) = €3000$ .

Producer surplus =  $(€3000 - €1000) + (€3000 - €2000) + (€3000 - €3000) = €3000$ . Total surplus =  $€3000 + €3000 = €6000$ . Free market total surplus is greater than social planner total surplus.

4. In Exhibit 3, plot the linear supply and demand curves for painting apartments implied by the information in questions (1) and (2) above (draw them so that they contact the vertical axis). Show consumer and producer surplus for the free market equilibrium price and quantity. Is this allocation of resources efficient? Why?

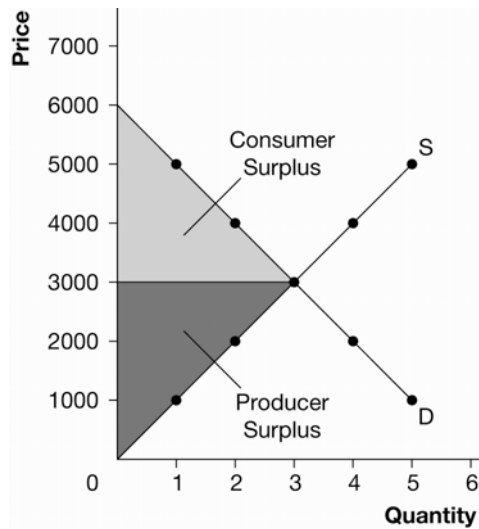
Exhibit 3



Answer:

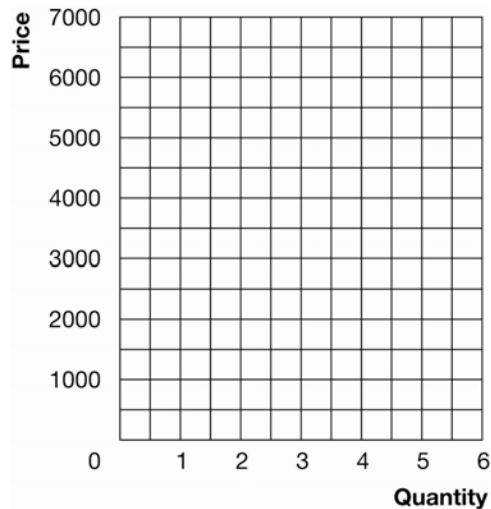
See Exhibit 8. Yes, it is efficient because at a quantity that is less than the equilibrium quantity we fail to produce units that buyers value more than their cost. At a quantity above the equilibrium quantity, we produce units that cost more than the buyers value them. At equilibrium we produce all possible units that are valued in excess of what they cost, which maximizes total surplus.

### Exhibit 8



5. Suppose Lauren Landlord has difficulty renting her dilapidated houses so she increases her willingness to pay for painting by €2000 per apartment. Plot Lauren's new willingness to pay along with Peter's cost in Exhibit 4. If the equilibrium price rises to €4000, what is the value of consumer surplus, producer surplus, and total surplus? Show consumer and producer surplus on the graph. Compare your answer to the answer you found in 3 (c) above.

### Exhibit 4



Answer:

See Exhibit 9.

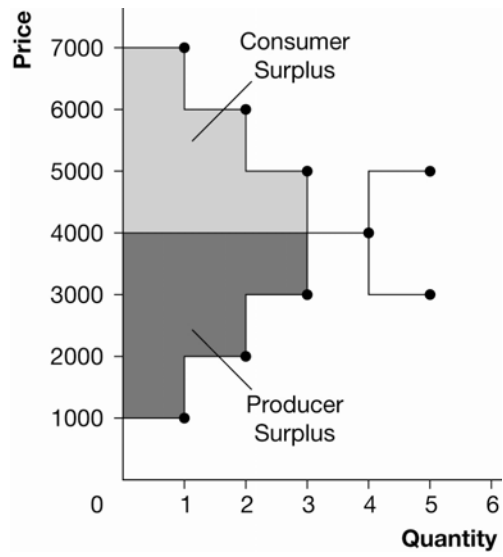
Consumer surplus = €3000 + €2000 + €1000 + €0 = €6000.

Producer surplus = €3000 + €2000 + €1000 + €0 = €6000.

Total surplus = €6000 + €6000 = €12000.

Consumer surplus, producer surplus, and total surplus have all increased.

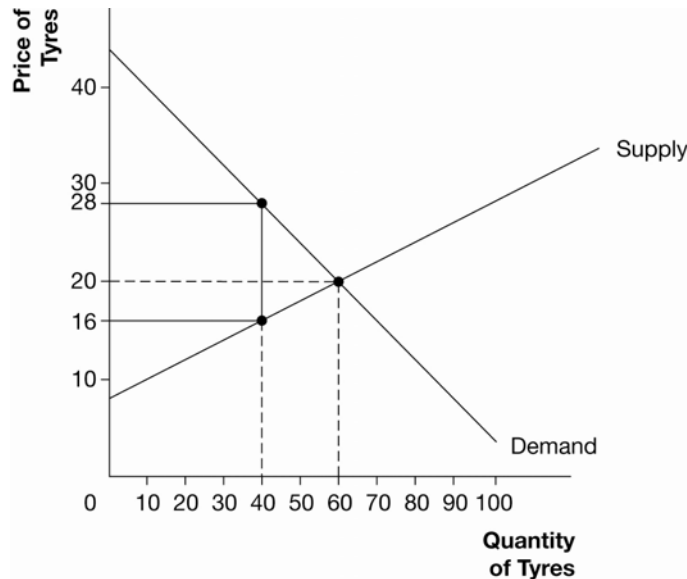
### Exhibit 9



## Chapter 8

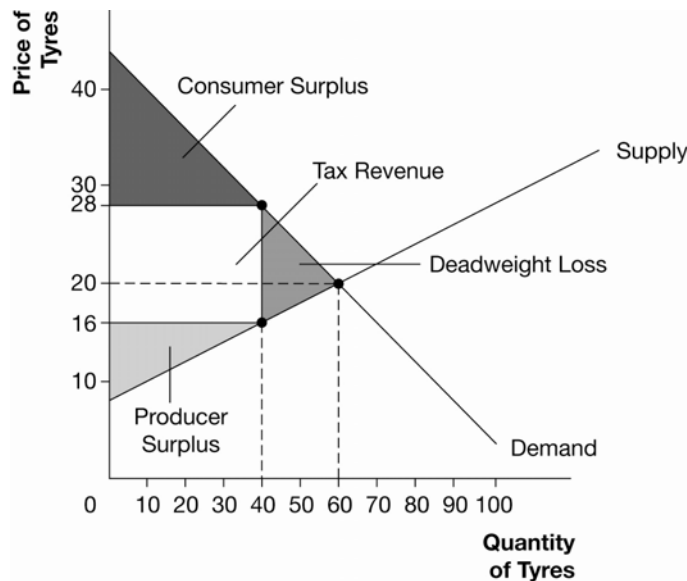
1. Exhibit 2 shows the market for tyres. Suppose that a €12 road use tax is placed on each tyre sold.
  - a. In Exhibit 2, locate consumer surplus, producer surplus, tax revenue, and the deadweight loss.

Exhibit 2



Answer:  
See Exhibit 5.

Exhibit 5



- b. Why is there a deadweight loss in the market for tyres after the tax is imposed?

Answer:

The tax raises the price paid by buyers and lowers the price received by sellers causing them to reduce their quantities demanded and supplied. Therefore, they fail to produce and exchange units where the value to buyers exceeds the cost to sellers.

- c. What is the value of the tax revenue collected by the government? Why wasn't the government able to collect €12 per tyre on 60 tyres sold (the original equilibrium quantity)?

Answer:

$€12 \times 40 = €480$ . The tax distorted prices to the buyers and sellers so that the quantity supplied and demanded with the tax is reduced to 40 units from 60 units.

- d. What is the value of the tax revenue collected from the buyers? What is the value of the tax revenue collected from the sellers? Did the burden of the tax fall more heavily on the buyers or the sellers? Why?

Answer:

$€8 \times 40 = €320$  from buyers.  $€4 \times 40 = €160$  from sellers. The burden fell more heavily on the buyers because the demand for tyres was less price elastic than the supply of tyres.

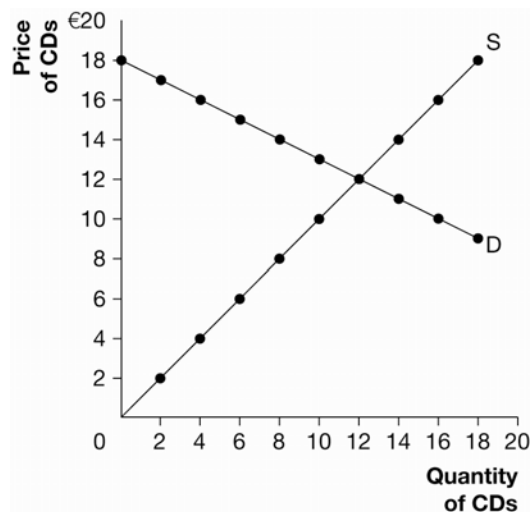
- e. Suppose over time, buyers of tyres are able to substitute away from car tyres (they walk and ride bicycles). Because of this, their demand for tyres becomes more price elastic. What will happen to the size of the deadweight loss in the market for tyres? Why?

Answer:

Deadweight loss will increase because when buyers are more sensitive to an increase in price (due to the tax) they will reduce their quantity demanded even more and shrink the market more. Thus, even fewer units that are valued by buyers in excess of their cost will be sold.

2. Use Exhibit 3, which shows the market for music CDs, to answer the following questions.

Exhibit 3



- a. Complete the table. (Note: to calculate deadweight loss, the area of a triangle is  $1/2$  base multiplied by height).

Tax per unit	Tax revenue collected	Deadweight loss
€0	_____	_____
3	_____	_____
6	_____	_____
9	_____	_____
12	_____	_____
15	_____	_____
18	_____	_____

Answer:

Tax per unit	Tax revenue collected	Deadweight loss
€0	€0	€0
3	30	$(€3 \times 2)/2 = €3$
6	48	$(€6 \times 4)/2 = €12$
9	54	$(€9 \times 6)/2 = €27$
12	48	$(€12 \times 8)/2 = €48$
15	30	$(€15 \times 10)/2 = €75$
18	0	$(€18 \times 12)/2 = €108$

- b. As the tax is increased, what happens to the amount of tax revenue collected? Why?

Answer:

It first rises, then falls. At first, as the tax is increased tax revenue rises. At some point, the tax reduces the size of the market to such a degree that the government is collecting a large tax on such a small quantity that tax revenue begins to fall.

- c. At a tax of €18 per CD, how much tax revenue is collected? Why?

Answer:

No tax revenue is collected because the tax is as large as the total surplus on the first unit. Therefore, there is no incentive to produce and consume even one unit and the entire market is eliminated.

- d. If the government wanted to maximize tax revenue, what tax per unit should it impose?

Answer:

€9 per unit.

- e. If the government wanted to maximize efficiency (total surplus) what tax per unit should it impose?

Answer:

€0 per unit which causes the market to return to its free market equilibrium.

- f. What happens to the deadweight loss due to the tax as the tax is increased? Why?

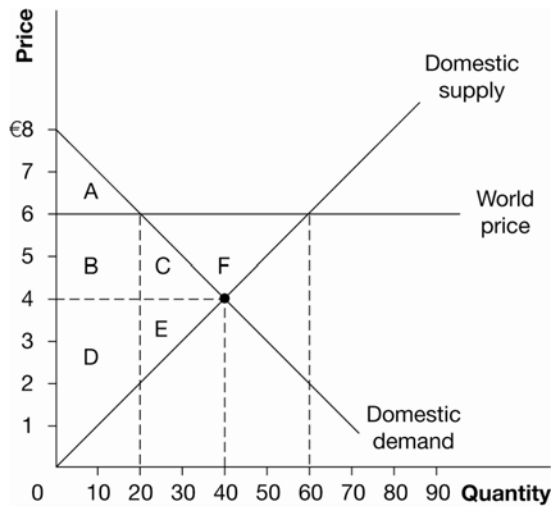
Answer:

It increases. Indeed, it increases at an increasing rate. This is because as the tax increases it causes the quantity exchanged to be reduced on units that have an ever larger potential surplus attached to them.

## Chapter 9

1. Use Exhibit 3 to answer the following questions.

Exhibit 3



- a. If trade is not allowed, what is the equilibrium price and quantity in this market?

Answer:

Price = €4, quantity = 40 units.

- b. If trade is allowed, will this country import or export this commodity? Why?

Answer:

Export because the world price is above the domestic price which implies that this country has a comparative advantage in the production of this good.

- c. If trade is allowed, what is the price at which the good is sold, the domestic quantity supplied and demanded, and the quantity imported or exported?

Answer:

Price = €6, quantity supplied = 60 units, quantity demanded = 20 units, quantity exported = 40 units.

- d. What area corresponds to consumer surplus if no trade is allowed?

Answer:

A + B + C

- e. What area corresponds to consumer surplus if trade is allowed?

Answer:

A

f. What area corresponds to producer surplus if no trade is allowed?

Answer:

D + E

g. What area corresponds to producer surplus if trade is allowed?

Answer:

B + C + D + E + F

h. If free trade is allowed, who gains and who loses, the consumers or the producers, and what area corresponds to their gain or loss?

Answer:

Consumers lose B + C, producers gain B + C + F

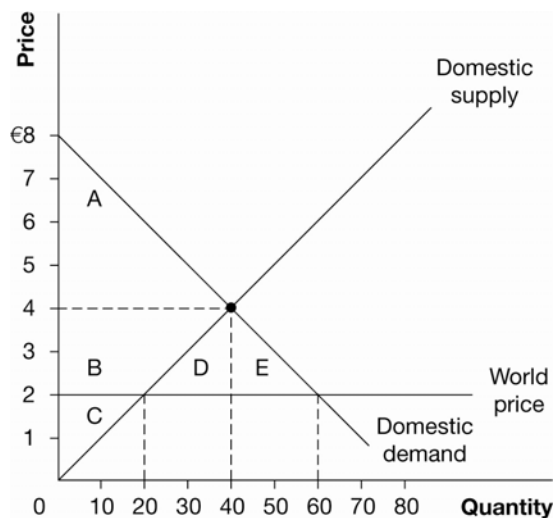
i. What area corresponds to the gains from trade?

Answer:

F

2. Use Exhibit 4 to answer the following questions.

Exhibit 4



a. If trade is not allowed, what is the equilibrium price and quantity in this market?

Answer:

Price = €4, quantity = 40 units.

b. If trade is allowed, will this country import or export this commodity? Why?

Answer:

Import because the world price is below the domestic price, which implies that other countries have a comparative advantage in the production of this good.

- c. If trade is allowed, what is the price at which the good is sold, the domestic quantity supplied and demanded, and the quantity imported or exported?

Answer:

Price = €2, quantity supplied = 20 units, quantity demanded = 60 units, quantity imported = 40 units.

- d. What area corresponds to consumer surplus if no trade is allowed?

Answer:

A

- e. What area corresponds to consumer surplus if trade is allowed?

Answer:

A + B + D + E

- f. What area corresponds to producer surplus if no trade is allowed?

Answer:

B + C

- g. What area corresponds to producer surplus if trade is allowed?

Answer:

C

- h. If free trade is allowed, who gains and who loses, the consumers or the producers, and what area corresponds to their gain or loss?

Answer:

Consumers gain B + D + E, producers lose B

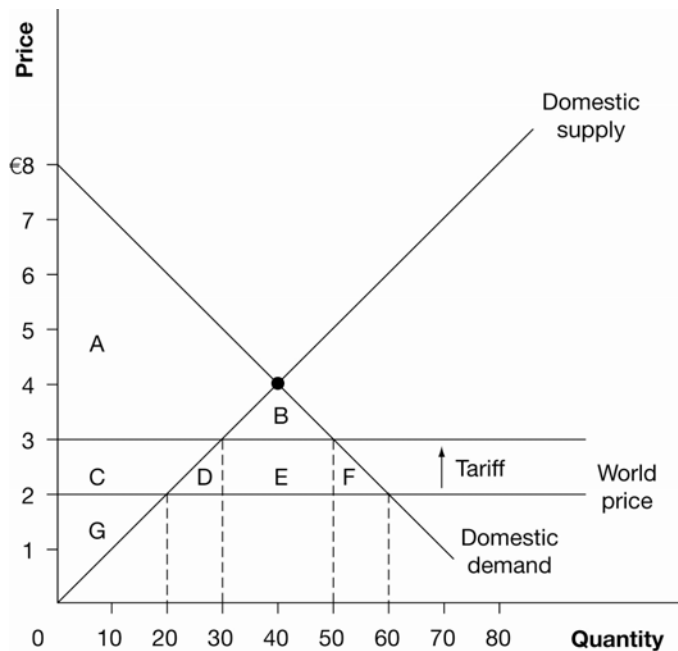
- i. What area corresponds to the gains from trade?

Answer:

D + E

3. Use Exhibit 5 to answer the following questions.

Exhibit 5



- a. If free trade is allowed, what is the domestic quantity supplied, domestic quantity demanded, and the quantity imported?

Answer:

Quantity supplied = 20 units, quantity demanded = 60 units, quantity imported = 40 units.

- b. If a €1 tariff is placed on this good, what is the domestic quantity supplied, domestic quantity demanded, and the quantity imported?

Answer:

Quantity supplied = 30 units, quantity demanded = 50 units, quantity imported = 20 units.

- c. What area corresponds to consumer and producer surplus before the tariff is applied?

Answer:

Consumer surplus = A + B + C + D + E + F, producer surplus = G

- d. What area corresponds to consumer surplus, producer surplus, and government revenue after the tariff is applied?

Answer:

Consumer surplus = A + B, producer surplus = C + G, government revenue = E

- e. What area corresponds to the deadweight loss associated with the tariff?

Answer:

D + F

- f. Describe in words the sources of the deadweight loss from a tariff.

Answer:

First, the rise in the price due to the tariff causes *overproduction* because units are produced that cost more than the world price. Second, the rise in price causes *underconsumption* because consumers fail to consume units where the value to consumers is greater than the world price.

- g. What is the size of the import quota that would generate results most similar to this €1 tariff?

Answer:

Import quota of 20 units—the same number of units imported with the €1 tariff.

- h. What is the size of the tariff that would eliminate trade altogether (i.e. that would return the market to its no-trade domestic solution)?

Answer:

A €2 tariff would raise the price to €4 (the no-trade domestic price) and eliminate trade.

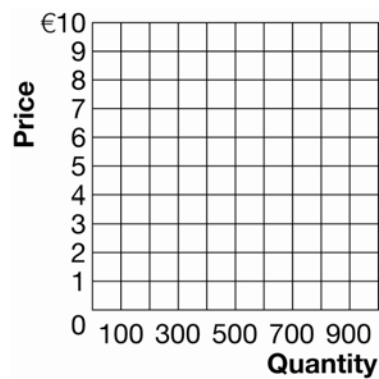
## Chapter 10

1. The information below provides the prices and quantities in a hypothetical market for automobile antifreeze.

Price per Gallon	Quantity Demanded	Quantity Supplied
€1	700	300
2	600	400
3	500	500
4	400	600
5	300	700
6	200	800
7	100	900
8	0	1,000

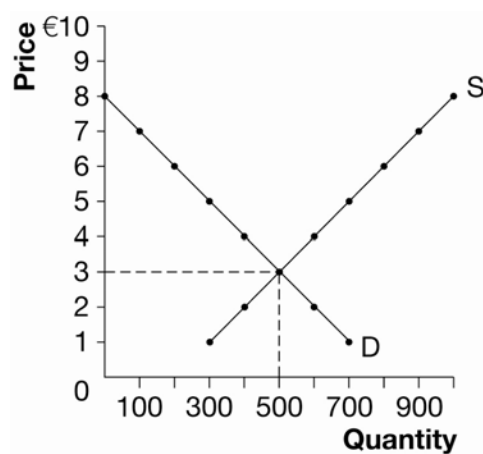
- a. Plot the supply and demand curves for antifreeze in Exhibit 1.

Exhibit 1



Answer:  
See Exhibit 3.

Exhibit 3



- b. What is the equilibrium price and quantity generated by buyers and sellers in the market?

Answer:

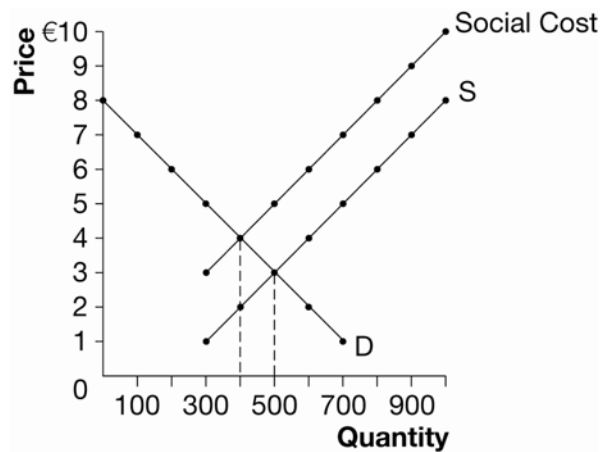
Price = €3, quantity = 500 units.

- c. Suppose that the production of antifreeze generates pollution in the form of chemical runoff and that the pollution imposes a €2 cost on society for each gallon of antifreeze produced. Plot the social cost curve in Exhibit 1.

Answer:

See Exhibit 4.

#### Exhibit 4



- d. What is the optimal quantity of antifreeze production? Does the market overproduce or under produce antifreeze?

Answer:

400 units. The market overproduces because the market quantity is 500 while the optimal quantity is 400 units.

- e. If the government were to intervene to make this market efficient, should it impose a Pigovian tax or a subsidy? What is the value of the appropriate tax or subsidy?

Answer:

The government should impose a Pigovian tax of €2 per unit.

2. Suppose citizens living around Metropolitan Airport value peace and quiet at a value of €3 billion.
- a. If it costs the airlines €4 billion to make their planes quieter (the airlines value noise at €4 billion), is it efficient for the government to require that the planes be muffled? Why?

Answer:

No, because the cost of correcting the externality exceeds the value placed on it by the affected parties.

- b. If it costs the airlines €2 billion to make their planes quieter, is it efficient for the government to require that the planes be muffled? Why?

Answer:

Yes, because the value placed on peace and quiet exceeds the cost of muffling the planes.

- c. Suppose there are no transaction costs and suppose that people have the right to peace and quiet. If it costs the airlines €2 billion to make their planes quieter, what is the private solution to the problem?

Answer:

The airlines could spend €2 billion and make their planes quieter or buy the right to make noise for €3 billion, so they will choose to make the planes quieter for €2 billion.

- d. Suppose there are no transaction costs and suppose that airlines have the right to make as much noise as they please. If it costs the airlines €2 billion to make their planes quieter, what is the private solution to the problem?

Answer:

The affected citizens must pay at least €2 billion and are willing to pay up to €3 billion to the airlines to have the planes made quieter.

- e. Compare your answers to (c) and (d) above. What are the similarities and what are the differences? What general rule can you make from the comparison?

Answer:

Similarities: the planes will be made quieter regardless of the original property rights because it is efficient. Differences: if the citizens have the right to quiet, citizens gain and airlines lose. If the airlines have the right to make noise, airlines gain and citizens lose.

- f. Suppose it costs the airlines €2 billion to make their planes quieter. If a private solution to the noise problem requires an additional €2 billion of transaction costs (due to legal fees, the large number of affected parties, and enforcement costs) can there be a private solution to the problem? Why?

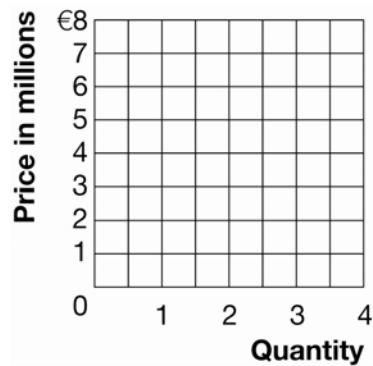
Answer:

No, because the transaction costs exceed the potential gains from trade. (The potential gains are the €3 billion value of quiet minus the €2 billion cost to quiet the planes, or €1 billion.)

3. Suppose there are four firms that each wish to dump one barrel of waste chemicals into the river. Firm 1 produces a product that is so valued by society and sells for such a high price that it is willing to pay €8 million to dump a barrel. Firm 2 produces a somewhat less valuable product and is only willing to pay €6 million to dump a barrel. In similar fashion, suppose firm 3 is willing to pay €4 million to dump a barrel and firm 4 will pay €2 million.

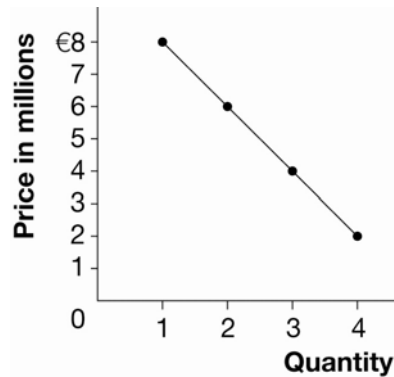
- a. Draw the demand for the right to pollute in Exhibit 2.

Exhibit 2



Answer:  
See Exhibit 5.

Exhibit 5



- b. Suppose the government's environment protection directorate estimates that the safe level of pollutants in the river is 3 barrels. At what value should they set a Pigovian tax?

Answer:  
€4 million per barrel.

- c. Suppose the government's environment protection directorate estimates that the safe level of pollutants in the river is 3 barrels. How many tradable pollution permits should they allocate? At what price will the permits trade?

Answer:  
3 permits should be sold. They will trade at a price of €4 million per permit.

- d. Compare part (b) and (c) above. How many barrels are dumped in each case? What is the price paid to pollute in each case? Is there an advantage to one method of internalizing the externality compared to the other?

**Answer:**

3 barrels. €4 million per barrel. Yes, with the tradable pollution permits the regulator does not need to know anything about the demand for pollution in this market in order to target pollution at 3 barrels and the initial allocation of pollution permits will not have an impact on the efficient solution.

## Chapter 11

1. Consider the rivalry and excludability of each of the following goods. Use this information to determine whether the goods are public goods, private goods, common resources, or produced by a natural monopoly. Explain.

- a. Fish in a private pond

Answer:

Rival and excludable, private good. Only one can eat a fish. Since it is private, non-payers can be excluded from fishing.

- b. Fish in the ocean

Answer:

Rival but not excludable, common resource. Only one can eat a fish but the ocean is not privately owned so non-payers cannot be excluded.

- c. Broadcast television signals

Answer:

Not rival and not excludable, public good. Additional viewers can turn on their TV without reducing the benefits to other consumers and non-payers cannot be excluded.

- d. Cable television signals

Answer:

Not rival but excludable, produced by a natural monopoly. More houses can be wired without reducing the benefit to other consumers and the cable company can exclude non-payers.

- e. Basic research on lifestyle and cholesterol levels

Answer:

rival and not excludable, public good. Once discovered, additional people can benefit from the knowledge without reducing the benefit to other consumers of the knowledge and once in the public domain, non-payers cannot be excluded.

- f. Specific research on a cholesterol lowering drug for which a patent can be obtained

Answer:

Not rival but excludable, produced by a natural monopoly. Additional users of the knowledge could use it without reducing the benefit to other consumers therefore it is not rival. If a patent can be obtained, no one else can produce the anti-cholesterol pill so it is excludable.

- g. An uncongested highway (no tolls)

Answer:

Not rival and not excludable, public good. Additional cars can travel the road without reducing the benefit to other consumers and the additional cars cannot be forced to pay for the road.

- h. A congested highway (no tolls)

Answer:

Rival but not excludable, common resource. Additional cars reduce the benefits of current users but they cannot be forced to pay for the use of the highway.

- i. An uncongested toll road

Answer:

Not rival but excludable, produced by a natural monopoly. Additional cars do not reduce the benefits to current users but they can be excluded if they don't pay the toll.

- j. A hot dog served at a private party

Answer:

Rival but not excludable, common resource. If one eats the hot dog, another cannot. However, once provided, party-goers cannot be charged for eating the hot dogs.

- k. A hot dog sold at a stand owned by the city government

Answer:

Rival and excludable, private good. If one eats the hot dog, another cannot. Even though it is supplied by the government, it is being sold so non-payers can be excluded.

2. Suppose the city of Roadville is debating whether to build a new motorway from its airport to the city centre. The city surveys its citizens and finds that, on average, each of the one million residents values the new highway at a value of €50 and the highway costs €40 million to construct.

- a. Assuming the survey was accurate, is building a new motorway efficient? Why?

Answer:

Yes, because the total benefit is  $€50 \times 1,000,000 = €50$  million while the cost is €40 million.

- b. Under what conditions would private industry build the road?

Answer:

If the road could be built as a toll road, then private industry could make the road excludable and the project could be profitable.

- c. Should the city build the road? On average, how much should it increase each resident's tax bill to pay for the road?

Answer:

Yes. €40.

- d. Is it certain that building the motorway is efficient? That is, what are the problems associated with using cost-benefit analysis as a tool for deciding whether to provide a public good?

Answer:

Yes. €40.

## Chapter 12

1. a. Fill out the table below assuming that the government taxes 20 percent of the first €30,000 of income and 50 percent of all income above €30,000.

Income	Taxes Paid	Average Tax Rate	Marginal Tax Rate
€10,000	_____	_____	_____
20,000	_____	_____	_____
30,000	_____	_____	_____
40,000	_____	_____	_____
50,000	_____	_____	_____

Answer:

Income	Taxes Paid	Average Tax Rate	Marginal Tax Rate
€10,000	€2,000	20%	20%
20,000	4,000	20	20
30,000	6,000	20	20
40,000	11,000	27.5	50
50,000	16,000	32	50

- b. Compare the taxes for someone earning €10,000 to those of someone earning €50,000 in part (a) above. Is this tax system progressive, regressive, or proportional? Explain.

Answer:

Progressive because the average tax rate for a person earning €50,000 exceeds the average tax rate for a person earning €10,000. That is, the rich pay a larger fraction of their income than do poor people.

2. a. Fill out the table below assuming that the government imposes a lump-sum tax of €6,000 on all individuals.

Income	Taxes Paid	Average Tax Rate	Marginal Tax Rate
€10,000	_____	_____	_____
20,000	_____	_____	_____
30,000	_____	_____	_____
40,000	_____	_____	_____
50,000	_____	_____	_____

Answer:

Income	Taxes Paid	Average Tax Rate	Marginal Tax Rate
€10,000	€6,000	60%	0%
20,000	6,000	30	0
30,000	6,000	20	0
40,000	6,000	15	0
50,000	6,000	12	0

- b. Compare the taxes for someone earning €10,000 to those of someone earning €50,000 in part (a) above. Is this tax system progressive, regressive, or proportional? Explain

Answer:

Regressive because the average tax rate for a person earning €10,000 exceeds the average tax rate for a person earning €50,000. That is, the poor pay a larger fraction of their income than do rich people.

3. a. Fill out the table below assuming that the government taxes 20 percent of all income.

Income	Taxes Paid	Average Tax Rate	Marginal Tax Rate
€10,000	_____	_____	_____
20,000	_____	_____	_____
30,000	_____	_____	_____
40,000	_____	_____	_____
50,000	_____	_____	_____

Answer:

Income	Taxes Paid	Average Tax Rate	Marginal Tax Rate
€10,000	€2,000	20%	20%
20,000	4,000	20	20
30,000	6,000	20	20
40,000	8,000	20	20
50,000	10,000	20	20

- b. Compare the taxes for someone earning €10,000 to those of someone earning €50,000 in part (a) above. Is this tax system progressive, regressive, or proportional? Explain.

Answer:

Proportional because the average tax rate for a person earning €10,000 is equal to that of a person earning €50,000.

4. a. Fill out the table below assuming that the government taxes 40 percent of the first €10,000 of income and 10 percent of all income above €10,000.

Income	Taxes Paid	Average Tax Rate	Marginal Tax Rate
€10,000	_____	_____	_____
20,000	_____	_____	_____
30,000	_____	_____	_____
40,000	_____	_____	_____
50,000	_____	_____	_____

Answer:

<b>Income</b>	<b>Taxes Paid</b>	<b>Average Tax Rate</b>	<b>Marginal Tax Rate</b>
€10,000	€4,000	40%	10%
20,000	5,000	25	10
30,000	6,000	20	10
40,000	7,000	17.5	10
50,000	8,000	16	10

- b. Compare the taxes for someone earning €10,000 to those of someone earning €50,000 in part (a) above. Is this tax system progressive, regressive, or proportional? Explain.

Answer:

Regressive because the average tax rate for a person earning €10,000 is greater than that of a person earning €50,000.

5. a. Suppose the only objective of the tax system is to collect €6,000 from people who earn €30,000. Which of the tax systems described in questions 1 through 4 is best? Why?

Answer:

They are all equally suitable because each system generates €6,000 tax revenue from people earning €30,000.

- b. Suppose the only objective of the tax system is to be efficient. Which of the tax systems described in questions 1 through 4 is best? Why?

Answer:

Taxes are more efficient if they generate smaller deadweight losses and smaller administrative burdens. The lump-sum tax in question 2 has a zero marginal rate so it does not distort economic decision making (no deadweight loss) and it is simple (small administrative burden), therefore it is most efficient. However, it is regressive.

- c. Suppose the only objective of the tax system is to be vertically equitable based on the ability-to-pay principle. Which of the tax systems described in questions 1 through 4 is best? Why?

Answer:

The tax system in question 1 because it is the only one that is progressive.

## Chapter 13

1. Joe runs a small boat factory. He can make ten boats per year and sell them for €25,000 each. It costs Joe €150,000 for the raw materials (fibreglass, wood, paint, and so on) to build the ten boats. Joe has invested €400,000 in the factory and equipment needed to produce the boats: €200,000 from his own savings and €200,000 borrowed at 10 percent interest. (Assume that Joe could have loaned his money out at 10 percent, too.) Joe can work at a competing boat factory for €70,000 per year.

- a. What is the total revenue Joe can earn in a year?

Answer:

$$10 \times €25,000 = €250,000$$

- b. What are the explicit costs Joe incurs while producing ten boats?

Answer:

$$€150,000 + (€200,000 \times 0.10) = €170,000$$

- c. What are the total opportunity costs of producing ten boats (explicit and implicit)?

Answer:

$$€150,000 + (€400,000 \times 0.10) + €70,000 = €260,000$$

- d. What is the value of Joe's accounting profit?

Answer:

$$€250,000 - €170,000 = €80,000$$

- e. What is the value of Joe's economic profit?

Answer:

$$€250,000 - €260,000 = -€10,000$$

- f. Is it truly profitable for Joe to operate his boat factory? Explain.

Answer:

No. Joe could make €70,000 plus 10 percent interest on his €200,000 financial capital for a total of €90,000 if he worked for the competition instead of running his own factory. His factory makes an accounting profit of only €80,000 per year so it costs him €10,000 to run his own factory (the size of the economic loss).

2. Complete the following table. It describes the production and cost of hamburgers at a roadside stand. All figures are measured per hour.

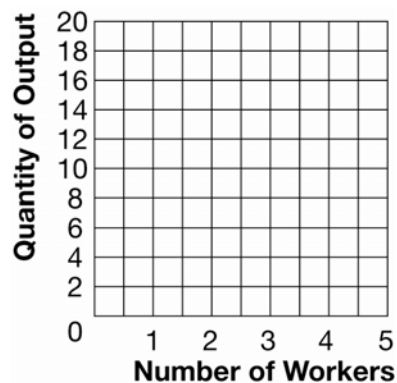
Number of Workers	Output	Marginal Product of Labour	Cost of Factory	Cost of Workers	Total Cost
0	0		€25	€0	
1	6		25	5	
2	11		25	10	
3	15		25	15	
4	18		25	20	
5	20		25	25	

Answer:

Number of Workers	Output	Marginal Product of Labour	Cost of Factory	Cost of Workers	Total Cost
0	0		€25	€0	€25
1	6	6	25	5	30
2	11	5	25	10	35
3	15	4	25	15	40
4	18	3	25	20	45
5	20	2	25	25	50

- a. Plot the production function in Exhibit 1.

Exhibit 1



Answer:  
See Exhibit 4.

#### Exhibit 4



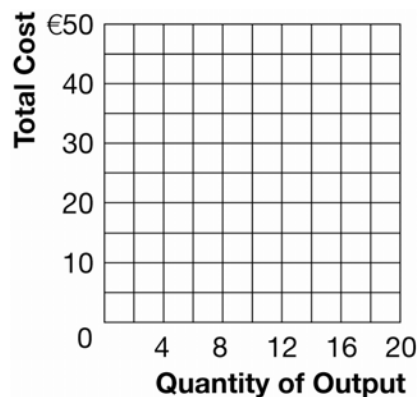
- b. What happens to the marginal product of labour as more workers are added to the production facility? Why? Use this information about the marginal product of labour to explain the slope of the production function you plotted above.

Answer:

It diminishes because additional workers have to share the production equipment and the work area becomes more crowded. The slope of the production function is the change in output from a change of one unit of input, which is the marginal product of labour. Since it is diminishing, the slope of the production function gets flatter as a greater number of inputs are used.

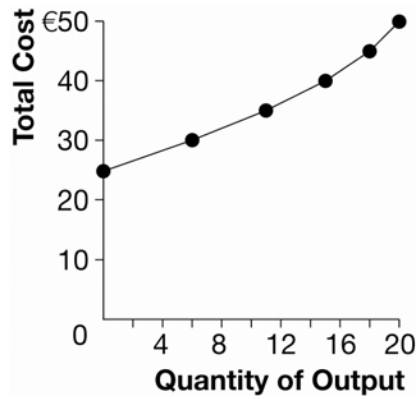
- c. Plot the total-cost curve in Exhibit 2.

#### Exhibit 2



Answer:  
See Exhibit 5.

### Exhibit 5



d. Explain the shape of the total cost curve.

Answer:

The total cost curve gets steeper as the quantity produced rises due to the diminishing marginal product of labour. That is, in order to produce additional equal increments of output the firm must employ ever greater amounts of inputs and costs rise at an increasing rate.

3. The information below is for Bob's blue jeans manufacturing plant. All data is per hour. Complete the table. Note the following abbreviations: FC (fixed cost), VC (variable cost), TC (total cost), AFC (average fixed cost), AVC (average variable cost), ATC (average total cost), MC (marginal cost).

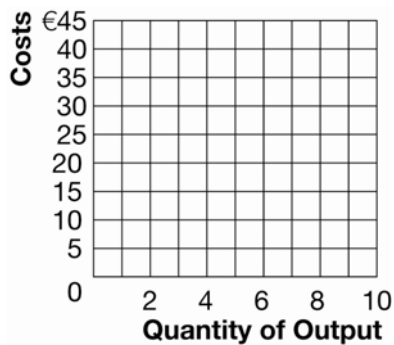
Quantity	FC	VC	TC	AFC	AVC	ATC	MC
0	€16	€0	_____	_____	_____	_____	_____
1	16	18	_____	_____	_____	_____	_____
2	16	31	_____	_____	_____	_____	_____
3	16	41	_____	_____	_____	_____	_____
4	16	49	_____	_____	_____	_____	_____
5	16	59	_____	_____	_____	_____	_____
6	16	72	_____	_____	_____	_____	_____
7	16	90	_____	_____	_____	_____	_____
8	16	114	_____	_____	_____	_____	_____
9	16	145	_____	_____	_____	_____	_____
10	16	184	_____	_____	_____	_____	_____

Answer:

Quantity	FC	VC	TC	AFC	AVC	ATC	MC
0	€16	€0	€16				€18
1	16	18	34	€16.00	€18.00	€34.00	13
2	16	31	47	8.00	15.50	23.50	10
3	16	41	57	5.33	13.67	19.00	8
4	16	49	65	4.00	12.25	16.25	10
5	16	59	75	3.20	11.80	15.00	13
6	16	72	88	2.67	12.00	14.67	18
7	16	90	106	2.29	12.86	15.14	24
8	16	114	130	2.00	14.25	16.25	31
9	16	145	161	1.78	16.11	17.88	39
10	16	184	200	1.60	18.40	20.00	

a. Plot AFC, AVC, ATC, and MC in Exhibit 3.

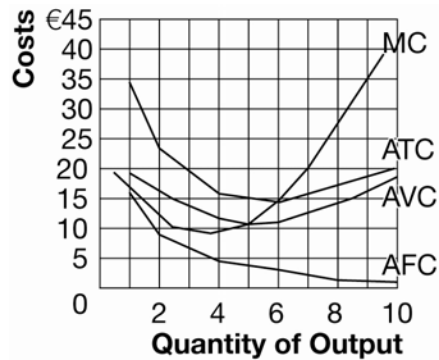
Exhibit 3



Answer:

See Exhibit 6.

## Exhibit 6



- b. Explain the shape of each of the curves you plotted in part (a) above.

Answer:

*AFC* declines as the quantity goes up because a fixed cost is spread across a greater number of units. *MC* declines for the first four units due to an increasing marginal product of the variable input. *MC* rises thereafter due to decreasing marginal product. *AVC* is U-shaped for the same reason as *MC*. *ATC* declines due to falling *AFC* and increasing marginal product. *ATC* rises at higher levels of production due to decreasing marginal product.

- c. Explain the relationship between *ATC* and *MC*.

Answer:

When *MC* is below *ATC*, *ATC* must be declining. When *MC* is above *ATC*, *ATC* must be rising. Therefore, *MC* crosses *ATC* at the minimum of *ATC*.

- d. Explain the relationship between *ATC*, *AFC*, and *AVC*.

Answer:

*AFC* plus *AVC* equals *ATC*.

- e. What is Bob's efficient scale? How do you find the efficient scale? Explain.

Answer:

Six pairs of blue jeans. Efficient scale is the output that minimizes *ATC*. It is also the place where *MC* crosses the average total cost curve.

## Chapter 14

1. Are the following markets likely to be perfectly competitive? Explain.

a. The market for petrol

Answer:

Yes, many buyers and sellers and the product of different sellers is nearly identical.

b. The market for blue jeans

Answer:

Probably not; many buyers and sellers but the product is not identical because of the importance of branding (eg Levi's) so each seller is not a price taker.

c. The market for agricultural products such as wheat and milk

Answer:

Yes, many buyers and sellers and the product of different sellers is identical.

d. The market for the shares of IBM

Answer:

Yes, many buyers and sellers and the product of different sellers is identical.

e. The market for electricity

Answer:

No, few sellers (often only one). If there were multiple sellers, the product would be identical.

f. The market for cable television

Answer:

No, few sellers (often only one). If there were multiple sellers, the product would be nearly identical.

2. a. The following table contains information about the revenues and costs for Barry's Golf Ball Manufacturing. All data are per hour. Complete the first group of columns which correspond to Barry's production if  $P = €3$ . (TR = total revenue, TC = total cost, MR = marginal revenue, MC = marginal cost)

Q	TR, $P = €3$	TC	Profit	MR	MC	TR, $P = €2$	Profit	MR
0	_____	€1	_____	_____	_____	_____	_____	_____
1	_____	2	_____	_____	_____	_____	_____	_____
2	_____	4	_____	_____	_____	_____	_____	_____
3	_____	7	_____	_____	_____	_____	_____	_____
4	_____	11	_____	_____	_____	_____	_____	_____
5	_____	16	_____	_____	_____	_____	_____	_____

Answer:

<b>Q</b>	<b>TR, P = €3</b>	<b>TC</b>	<b>Profit</b>	<b>MR</b>	<b>MC</b>
0	€0	€1	-€1		
1	3	2	1	€3	€1
2	6	4	2	3	2
3	9	7	2	3	3
4	12	11	1	3	4
5	15	16	-1	3	5

- b. If the price is €3 per golf ball, what is Barry's optimal level of production? What criteria did you use to determine the optimal level of production?

Answer:

Optimal production is either two or three golf balls per hour. This level of production maximizes profit (at €2) and it is the level of output where  $MC = MR$  (at €3).

- c. Is €3 per golf ball a long-run equilibrium price in the market for golf balls? Explain. What adjustment will take place in the market for golf balls and what will happen to the price in the long run?

Answer:

No, because Barry is earning positive economic profits of €2. These profits will attract new firms to enter the market for golf balls, the market supply will increase, and the price will fall until economic profits are zero.

- d. Suppose the price of baseballs falls to €2. Fill out the remaining three columns of the table above. What is the profit-maximizing level of output when the price is €2 per baseball? How much profit does Barry's Baseball Manufacturing earn when the price of baseballs is €2?

Answer:

Optimal production is either one or two golf balls per hour. Zero economic profit is earned by Barry.

<b>Q</b>	<b>TR, P = €3</b>	<b>TC</b>	<b>Profit</b>	<b>MR</b>	<b>MC</b>	<b>TR, P = €2</b>	<b>Profit</b>	<b>MR</b>
0	€0	€1	-€1			€0	-€1	
1	3	2	1	€3	€1	2	0	€2
2	6	4	2	3	2	4	0	2
3	9	7	2	3	3	6	-1	2
4	12	11	1	3	4	8	-3	2
5	15	16	-1	3	5	10	-6	2

- e. Is €2 per golf ball a long-run equilibrium price in the market for golf balls? Explain. Why would Barry continue to produce at this level of profit?

Answer:

Yes. Economic profits are zero and firms neither enter nor exit the industry. Zero economic profits means that Barry doesn't earn anything beyond his opportunity costs of production but his revenues do cover the cost of his inputs and the value of his time and money.

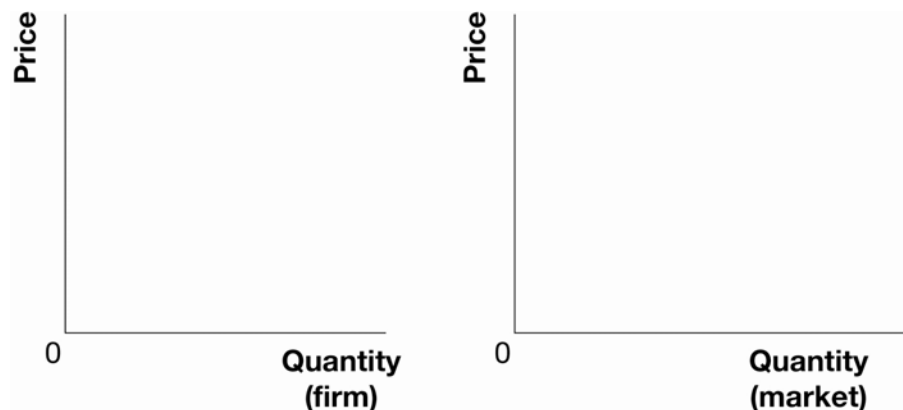
- f. Describe the slope of the short-run supply curve for the market for golf balls. Describe the slope of the long-run supply curve in the market for golf balls.

Answer:

The slope of the short-run supply curve is positive because when  $P = €2$ , quantity supplied is one or two units per firm and when  $P = €3$ , quantity supplied is two or three units per firm. In the long run, supply is horizontal (perfectly elastic) at  $P = €2$  because any price above €2 causes firms to enter and drives the price back to €2.

3. a. In Exhibit 1, show the cost curves of a representative firm in long-run equilibrium along side the corresponding market equilibrium.

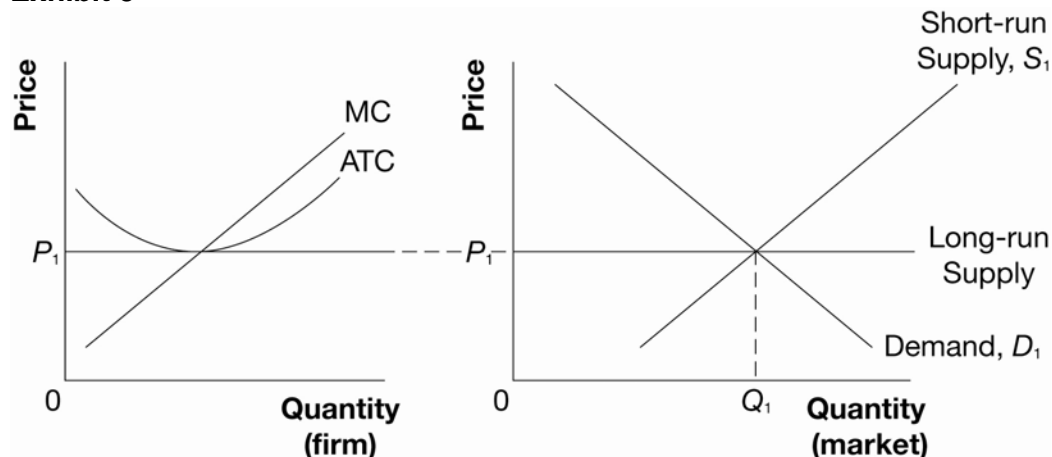
Exhibit 1



Answer:

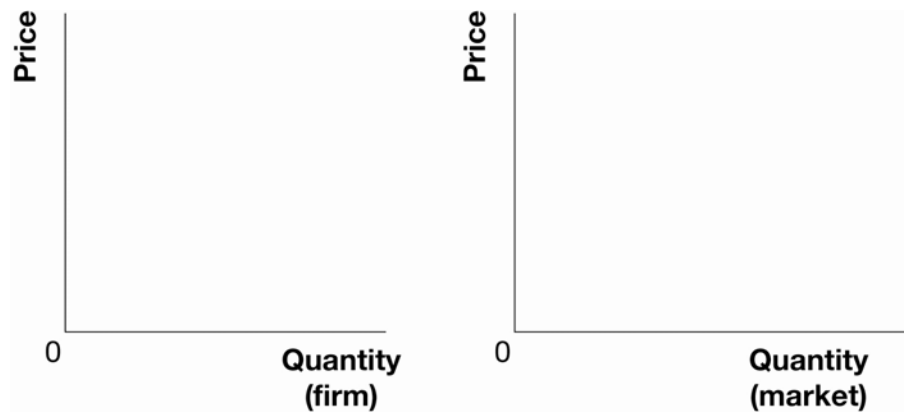
See Exhibit 5.

Exhibit 5



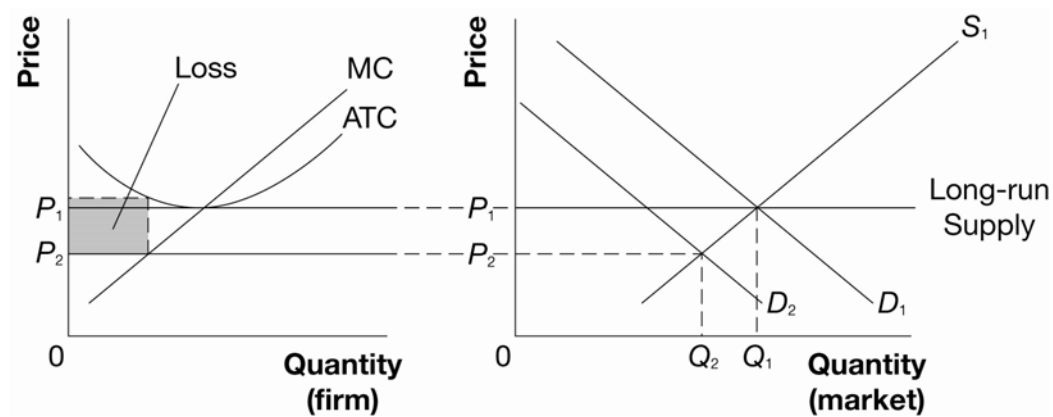
- b. Suppose there is a decrease in the demand for this product. In Exhibit 2, show the shift in demand in the market for this product and the corresponding profit or loss on the cost curves of the representative firm.

Exhibit 2



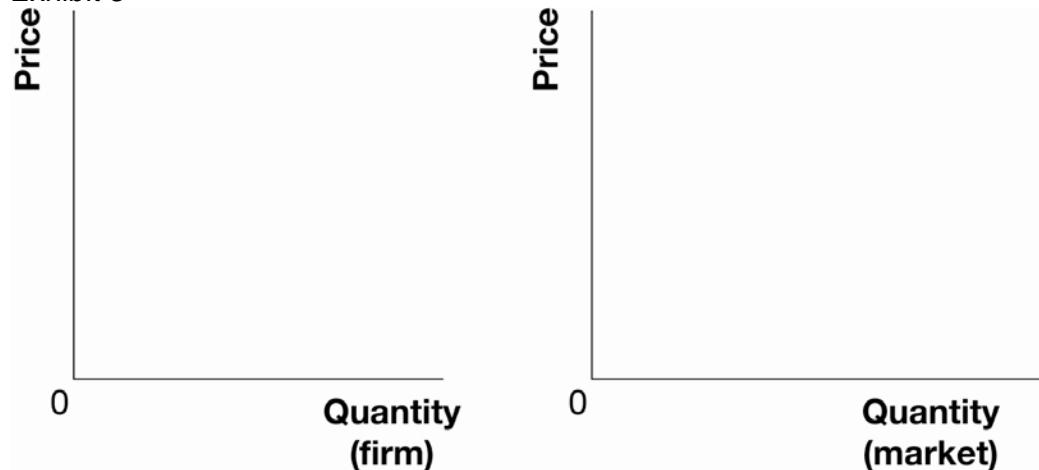
Answer:  
See Exhibit 6.

Exhibit 6



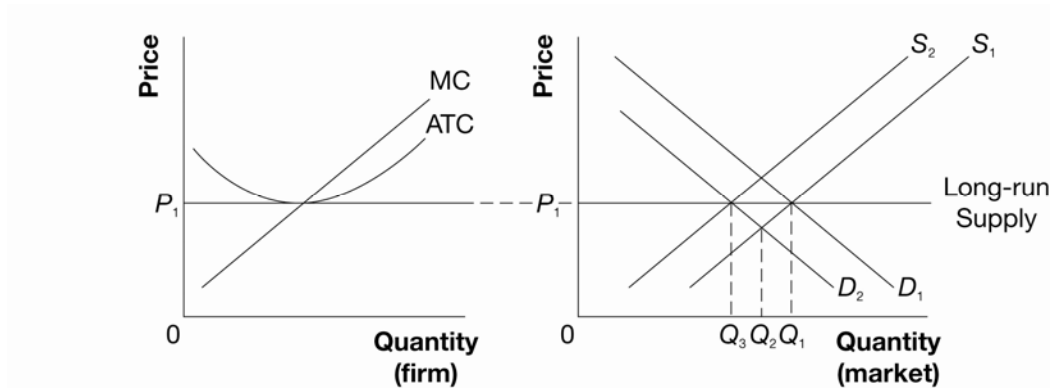
- c. In Exhibit 3, show the adjustment that takes place in order to return the market and firm to long-run equilibrium.

Exhibit 3



Answer:  
See Exhibit 7.

### Exhibit 7



- d. After the market has returned to long-run equilibrium, is the price higher, lower, or the same as the initial price? Are there more, fewer, or the same number of firms producing in the market?

Answer:  
The price has returned to its initial level. There are fewer firms producing in this market.

## Chapter 15

1. a. What are the three sources of the barriers to entry that allow a monopoly to remain the sole seller of a product?

Answer:

A key resource is owned by a single firm (monopoly resource), the government gives a single firm the exclusive right to produce a good (government created monopoly), the costs of production make a single producer more efficient (natural monopoly).

- b. What is the entry barrier that is the source of the monopoly power for the following products or producers? List some competitors that keep these products or producers from having absolute monopoly power.

1. The UK's Royal Mail (postal service)
2. Perrier Spring Water
3. Prozac (a brand name drug)
4. DeBeers Diamonds
5. Economics, by N. Gregory Mankiw and Mark P. Taylor (your textbook)

Answer:

1. Natural monopoly. E-mail, Fax machines, telephone, private delivery such as Federal Express.
2. Monopoly resource. Other bottled water, soft drinks.
3. Government created monopoly due to a patent. Other drugs for depression, generic drugs when the patent expires.
4. Monopoly resource. Other gems such as emeralds, rubies, sapphires.
5. Government created monopoly due to copyright. Other principles of economics text books.

2. Suppose a firm has a patent on a special process to make a unique smoked salmon. The following table provides information about the demand facing this firm for this unique product.

Pounds of Salmon	Price	$(P \times Q)$ Total Revenue	$(\Delta TR/\Delta Q)$ Marginal Revenue
0	€20	_____	_____
1	18	_____	_____
2	16	_____	_____
3	14	_____	_____
4	12	_____	_____
5	10	_____	_____
6	8	_____	_____
7	6	_____	_____

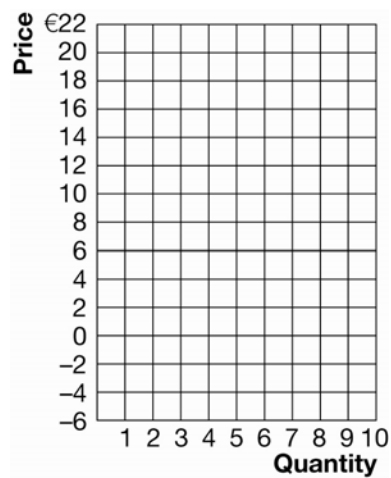
a. Complete the table above.

Answer:

Pounds of Salmon	Price	$(P \times Q)$ Total Revenue	$(\Delta TR/\Delta Q)$ Marginal Revenue
0	€20	0	
1	18	18	18
2	16	32	14
3	14	42	10
4	12	48	6
5	10	50	2
6	8	48	-2
7	6	42	-6

b. Plot the demand curve and the marginal revenue curve in Exhibit 1.

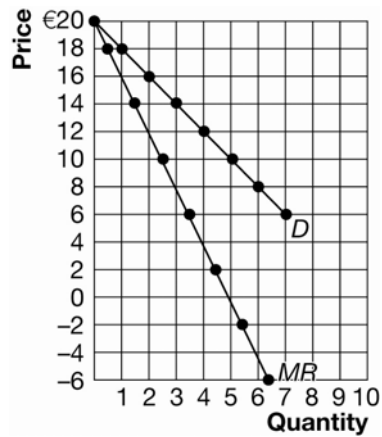
Exhibit 1



Answer:

See Exhibit 5.

### Exhibit 5

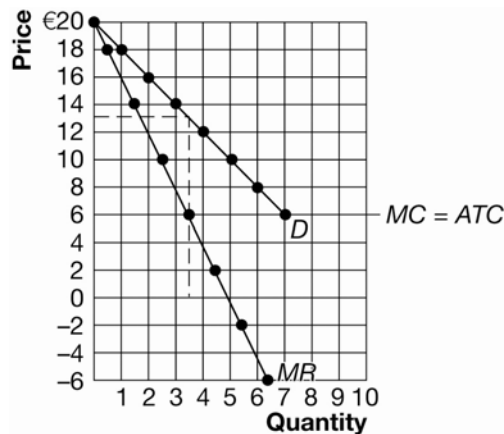


- c. Suppose that there are no fixed costs and that the marginal cost of production of smoked salmon is constant at €6 per kilogram. (Thus, the average total cost is also constant at €6 per kilogram.) What is the quantity and price chosen by the monopolist? What is the profit earned by the monopolist? Show your solution on the graph you created in part (b) above.

Answer:

$Q$  = between 3 and 4 units (say 3.5),  $P$  = between €12 and €14, (say €13). Profit =  $TR - TC$   
 or profit =  $(3.5 \times €13) - (3.5 \times €6) = €45.50 - €21.00 = €24.50$ . (Or profit =  $(P - ATC) \times Q = (€13 - €6) \times 3.5 = €24.50$ .) See Exhibit 6.

### Exhibit 6



- e. What is the price and quantity that maximizes total surplus?

Answer:

7 units at €6 each. (The efficient solution is where the market produces all units where benefits exceed or equal costs of production which is where demand intersects  $MC$ .)

- f. Compare the monopoly solution and the efficient solution. That is, is the monopolist's price too high or too low? Is the monopolist's quantity too high or too low? Why?

Answer:

Yes. Units from 3.5 to 7, or an additional 3.5 pounds of salmon are valued by the consumer at values in excess of the €6 per pound *MC* of production and these units are not produced and consumed when the price is €13. (Deadweight loss = the deadweight loss triangle =  $1/2 (7 - 3.5) \times (\text{€}13 - \text{€}6) = \text{€}12.25$ .)

- g. Is there a deadweight loss in this market if the monopolist charges the monopoly price? Explain.

Answer:

Yes. Units from 3.5 to 7, or an additional 3.5 kilograms of salmon are valued by the consumer at values in excess of the €6 per pound *MC* of production and these units are not produced and consumed when the price is €13. (Deadweight loss = the deadweight loss triangle =  $1/2 (7 - 3.5) \times (\text{€}13 - \text{€}6) = \text{€}12.25$ .)

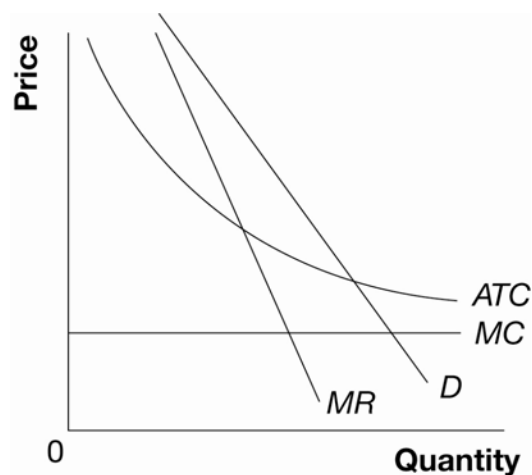
- h. If the monopolist is able to costlessly and perfectly price discriminate, is the outcome efficient? Explain. What is the value of consumer surplus, producer surplus, and total surplus? Explain.

Answer:

Yes, all units are produced where the value to buyers is greater than or is equal to the cost of production (7 units). Total surplus is now producer surplus and there is no consumer surplus. Total surplus and producer surplus is the area under the demand curve and above the price or  $1/2(\text{€}20 - \text{€}6) \times 7 = \text{€}49$ . Consumer surplus = €0.

3. a. What type of market is represented in Exhibit 2: perfect competition, monopoly, or natural monopoly? Explain.

Exhibit 2



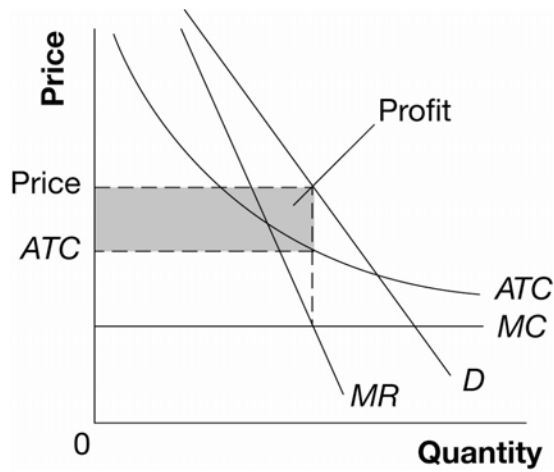
Answer:

Natural monopoly because *ATC* is still declining at the quantity that could satisfy the entire market.

- b. Show the profit or loss generated by this firm in Exhibit 2 assuming that the firm maximizes profit.

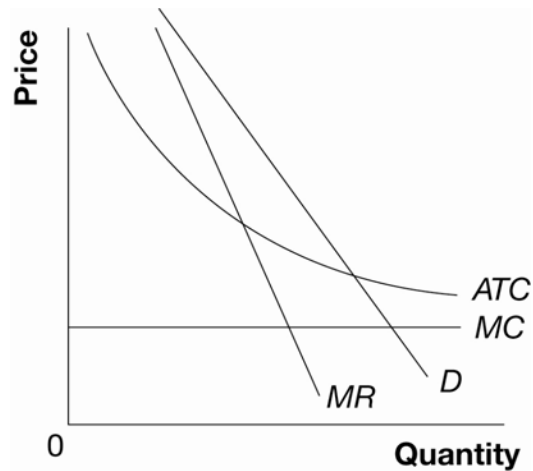
Answer:  
See Exhibit 7.

#### Exhibit 7



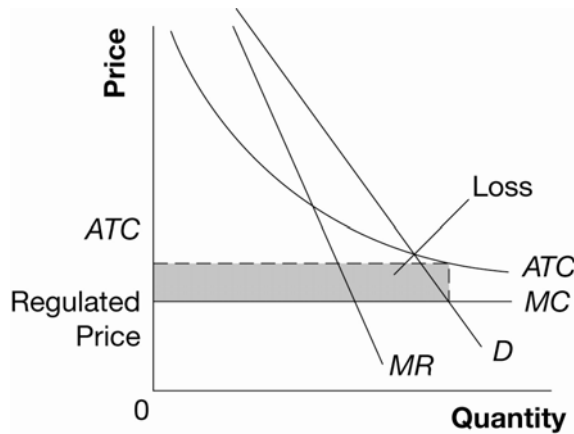
- c. Suppose government regulators force this firm to set the price equal to its marginal cost in order to improve efficiency in this market. In Exhibit 3 show the profit or loss generated by this firm.

#### Exhibit 3



Answer:  
See Exhibit 8.

### Exhibit 8



- d. In the long run, will forcing this firm to charge a price equal to its marginal cost improve efficiency? Explain.

Answer:

No. Since marginal cost must be below average total cost if average total cost is declining, this firm will generate losses if forced to charge a price equal to marginal cost. It will simply exit the market, which eliminates all surplus associated with this market.

## Chapter 16

1. In which market structure would you place each of the following products: monopoly, oligopoly, monopolistic competition, or perfect competition? Why?

- a. Retail market for water and sewerage services

Answer:

Monopoly, only one firm from which to purchase.

- b. Economics textbooks

Answer:

Monopolistic competition, many firms each selling differentiated products.

- c. Economics, by N. Gregory Mankiw and Mark P. Taylor

Answer:

Monopoly, only one firm can produce it due to copyright laws.

- d. Photographic film

Answer:

Oligopoly, few firms (Fuji, Kodak) selling similar products.

- e. Restaurants in a large city

Answer:

Perfect competition, many firms selling identical products.

- f. Car tyres

Answer:

Oligopoly, few firms (Goodyear, Bridgestone, Michelin) selling very similar products.

- g. Breakfast cereal

Answer:

Oligopoly, few firms (Kellogg's, Nestle) selling similar products.

- h. Gold bullion

Answer:

Monopoly, only one firm from which to purchase.

- i. Air travel from any one airport

Answer:

Oligopoly, few airlines from which to choose at any one airport, similar product.

Note: While monopoly and competition are more easily distinguished, the line between oligopoly and monopolistic competition is not as sharp. For example, (b) might be considered to be an oligopoly since there are relatively few publishers and economic text books may be considered to be very similar, and (g) might be considered to be monopolistic competition if the products are considered to be differentiated, and so on.

2. The following information describes the demand schedule for a unique type of apple. This type of apple can only be produced by two firms because they own the land on which these unique trees spontaneously grow. As a result, the marginal cost of production is zero for these duopolists, causing total revenue to equal profit.

- a. Complete the following table.

Price per box	Quantity (in boxes)	Total revenue (profit)
€12	0	_____
11	5	_____
10	10	_____
9	15	_____
8	20	_____
7	25	_____
6	30	_____
5	35	_____
4	40	_____
3	45	_____
2	50	_____
1	55	_____

Answer:

Price per box	Quantity (in boxes)	Total revenue (profit)
€12	0	€0
11	5	55
10	10	100
9	15	135
8	20	160
7	25	175
6	30	180
5	35	175
4	40	160
3	45	135
2	50	100
1	55	55
0	60	0

- b. If the market were perfectly competitive, what price and quantity would be generated by this market? Explain.

Answer:

In a competitive market, competition reduces the price until it equals marginal cost (which is zero in this case), therefore  $P = €0$  and  $Q = 60$ .

- c. If these two firms colluded and formed a cartel, what price and quantity would be generated by this market? What is the level of profit generated by the market? And what is the level of profit generated by each firm?

Answer:

These duopolists would behave as a monopolist, produce at the level that maximizes profit, and agree to divide the production levels and profit. Therefore,  $P = €6$ ,  $Q = 30$  for the market. Profit =  $€6 \times 30 = €180$ . Each firm produces 15 units at  $€6$  and receives profit of  $€90$  (half of the  $€180$ ).

- d. If one firm cheats and produces one additional increment (five units) of production, what is the level of profit generated by each firm?

Answer:

Cheating firm:  $20 \times €5 = €100$ , other firm:  $15 \times €5 = €75$ .

- e. If both firms cheat and each produces one additional increment (five units) of production (compared to the cooperative solution), what is the level of profit generated by each firm?

Answer:

Each firm:  $20 \times €4 = €80$ .

- f. If both firms are cheating and producing one additional increment of output (five additional units compared to the cooperative solution), will either firm choose to produce an additional increment (five more units)? Why? What is the value of the Nash equilibrium in this duopoly market?

Answer:

No, because the profit would fall for the cheater to  $25 \times \text{€}3 = \text{€}75$  which is below €80 profit from part (e) above. Therefore, the Nash equilibrium is each firm producing 20 units (40 for the market) at a price of €4, creating €160 of profit for the market and each duopolist receives €80 profit.

- g. Compare the competitive equilibrium to the Nash equilibrium. In which situation is society better off? Explain.

Answer:

The Nash equilibrium has a higher price (€4 compared to €0) and a smaller quantity (40 units compared to 60 units). Society is better off with competitive equilibrium.

- h. Describe what would happen to the price and quantity in this market if an additional firm were able to grow these unique apples. (Do not attempt to calculate quantitative changes – the direction of change is all that's required.)

Answer:

The new Nash equilibrium would have a lower price and a larger quantity. It would move toward the competitive solution.

- i. Use the data from the duopoly example above to fill in the boxes of the prisoners' dilemma. Place the value of the profits earned by each duopolist in the appropriate box in Exhibit 1.

Exhibit 1

		Firm 1 Decision	
		Sell 15	Sell 20
Firm 2 Decision	Sell 15		
	Sell 20		

Answer:

See Exhibit 3.

### Exhibit 3

		Firm 1 Decision	
		Sell 15	Sell 20
Firm 2 Decision	Sell 15	Firm 1: Profit of €90	Firm 1: Profit of €100
	Sell 20	Firm 1: Profit of €75	Firm 1: Profit of €80

j. What is the solution to this prisoners' dilemma? Explain.

Answer:

The dominant strategy for each is to cheat and sell 20 units because each firm's profit is greater when it sells 20 units regardless of whether the other firm sells 15 or 20 units.

k. What might the solution be if the participants were able to repeat the "game?" Why? What simple strategy might they use to maintain their cartel?

Answer:

They might be able to maintain the cooperative (monopoly) production level of 30 units and each produce 15 units because if the game is repeated, the participants can devise a penalty for cheating. The simplest penalty is "tit-for-tat."

## Chapter 17

1. Categorize each of the following markets as one of: competitive, monopolistic, or monopolistically competitive. Explain.

- a. toothpaste

Answer:

monopolistically competitive—many firms, differentiated products, free entry

- b. local newspapers

Answer:

monopoly—one firm

- c. magazines

Answer:

competitive—many firms, identical products

- d. wheat

Answer:

monopoly—one firm (Could be a natural monopoly because one firm can satisfy the entire market on the downward-sloping portion of its *ATC* curve.)

- e. video games

Answer:

monopolistically competitive—many firms, differentiated products, free entry

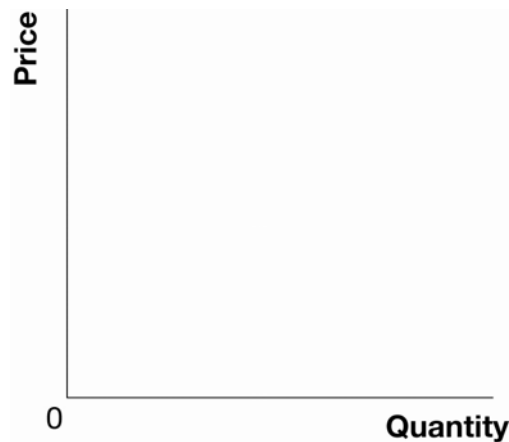
- f. beer

Answer:

competitive—many firms, identical products

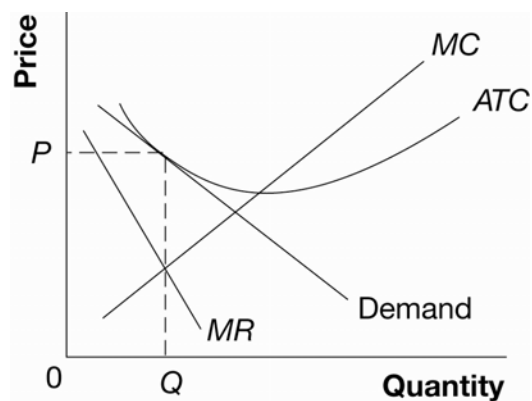
2. Suppose that there are many restaurants in the city and that each has a somewhat different menu.
  - a. In Exhibit 1, draw the diagram of the cost curves (average total cost and marginal cost), demand curve, and marginal revenue curve for Mario's Pizza when it is in long-run equilibrium.

Exhibit 1



Answer:  
See Exhibit 5.

Exhibit 5



- b. Is Mario's Pizza profitable in the long run? Explain

Answer:  
No. Since there is free entry, profit causes firms to enter the industry, which reduces the existing demand faced by profitable firms until  $P = ATC$  and profit is zero.

- c. Is Mario's Pizza producing at the efficient scale? Explain. Why doesn't Mario's expand its output if it has excess capacity?

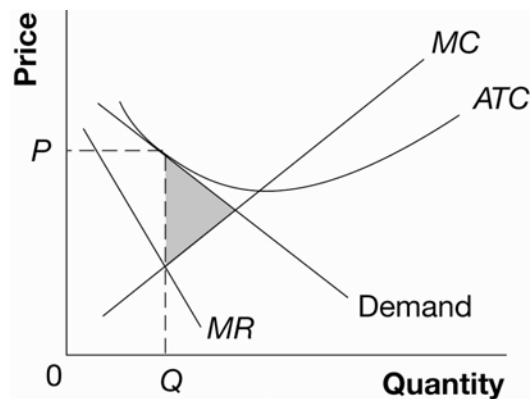
Answer:  
No. Profits attract new firms, which reduces the demand for an incumbent firm's product to the point where its demand is tangent to its  $ATC$  curve causing  $P = ATC$  and profits equal zero. Since the tangency of demand and  $ATC$  is in the negatively sloping portion of  $ATC$ , the firm is operating at less than the efficient scale. If Mario's expanded output,  $MC$  would exceed  $MR$  and  $P < ATC$  so profits would be negative.

- d. In Exhibit 1, show the deadweight loss associated with Mario's level of output. Does this deadweight loss occur because the price is higher than a competitive firm would charge or because the quantity is smaller than a competitive firm would produce? Explain.

Answer:

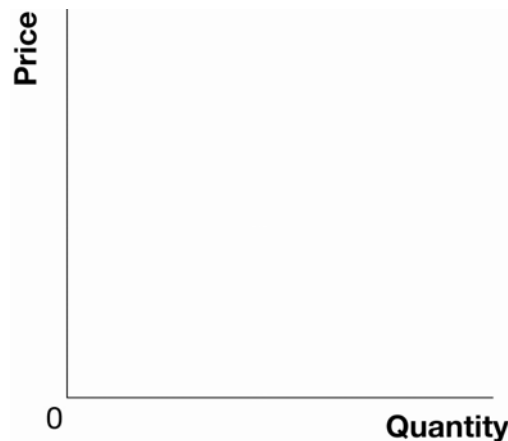
See Exhibit 6. The deadweight loss occurs because firms fail to produce units that the buyer values in excess of the cost of production. That is, the loss is due to the reduced quantity in monopolistic competition.

#### Exhibit 6



- e. Suppose that Mario's engages in an advertising campaign that is a huge success. In Exhibit 2, draw the diagram of Mario's cost curves, demand curve, and marginal revenue curve and show Mario's profit in the short run. Can this situation be maintained in the long run? Explain.

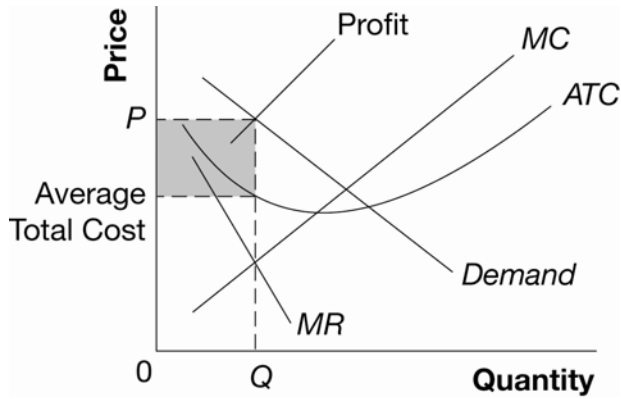
#### Exhibit 2



Answer:

See Exhibit 7. No. Profits attract entry which reduces the demand faced by each firm to the point where it is again tangent to its  $ATC$  curve.

### Exhibit 7



3. For each of the following pairs of firms, which firm would likely spend a higher proportion of its revenue on advertising? Explain.

a. the maker of Disprin or the maker of a generic aspirin pill

Answer:

The maker of Disprin because it is a branded or differentiated consumer good.

b. a firm introducing a low quality ice cream or a firm introducing a high quality ice cream that each cost about the same to make.

Answer:

Firm generating high quality ice cream because advertising is more profitable if there are repeat buyers.

c. the bakery that bakes Hovis bread or a wheat farmer

Answer:

John Deere lawnmower division because lawnmowers are sold to consumers as opposed to industry.

## Chapter 18

- Suppose that labour is the only variable input in the production process for a competitive profit-maximizing firm that produces coffee mugs. The firm's production function is shown below.

Labour (number of workers)	Output per Hour	Marginal Product of Labour	Value of MPL when $P = €3$	Value of MPL when $P = €5$
0	0			
1	9			
2	17			
3	24			
4	30			
5	35			
6	39			
7	42			
8	44			

- Fill out columns three and four of the table above (the marginal product of labour and the value of the marginal product of labour when the price of output equals €3 per mug).

Answer:

Labour (number of workers)	Output per Hour	Marginal Product of Labour	Value of MPL when $P = €3$
0	0		
1	9	9	€27
2	17	8	24
3	24	7	21
4	30	6	18
5	35	5	15
6	39	4	12
7	42	3	9
8	44	2	6

- b. Suppose that the competitive wage for workers who can make coffee mugs is €19 per hour. How many workers should this firm hire? Why?

Answer:

Three workers because the value of the marginal product of each of the first three workers exceeds the €19 wage so each worker adds to profits but the fourth worker only has a value of marginal product of €18 so hiring the fourth worker would reduce profits.

- c. Suppose that colleges that teach pottery skills increase the supply of workers that can make coffee mugs and that this lowers the competitive wage for coffee mug workers to €13 per hour. How many workers should this firm hire? Why? Does this represent a shift in the firm's demand for labour or a movement along the firm's demand for labour? Explain.

Answer:

Five workers because the value of the marginal product of each of the first five workers now exceeds the €13 wage but the sixth worker only has a value of marginal product of €12 so hiring the sixth worker would reduce profits. This is a movement along the firm's demand curve for labour because the value of the marginal product of labour for each worker is remaining the same but the wage facing the firm has changed.

- d. Suppose there is an increase in the demand for coffee mugs and that the price of coffee mugs rises to €5 per mug. Fill out the last column of the table above to show the value of the marginal product of labour when the price of mugs is €5 per mug.

Answer:

See the fifth column in the table.

Labour (number of workers)	Output per Hour	Marginal Product of Labour	Value of MPL when $P = €3$	Value of MPL when $P = €5$
0	0			
1	9	9	€27	€45
2	17	8	24	40
3	24	7	21	35
4	30	6	18	30
5	35	5	15	25
6	39	4	12	20
7	42	3	9	15
8	44	2	6	10

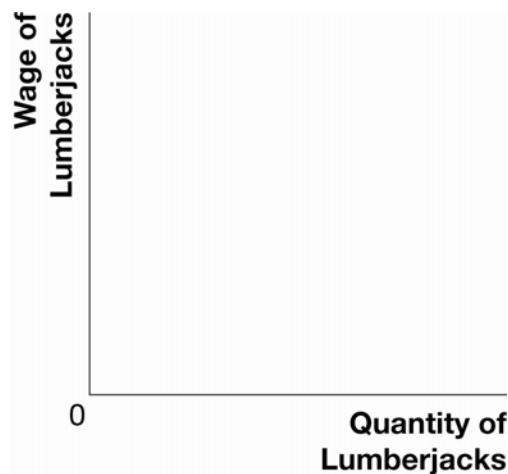
- e. Suppose that the competitive wage for coffee mug workers remains at €13 per hour and the price of mugs is €5 per mug. How many workers should this firm now hire? Why? Does this represent a shift in the firm's demand for labour or a movement along the firm's demand for labour? Explain.

Answer:

Seven workers because the value of the marginal product of each of the first seven workers exceeds the €13 wage but the eighth worker only has a value of marginal product of €10 so it would be unprofitable to hire that worker. This is a shift in the demand curve for labour because the value of the marginal product of labour has increased for each worker because the price of output rose. Thus, the firm demands more workers at the same €13 wage.

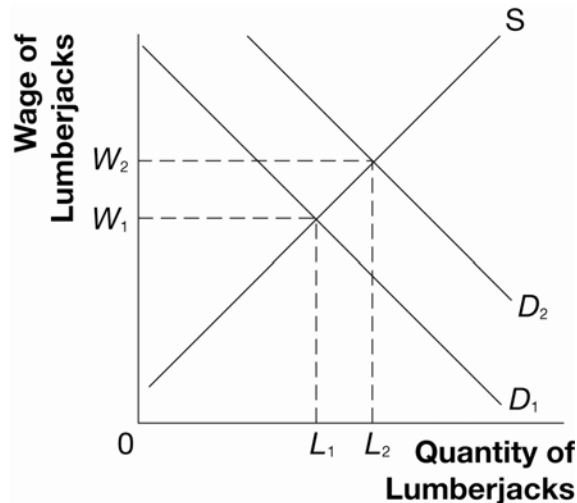
2. Suppose there is an increase in the demand for lumber, which raises the price of lumber.
- a. Show the impact of the increase in the price of lumber on the market for lumberjacks in Exhibit 1.

Exhibit 1



Answer:  
See Exhibit 4.

Exhibit 4



- b. What did the increase in the price of lumber do to the value of the marginal product of lumberjacks and the wage of lumberjacks? Explain.

Answer:

Increase the value of the marginal product of labour and the wage.

- c. What will happen to the value of the marginal product and the rental rate for timber-growing land and for capital that is used for cutting and shipping timber? Explain.

Answer:

When the price of output rises, the value of the marginal product of all of the inputs increases accordingly. Thus, the value of the marginal product of both land and capital will rise and so will their rental rates.

- d. How has this development affected the prosperity of the firm and the owners of the factors of production employed by the firm? Explain.

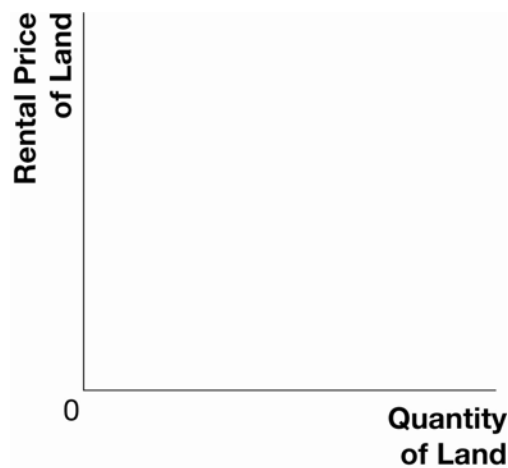
Answer:

When the price of output changes, the prosperity of the firm and the owners of the factors of production move together. In this case, the prosperity of the firm and the owners of the factors of production are increased.

3. Suppose that an enormous amount of forest land is cleared for agricultural use in Brazil.

- a. Show the impact of this event on the market for agricultural land in Brazil in Exhibit 2. What has happened to the marginal product of land and the rental price of land in Brazil?

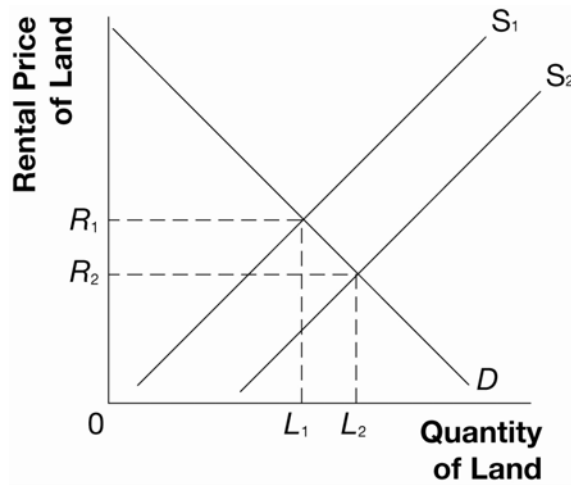
Exhibit 2



Answer:

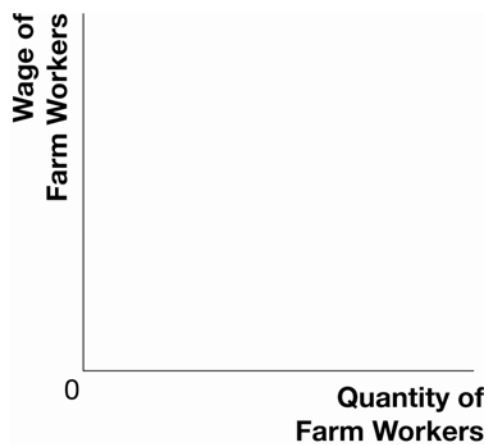
See Exhibit 5. This event increases the supply of agricultural land and decreases the marginal product of land and the rental price of land.

**Exhibit 5**



- b. Show the impact of this event on the market for Brazilian farm workers in Exhibit 3. What has happened to the marginal product of farm labour and the wage of farm labour?

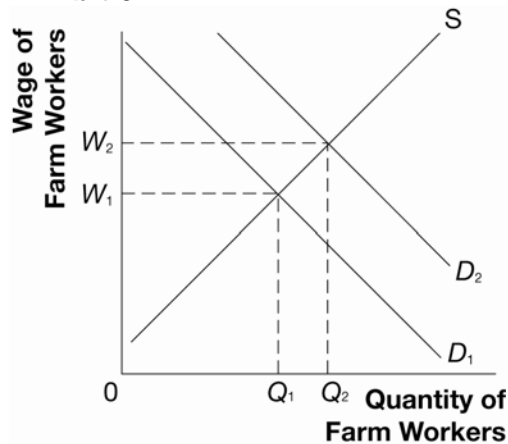
**Exhibit 3**



Answer:

See Exhibit 6. The increase in the supply of agricultural land increases the marginal product of labour and shifts the demand for farm labour to the right, which increases the wage.

**Exhibit 6**



4. Describe the impact of the following events on the market for car workers in Swindon, England. (Note that Honda operates a factory in Swindon.)

a. Honda expands its factory in Swindon.

Answer:

The increase in capital available for workers increases the marginal product of labour, shifts the demand for labour to the right, and increases the wage.

b. *Which?* magazine declares Honda to be the best-made cars in its class.

Answer:

This event increases the demand for Hondas and increases the price of Hondas. The increase in the price of Hondas increases the value of the marginal product of labour, shifts the demand for labour to the right, and increases the wage.

c. Migrants with manufacturing skills from Poland and Romania relocate to Swindon.

Answer:

This event increases the supply of labour, increases the amount of labour per unit of capital, and so decreases the marginal product of labour, and decreases the wage.

## Chapter 19

1. Within each of the following pairs of workers, which worker is likely to earn more and why? (It may be obvious which one is paid more. The real issue is to explain why one is paid more than the other.)
  - a. A carpenter working at the top of a 600-foot cooling tower of a nuclear power plant or a carpenter who frames houses?

Answer:

The carpenter working at the 600 foot height because he/she will likely require a compensating differential for the danger of the job.

- b. A shop assistant in a supermarket store or a lawyer?

Answer:

A lawyer because the lawyer has greater human capital from years of education and the lawyer requires a compensating differential to compensate for the cost and effort of becoming educated.

- c. A lawyer with one year of experience or a lawyer with six years of experience?

Answer:

A lawyer with six years of experience because work experience is part of human capital.

- d. A worker in a car factory who works the day shift or a worker in a car factory who works the night shift?

Answer:

The nightshift worker because the nightshift is disagreeable and the worker requires a compensating differential.

- e. An economics professor or a corporate economist?

Answer:

The corporate economist because the corporate economist requires a compensating differential to compensate for the less agreeable nature of the work. Also, the corporate economist may have a greater value of marginal product.

- f. A history professor or an economics professor?

Answer:

An economics professor because the market wage for economists is higher due to the economist's higher value of marginal product in the corporate labour market.

- g. Someone trained as a key-punch operator (typist who types input commands on cards to be read by a mainframe computer prior to the existence of computer terminals) or someone trained as a personal computer specialist?

Answer:

A personal computer specialist because technology has changed such that key-punch operators are no longer needed while PC specialists are needed.

- h. Your favourite local blues band that plays regularly at a nearby campus bar or David Bowie?

Answer:

Superstar David Bowie because through technology he is able to satisfy the entire market at the same time. (He is the first rock star to have a net worth in excess of one billion dollars).

- i. A lazy, stupid plumber or a hardworking, bright plumber?

Answer:

The hardworking bright plumber because the value of the marginal product is higher for people with ability and who work hard.

- j. The best carpenter on the planet or the best writer on the planet?

Answer:

The best writer because the writer is in a market that can support a superstar while the carpenter is not.

2. a. Explain the human capital view of education and the signalling view of education.

Answer:

Education increases human capital and raises the value of the marginal product of labour and, thus, the wage. Alternatively, education is only a signal of high ability.

- b. What are the implications for education policy under each view?

Answer:

According to the human capital view, policies that increase educational attainment for all will increase all wages. According to the signalling view, an increase in educational attainment will not affect wages because education does not increase productivity.

- c. Which of the above is true? Explain.

Answer:

Probably both are true. It is unclear which of these two effects of education is the more important.

3. a. How can a competitive market eliminate discrimination in the labour market?

Answer:

Firms only interested in profit will hire the group of workers that is discriminated against. Since their wages are relatively low, the firms that do not discriminate will have a competitive advantage over the discriminatory firms. As the non-discriminating firms replace the discriminatory firms, the relative demand for workers previously discriminated against will increase, which will remove the discriminatory wage differential.

- b. What limits a competitive market's ability to reduce discrimination? Explain.

Answer:

If bigoted customers are willing to pay higher prices to firms that discriminate, or if the government requires discrimination, the competitive market cannot eliminate discrimination.

## Chapter 20

1. Use Table 20.2 from Chapter 20 in your text to answer this question.
  - a. In the most recent year available, what percentage of income did the bottom fifth of the income distribution receive? What percent of income did the top fifth of the distribution receive? Roughly, what is the relationship between what the bottom fifth received and what the top fifth received?

Answer:

Bottom fifth = 7.5 per cent. Top fifth = 42.0 per cent. The top fifth received nearly six times what the bottom fifth received.

- b. What is the range of the percentage of income received by the bottom fifth of the income distribution over the last 33 years? What is the range for the top fifth? Describe the trend for each group over the last 33 years.

Answer:

Bottom fifth range is from 10.0 per cent to 7.5 per cent. Top fifth range is from 35.0 per cent to 42.0 per cent. For the bottom fifth, their share fell between 1979 and 1990 and appears to have remained constant thereafter. For the top fifth, their share rose between 1979 and 1990 and seems to have remained quite constant since.

- c. Describe three reasons why the measure of income distribution used in Table 20.2 in Chapter 20 may not truly measure someone's ability to maintain a certain standard of living. As a result, are the standard measures of income distribution likely to exaggerate or understate the true distribution of the standard of living? Explain.

Answer:

In-kind transfers are not included; the economic life-cycle is not recognized; and transitory versus permanent income is not recognized. All three problems suggest that standard measures exaggerate economic inequality because the poor receive transfers in the form of goods and services, because people may be poor at certain points in their lives but not at others, and because the variation in income can be smoothed by borrowing and lending.

- d. What is permanent income? Why might we wish to use permanent income when measuring the distribution of income? If we used permanent income instead of current annual income when measuring the distribution of income, would this tend to exaggerate or understate the true distribution of the standard of living? Explain. (Hint: If you are a full-time student, can you borrow as much as you want in order to perfectly smooth out your lifetime consumption?)

Answer:

Permanent income is a person's normal, or average, income. Using it removes the life-cycle effects and the transitory effects that cause any given year's income to be non-representative of the person's true standard of living. This would probably tend to understate the true distribution of the standard of living because, in reality, we cannot fully smooth our living standards by borrowing when young or when we have a bad year.

2. Susan earns five times as much as Joe.
  - a. What would the political philosophy of utilitarianism, liberalism, and libertarianism likely suggest should be done in this situation? Explain.

Answer:

Utilitarianism: Since there is diminishing marginal utility of income as income grows large, it would harm Susan less than it would help Joe if we redistributed income from Susan to Joe. Thus, to maximize total utility, redistribute from Susan to Joe. Liberalism: Both Susan and Joe would agree that if they didn't know their station in life, they would choose to socially insure each other with a maximin system in case they were to be the one on the bottom end of the income distribution. So, redistribute from Susan to Joe. Libertarian: Since equal opportunity is more important than equal outcome, if each came by their income fairly and honestly, then no redistribution need take place.

- b. Compare the degree of redistribution each suggests.

Answer:

From least redistribution to most, libertarianism, utilitarianism, liberalism.

3. Suppose the government has to choose between two anti-poverty programs. Each program guarantees that every family has at least €15,000 of income. One scheme establishes a negative income tax where:  $\text{Taxes} = (0.50 \text{ of income}) - €15,000$ . The other scheme is for the government to guarantee every family at least €15,000 to spend and if a family falls short, the government will simply make up the difference.

- a. Using the negative income tax scheme described above, fill out the following table.

Earned Income	Taxes Paid	After-tax Income
€0	_____	_____
5,000	_____	_____
10,000	_____	_____
20,000	_____	_____
30,000	_____	_____
40,000	_____	_____

Answer:

Earned Income	Taxes Paid	After-tax Income
€0	-€15,000	€15,000
5,000	-12,500	17,500
10,000	-10,000	20,000
20,000	-5,000	25,000
30,000	0	30,000
40,000	5,000	35,000

- b. What is the value of income for which this family neither receives a subsidy nor pays any tax? (That is, how high does income have to be for the family to stop receiving a subsidy?)

Answer:

€30,000

- c. Under the second scheme where the government simply guarantees at least €15,000 to every family, what is the level of income at which a family stops receiving a subsidy? Explain.

Answer:

€15,000. The government simply guarantees that each family has €15,000 so once a family reaches that level, it fails to receive a subsidy.

- d. Which plan is likely to be more expensive to the government? Explain

Answer:

The negative income tax because, under this tax scheme, the government will continue to subsidize families in the €15,000 to €30,000 range.

- e. Suppose a poor family that only earns €5,000 per year decides to plant a garden and sell the produce in a "farmer's market" in the city. Suppose the family earns an additional €5,000 selling the produce. What is the family's final income under each scheme? What is the effective tax rate on the €5,000 earned by family under each scheme? Which scheme promotes a work ethic among the poor and which one discourages work? Explain.

Answer:

If negative income tax, final income = €10,000 earned income + €10,000 subsidy = €20,000.  
If €15,000 guarantee, final income = €10,000 + €5,000 subsidy = €15,000. If negative income tax, tax rate equals .50 because when income went up €5,000, take home pay went up €2,500 or  $€2,500/€5,000 = .50$ .

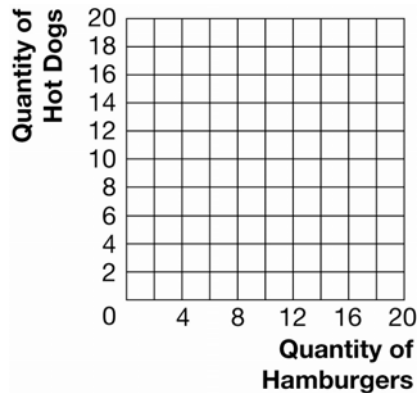
If €15,000 guarantee, tax rate equals 100 percent, because when income went up €5,000, final take home pay stayed the same at €15,000 because benefits were reduced by €5,000 or  $€5,000/€5,000 = 100$  percent.

The €15,000 guarantee discourages work because there is no gain whatsoever from working when income is in the €0 to €15,000 range.

## Chapter 21

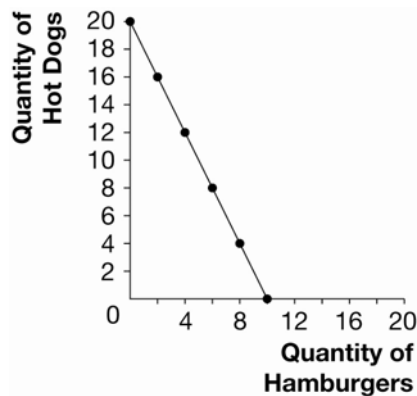
1. Suppose a consumer only buys two goods: hot dogs and hamburgers. Suppose the price of hot dogs is €1, the price of hamburgers is €2, and the consumer's income is €20.
  - a. Plot the consumer's budget constraint in Exhibit 1. Measure the quantity of hot dogs on the vertical axis and the quantity of hamburgers on the horizontal axis. Explicitly plot the points on the budget constraint associated with the even numbered quantities of hamburgers (0, 2, 4, 6 ...).

Exhibit 1



Answer:  
See Exhibit 5.

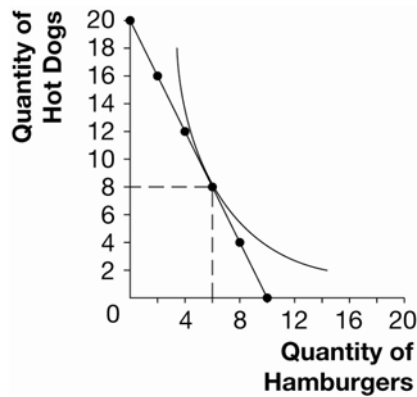
Exhibit 5



- b. Suppose the individual chooses to consume six hamburgers. What is the maximum amount of hot dogs that he can afford? Draw an indifference curve on the figure above that establishes this bundle of goods as the optimum.

Answer:  
Eight. For the indifference curve, see Exhibit 6.

### Exhibit 6



- c. What is the slope of the budget constraint? What is the slope of the consumer's indifference curve at the optimum? What is the relationship between the slope of the budget constraint and the slope of the indifference curve at the optimum? What is the economic interpretation of this relationship?

Answer:

Rise over run =  $2/1$ . This is also the price ratio of price of hamburgers to price of hot dogs =  $\text{€}2/\text{€}1$ . The slope of the indifference curve is also  $2/1$ . (Note: all of these slopes are negative.) At the optimum, the indifference curve is tangent to the budget constraint so their slopes are equal. Thus, the trade-off between the goods that the individual is willing to undertake (*MRS*) is the same as the trade off that the market requires (slope of budget constraint).

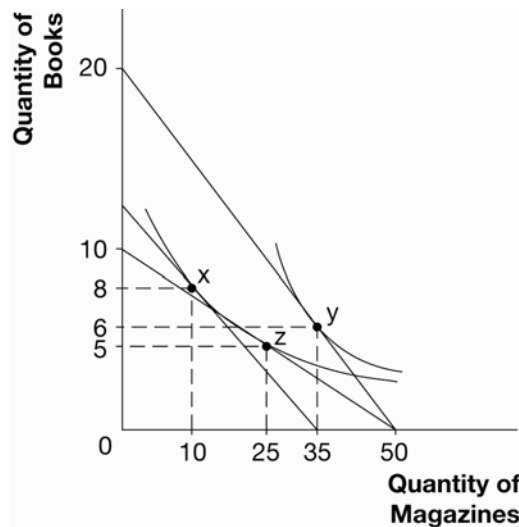
- d. Explain why any other point on the budget constraint must be inferior to the optimum.

Answer:

Since the highest indifference curve reachable is tangent to the budget constraint, any other point on the budget constraint must have an indifference curve running through it that is below the optimal indifference curve so that point must be inferior to the optimum.

2. Use Exhibit 2 to answer the following questions.

Exhibit 2



- a. Suppose the price of a magazine is €2, the price of a book is €10, and the consumer's income is €100. Which point on the graph represents the consumer's optimum: X, Y, or Z? What are the optimal quantities of books and magazines this individual chooses to consume?

Answer:

Point Z. 25 books and five magazines.

- b. Suppose the price of books falls to €5. What are the two optimum points on the graph that represent the substitution effect (in sequence)? What is the change in the consumption of books due to the substitution effect?

Answer:

From point Z to point X. From five books to eight books.

- c. Again, suppose the price of books falls to €5. What are the two optimum points on the graph that represent the income effect (in sequence)? What is the change in the consumption of books due to the income effect? Is a book a normal good or an inferior good for this consumer? Explain.

Answer:

From point X to point Y. From eight books to six books. Books are inferior because an increase in income decreases the quantity demanded of books.

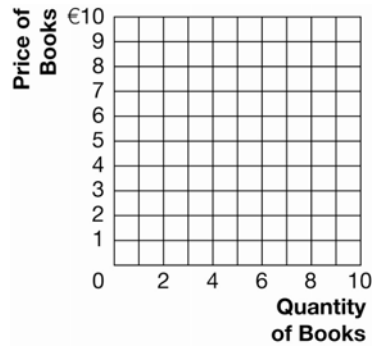
- d. For this consumer, what is the total change in the quantity of books purchased when the price of books fell from €10 to €5?

Answer:

The quantity demanded increased from five books to six books.

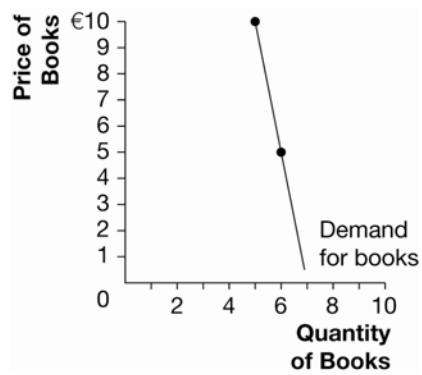
- e. Use the information in this problem to plot the consumer's demand curve for books in Exhibit 3.

Exhibit 3



Answer:  
See Exhibit 7.

Exhibit 7



## Chapter 22

1. For each of the following situations, identify the principal and the agent, describe the information asymmetry involved, and explain how moral hazard has been reduced.

- a. Dental insurance companies offer free annual check-ups

Answer:

The insurance company is the principal; the insured is the agent. Only the agent knows how well he takes care of his teeth. By checking the insured's teeth each year, the insurance company can better monitor the behaviour of the insured and reduce major future claims.

- b. Firms compensate travelling salespersons with commissions (a percentage of the value of the sales)

Answer:

The firm is the principal; the salesperson is the agent. The firm does not know how hard the salesperson works. By only paying the salesperson a commission, the firm is able to better monitor the salespersons work habits, and the worker is less likely to shirk.

- c. Agricultural seed companies pay migrant workers bonuses if they work the entire summer season

Answer:

The firm is the principal; the worker is the agent. The firm does not know how hard the migrant worker works. By paying a large bonus for completing the season, the firm raises the cost of shirking and the cost of being fired. The worker is less likely to shirk.

- d. McDonald's pays twice the minimum wage to high school students

Answer:

McDonald's is the principal; the student is the agent. McDonald's does not know how hard the student works. By paying above market wages, McDonald's increases the cost of shirking and the cost of being fired. The worker is less likely to shirk.

2. For each of the following situations, describe the information asymmetry involved, name the type of action that has been taken to reduce adverse selection (signalling or screening), and explain how adverse selection has been reduced.

- a. McDonald's only hires high school students with good grades

Answer:

McDonald's doesn't know the abilities of the potential workers as well as do the workers. McDonald's *screens* potential workers using past educational performance and it is able to select high-ability workers.

- b. Hyundai (a Korean car manufacturer) provides a 100,000 kilometre warranty on its new cars

Answer:

Buyers may be unsure of the quality of Hyundai cars because they are relatively new to the European market. Hyundai *signals* high quality with a long warranty and buyers are able to select high quality cars.

- c. A health insurance company requires prospective customers to take a physical examination

Answer:

The insurance company does not know as much about the health of the insurance buyer as does the buyer. The insurance company *screens* prospective customers with a physical exam to find hidden health problems so its insurance pool is not sicker than average.

- d. Budweiser sponsors the Super Bowl half-time show

Answer:

Beer buyers don't know the quality of Budweiser as well as Budweiser. Budweiser *signals* high quality with expensive advertising because they could only afford to do it if they could generate repeat buyers. Customers are able to choose a high quality beer.

3. Answer the questions regarding the Condorcet paradox for the three sets of voting preferences below.

**Case 1**

	Voter Type		
	Type 1	Type 2	Type 3
Percent of electorate	15	40	45
First Choice	C	A	B
Second Choice	A	B	C
Third Choice	B	C	A

- If voters must choose between A and B, what are the percentages of votes that each outcome receives and which outcome wins?
- If voters must choose between B and C, what are the percentages of votes that each outcome receives and which outcome wins?
- If voters must choose between C and A, what are the percentages of votes that each outcome receives and which outcome wins?
- Do these preferences exhibit transitivity? Explain.
- If the voters choose between A and B and then compare to C, which outcome wins?  
If the voters choose between B and C and then compare to A, which outcome wins?  
If the voters choose between A and C, and then compare to B which outcome wins?

Does the order in which items are voted on matter in this case? Why?

Answer:

Case 1:

- $A = 15 + 40 = 55$ ,  $B = 45$ . A beats B.
- $B = 40 + 45 = 85$ ,  $C = 15$ . B beats C.
- $C = 15 + 45 = 60$ ,  $A = 40$ . C beats A.
- No. A beats B and B beats C, so transitivity requires that A beats C but, in fact, C beats A.
- A beats B, so compare A to C and C wins.  
B beats C, so compare B to A and A wins.  
C beats A, so compare C to B and B wins.  
Yes, because these preferences do not exhibit transitivity.

**Case 2**

	Voter Type		
	Type 1	Type 2	Type 3
Percent of electorate	30	15	55
First Choice	A	B	C
Second Choice	B	C	A
Third Choice	C	A	B

- If voters must choose between A and B, what are the percentages of votes that each outcome receives and which outcome wins?
- If voters must choose between B and C, what are the percentages of votes that each outcome receives and which outcome wins?
- If voters must choose between C and A, what are the percentages of votes that each outcome receives and which outcome wins?
- Do these preferences exhibit transitivity? Explain.
- If the voters choose between A and B and then compare to C, which outcome wins?  
If the voters choose between B and C and then compare to A, which outcome wins?  
If the voters choose between A and C and then compare to B, which outcome wins?  
Does the order in which items are voted on matter in this case? Why?

Answer:

Case 2:

- $A = 30 + 55 = 85$ ,  $B = 15$ . A beats B.
- $B = 30 + 15 = 45$ ,  $C = 55$ . C beats B.
- $A = 30$ ,  $C = 15 + 55 = 70$ . C beats A.
- Yes. C beats A and A beats B. Transitivity requires that C beats B and it does.
- A beats B, so compare B to C and C wins.  
C beats B, so compare C to A and C wins.  
C beats A, so compare C to B and C wins.  
No, because these preferences exhibit transitivity.

**Case 3**

	Voter Type		
	Type 1	Type 2	Type 3
Percent of electorate	25	35	40
First Choice	A	B	C
Second Choice	B	A	A
Third Choice	C	C	B

- If voters must choose between A and B, what are the percentages of votes that each outcome receives and which outcome wins?
- If voters must choose between B and C, what are the percentages of votes that each outcome receives and which outcome wins?

- c. If voters must choose between C and A, what are the percentages of votes that each outcome receives and which outcome wins?
- d. Do these preferences exhibit transitivity? Explain.
- e. If the voters choose between A and B and then compare to C, which outcome wins?  
 If the voters choose between B and C and then compare to A, which outcome wins?  
 If the voters choose between A and C and then compare to B, which outcome wins?  
 Does the order in which items are voted on matter in this case? Why?  
 Is the winning outcome the first choice of a large portion of the population? How can this be?

Answer:

Case 3:

- a.  $A = 25 + 40 = 65$ ,  $B = 35$ . A beats B.
  - b.  $B = 25 + 35 = 60$ ,  $C = 40$ . B beats C.
  - c.  $A = 25 + 35 = 60$ ,  $C = 40$ . A beats C.
  - d. Yes. A beats B and B beats C. Transitivity requires that A beats C and it does.
  - e. A beats B, so compare A to C and A wins.  
 B beats C, so compare B to A and A wins.  
 A beats C, so compare A to B and A wins.
- No, because these preferences exhibit transitivity. No, only 25 percent of the population chooses A as their first choice, but most of the population greatly dislikes C and none of the population greatly dislikes A.

4. a. For Case 1 in problem 3 above, which outcome wins if you use a Borda count to determine the winner among outcomes A, B, and C, and what are the scores for each outcome?

Answer:

If choosing between A, B, and C,  $A = 30 + 120 + 45 = 195$ ,  $B = 15 + 80 + 135 = 230$ ,  $C = 45 + 40 + 90 = 175$  and B wins.

- b. For Case 1 in problem 3 above, eliminate outcome C and use a Borda count to find the winner from the remaining choices of A and B. What property required of a perfect voting system has been violated? Explain

Answer:

If choosing between only A and B,  $A = 30 + 80 + 45 = 155$ ,  $B = 15 + 40 + 90 = 145$  and A wins. Independence of irrelevant alternatives: the rankings of A and B shouldn't change when C is removed but the ranking did change.

- c. Compare the results of Case 1 in problem 3 under simple majority rule, a Borda count with three choices, and a Borda count with two choices. What conclusions can you draw from these results?

Answer:

A wins, then B wins, then A wins again. Thus, majority voting does not necessarily tell us what society wants and deciding the order on which items are voted may affect the outcome.

5. In each of the following situations, describe the behaviour that suggests that people may not always behave as self-interested rational maximizers.
- a. Workers agree to a labour contract that gives them a 5 per cent raise for each of the next three years. After one year passes, they discover that the firm's profits have increased by 100 per cent. The workers go on strike and receive no income during the strike.

Answer:

People care about fairness and may be willing to accept nothing so that their adversary gets nothing if they think the split was unfair.

- b. A worker plans to start saving 20 per cent of his income starting three months from now because he has to first pay off some overdue bills. After three months passes, the worker saves nothing and instead spends all of his monthly income.

Answer:

People are inconsistent over time. From 3 months away, saving seems like a good idea but as that date approaches, the desire for immediate gratification takes over.

- c. After a famous rock star dies in a plane crash, many people decide to travel by train rather than fly.

Answer:

People give too much weight to a small number of vivid observations. The probability of a plane crash has probably not changed yet people are more afraid to fly due to one highly publicized case.

- d. Joe wants to go on a fishing trip to Ireland and his wife, Sue, wishes to take a different type of trip. The newspaper reports that the size and number of fish being caught in the area where Joe hopes to fish is greater than normal because the temperature has become unseasonably cool. Joe is more sure about his choice of the fishing trip and Sue is more sure about her desire to go on a different type of trip.

Answer:

People are reluctant to change their minds. Both Joe and Sue use the same information to defend their original opinion.

## Chapter 23

1. a. Complete the following table.

	Type 1	Type 2	Type 3
Gross Domestic Product	4,532	4,804	
Consumption		3,320	3,544
Investment	589	629	673
Government Purchases	861		977
Net Exports	-45	-58	-54

Answer:

	Type 1	Type 2	Type 3
Gross Domestic Product	4,532	4,804	5,140
Consumption	3,127	3,320	3,544
Investment	589	629	673
Government Purchases	861	913	977
Net Exports	-45	-58	-54

b. What is the largest expenditure component of GDP?

Answer:

Consumption

c. Does investment include the purchase of company shares and bonds? Why?

Answer:

No, because that transaction is a purchase of an asset, not a purchase of currently produced capital goods.

d. Do government purchases include government spending on unemployment benefit? Why?

Answer:

No, because unemployment benefits are expenditures for which the government receives no production in return.

e. What does it mean to say that net exports are negative?

Answer:

It means that imports exceed exports.

2. Suppose the base year in the following table is 2004.

Year	Production of X	Price per Unit of X
2004	20 units	€5
2005	20 units	10
2006	20 units	20

a. What is nominal GDP for 2004, 2005, and 2006?

Answer:

€100, €200, €400

b. What is real GDP for 2004, 2005, and 2006?

Answer:

€100, €100, €100

3. Suppose the following table records the total output and prices for an entire economy. Further, suppose the base year in the following table is 2004.

Year	Price of Soda	Quantity of Soda	Price of Jeans	Quantity of Jeans
2004	€1.00	200	€10.00	50
2005	1.00	220	11.00	50

a. What is the value of nominal GDP in 2004?

Answer:

€700

b. What is the value of real GDP in 2004?

Answer:

€700

c. What is the value of nominal GDP in 2005?

Answer:

€770

d. What is the value of real GDP in 2005?

Answer:

€720

e. What is the value of the GDP deflator in 2004?

Answer:

100

f. What is the value of the GDP deflator in 2005?

Answer:

107

g. From 2000 to 2001, prices rose approximately what percentage?

Answer:

$(107 - 100)/100 = 0.07 = 7\%$

h. Was the increase in nominal GDP from 2000 to 2001 mostly due to an increase in real output or due to an increase in prices?

Answer:

Percent increase in nominal GDP =  $(€770 - €700)/700 = 0.10 = 10\%$ . Percent increase in prices = 7%, therefore most of the increase was due to prices.

4. Complete the following table.

Year	Nominal GDP	Real GDP	GDP deflator
1		€100	100
2	€120		120
3	150	125	

Answer:

Year	Nominal GDP	Real GDP	GDP deflator
1	€100	€100	100
2	120	100	120
3	150	125	120

a. What year is the base year? How can you tell?

Answer:

Year 1, because the deflator = 100.

b. From year 1 to year 2, did real output rise or did prices rise? Explain?

Answer:

Prices rose 20 percent and real output stayed the same.

c. From year 2 to year 3, did real output rise or did prices rise? Explain?

Answer:

Prices stayed the same and real output rose 25 percent.

## Chapter 24

1. The following table shows the prices and the quantities consumed in the country known as the University States. Suppose the base year is 2003. This is the year the typical consumption basket was determined so the quantities consumed during 2003 are the only quantities needed to calculate the CPI in every year.

Year	Price of Books	Quantity of Books	Price of Pencils	Quantity of Pencils	Price of Pens	Quantity of Pens
2003	€50	10	€1	100	€5	100
2004	50	12	1	200	10	50
2005	60	12	1.50	250	20	20

- a. What is the value of the CPI in 2003?

Answer:

$$(\text{€}1100/\text{€}1100) \times 100 = 100$$

- b. What is the value of the CPI in 2004?

Answer:

$$(\text{€}1600/\text{€}1100) \times 100 = 145.5$$

- c. What is the value of the CPI in 2005?

Answer:

$$(\text{€}2750/\text{€}1100) \times 100 = 250$$

- d. What is the inflation rate in 2004?

Answer:

$$[(145.5 - 100)/100] \times 100 = 45.5 \text{ percent}$$

- e. What is the inflation rate in 2005?

Answer:

$$[(250 - 145.5)/145.5] \times 100 = 71.8 \text{ percent}$$

- f. What type of bias do you observe in the CPI and corresponding inflation rates you generated above? Explain.

Answer:

Substitution bias, because as the price of pens increased, the quantity consumed declined significantly.

- g. If you had a clause in your wage contract that increased your wage by the rate of inflation as measured by the CPI calculated above, would your standard of living increase, decrease, or stay the same over the years 2003–2005? Why?

Answer:

Increase, because the CPI overstates the increase in the cost of living (assuming that your expenditure reflects the typical consumption basket in each year).

- h. Again, suppose you had a clause in your wage contract that increased your wage by the rate of inflation as measured by the CPI calculated above. If you personally only consume pens (no paper or pencils), would your standard of living increase, decrease, or stay the same over the years 2003–2005? Why?

Answer:

Decrease, because the price of pens has increased a greater percentage than the CPI.

2. Suppose that you lend your flatmate €100 for one year at 9 per cent nominal interest.
- a. How many dollars of interest will your flatmate pay you at the end of the year?

Answer:

€9

- b. Suppose at the time you both agreed to the terms of the loan, you both expected the inflation rate to be 5 per cent during the year of the loan. What do you both expect the real interest rate to be on the loan?

Answer:

9 per cent – 5 per cent = 4 per cent

- c. Suppose at the end of the year, you are surprised to discover that the actual inflation rate over the year was 8 per cent. What was the actual real interest rate generated by this loan?

Answer:

9 per cent – 8 per cent = 1 per cent

- d. In the case described above, actual inflation turned out to be higher than expected. Which of the two of you had the unexpected gain or loss? Your flatmate (the borrower), or you (the lender)? Why?

Answer:

Your flatmate (the borrower) gained; you lost because the borrower repaid the loan with dollars of surprisingly little value.

- e. What would the real interest rate on the loan have been if the actual inflation rate had turned out to be 11 per cent?

Answer:

9 per cent – 11 per cent = –2 per cent

- f. Explain what it means to have a negative real interest rate.

Answer:

$€3.80 \times (172.2/130.7) = €5.01 < €5.15$ , so the standard of living of a worker earning the minimum wage improved slightly during the 1990s.

## Chapter 25

1.

Country	Current real GDP/person	Current Growth Rate
Northcountry	€15,468	1.98 %
Southcountry	13,690	2.03
Eastcountry	6,343	3.12
Westcountry	1,098	0.61

a. Which country is richest? How do you know?

Answer:

Northcountry, because it has the largest real GDP per person.

b. Which country is advancing most quickly? How do you know?

Answer:

Eastcountry, because it has the largest growth rate.

c. Which country would probably see the greatest benefit from an increase in capital investment? Why?

Answer:

Westcountry is the poorest and probably has the least capital. Since capital exhibits diminishing returns, it is most productive when it is relatively scarce.

d. Referring to (c): Would this country continue to see the same degree of benefits from an increase in capital investment forever? Why?

Answer:

No. Because of diminishing returns to capital, the additional growth from increasing capital declines as a country has more capital.

e. Referring to (d): Why might investment in human capital and research and development fail to exhibit the same degree of diminishing returns as investment in physical capital?

Answer:

Human capital emits a positive externality. Research and development is a public good after dissemination.

f. Which country has the potential to grow most quickly? List some reasons why it may not be living up to potential.

Answer:

Westcountry, because it is currently the poorest and could easily benefit from additional capital. It may have trade restrictions (inward oriented policies), a corrupt or unstable government, few courts and a lack of established property rights, etc.

g. If real GDP per person in Northcountry next year is \$15,918, what is its annual growth rate?

Answer:

$(\$15,918 - \$15,468) / \$15,468 = 0.029 = 2.9\%$

2. Imagine a kitchen. It contains a cook, the cook's diploma, a recipe book, a stove and utensils, and some rabbit meat harvested from the open countryside.
- a. Link each object in the kitchen to a general category within the factors of production.

Answer:

Cook = labour, diploma = human capital, recipes = technological knowledge, stove and utensils = capital, rabbit meat = natural resource.

- b. While the different factors of production exhibit different levels of durability, which one is special in that it does not wear out?

Answer:

Recipes (technological knowledge) never wear out. Labour and human capital die. The stove and utensils wear out slowly. The rabbit meat is used up (although it is probably renewable).

3. a. List the policies governments might pursue to increase the productivity of their citizens.

Answer:

Encourage saving and investment, investment from abroad, education, free trade, research and development, protect property rights and establish political stability.

- b. Which one is, at the very least, fundamentally necessary as a background in which the other policies may operate? Why?

Answer:

Property rights and political stability are necessary for there to be any incentive to save, invest, trade, or educate.

- c. Does a growing population enhance or inhibit growth in productivity? Explain.

Answer:

The answer is uncertain. A rapidly growing population may reduce productivity by stretching natural resources across more people and by diluting the capital stock across more workers. However, there is evidence that more technological progress takes place in areas with large populations.

## Chapter 26

1. Fly-by-night Corporation is in need of capital funds to expand its production capacity. It is selling short- and long-term bonds and is issuing shares. You are considering the prospect of helping finance their expansion.
  - a. If you were to buy both short- and long-term bonds from Fly-by-night, from which bond would you demand a higher rate of return: short or long term? Why?

Answer:

Long term, because it is more likely that you may need to sell the long-term bond at a depressed price prior to maturity.

- b. If Standard and Poor's lowered the credit worthiness of Fly-by-night, would this affect the rate of return you would demand when buying their bonds? Why?

Answer:

Yes, the credit risk has increased and lenders would demand a higher rate of return.

- c. If Fly-by-night is issuing both shares and bonds, from which would you expect to earn the higher rate of return over the long run? Why?

Answer:

Owners of shares demand a higher rate of return because it is riskier.

- d. Which would be safer: putting all of your personal saving into Fly-by-night shares, or putting all of your personal saving into an investment fund that has some Fly-by-night shares in its portfolio? Why?

Answer:

It is safer to put money in an investment fund because it is diversified (not all of your eggs are in one basket).

2. Use the saving and investment identities from the National Income Accounts to answer the following questions. Suppose the following values are from the national income accounts of a country with a closed economy (all values are in billions).

$$Y = \text{€}6,000$$

$$T = \text{€}1,000$$

$$C = \text{€}4,000$$

$$G = \text{€}1,200$$

- a. What is the value of saving and investment in this country?

Answer:

$$(\text{€}6,000 - \text{€}1,000 - \text{€}4,000) + (\text{€}1,000 - \text{€}1,200) = \text{€}800 \text{ billion}$$

b. What is the value of private saving?

Answer:

$$€6,000 - €1,000 - €4,000 = €1,000 \text{ billion}$$

c. What is the value of public saving?

Answer:

$$€1,000 - €1,200 = -€200 \text{ billion}$$

d. Is the government's budget policy contributing to growth in this country or harming it? Why?

Answer:

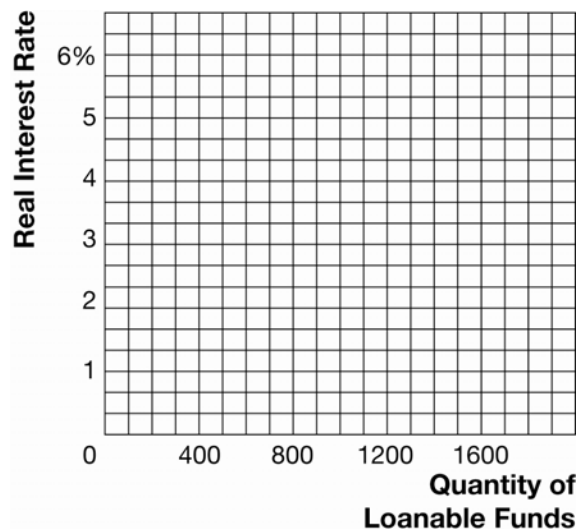
It is harming growth because public saving is negative so less is available for investment.

3. The following information describes a loanable funds market. Values are in billions.

Real Interest Rate	Quantity of Loanable Funds Supplied	Quantity of Loanable Funds Demanded
6%	€1,300	€700
5	1,200	800
4	1,000	1,000
3	800	1,200
2	600	1,500

a. Plot the supply and demand for loanable funds in Exhibit 1. What is the equilibrium real interest rate and the equilibrium level of saving and investment?

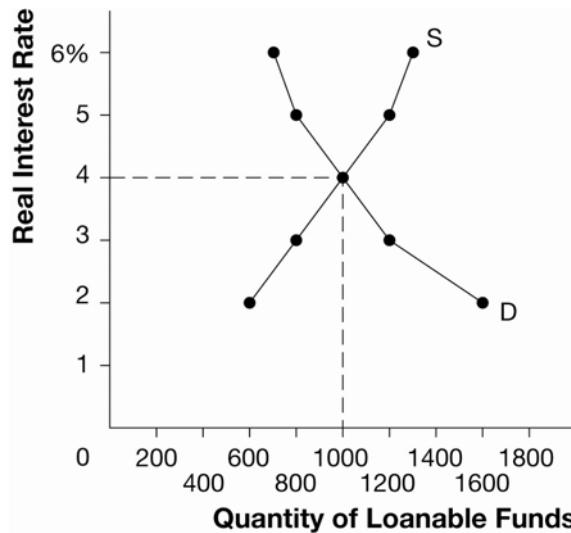
Exhibit 1



Answer:

Equilibrium real interest rate = 4%, equilibrium S and I = €1000 billion.

#### Exhibit 4



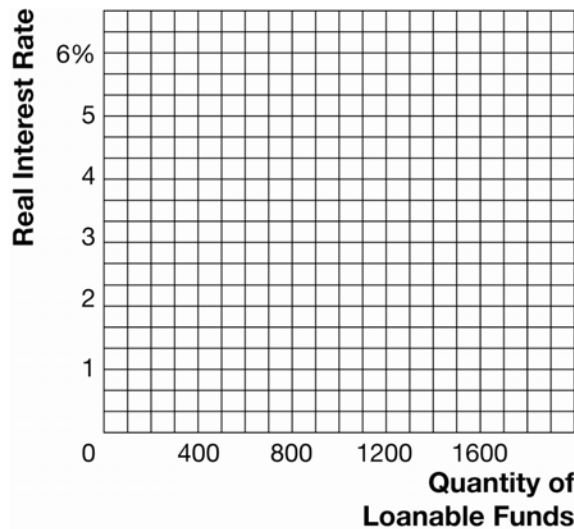
- b. What "market forces" will not allow 2 per cent to be the real interest rate?

Answer:

At 2 per cent interest, the quantity demanded of loanable funds exceeds the quantity supplied by €900 billion. This excess demand for loans (borrowing) will drive interest rates up to 4 per cent.

- c. Suppose the government suddenly increases its budget deficit by €400 billion. What is the new equilibrium real interest rate and equilibrium level of saving and investment? (Show graphically in Exhibit 2.)

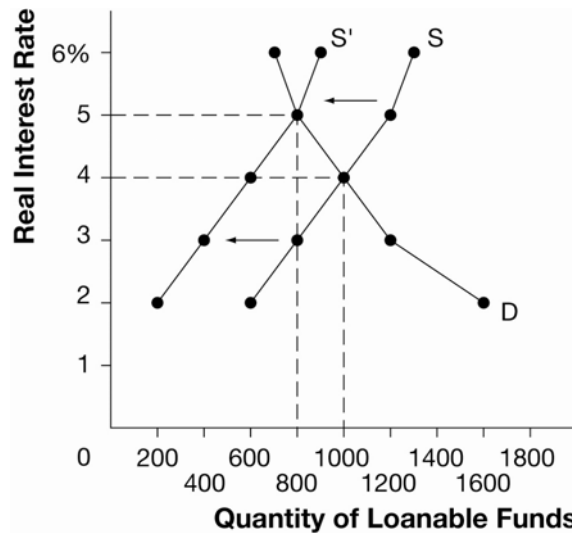
#### Exhibit 2



Answer:

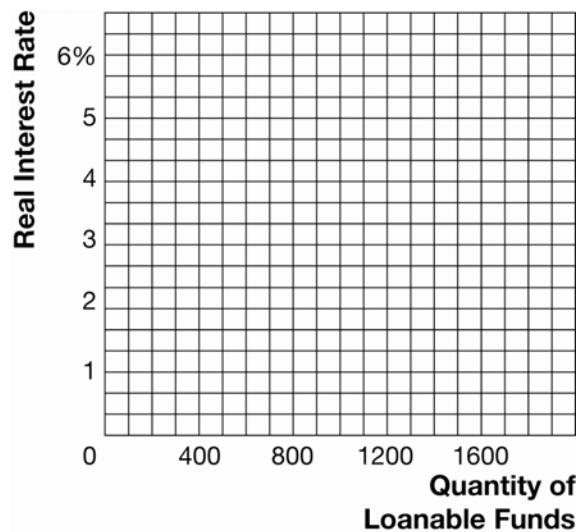
Equilibrium real interest rate = 5%, equilibrium  $S$  and  $I$  = €800 billion.

### Exhibit 5



- d. Starting at the original equilibrium, suppose the government introduces an investment tax credit that stimulates the demand for loanable funds for capital investment by €400 billion at any real interest rate. What is the new equilibrium real interest rate and equilibrium level of saving and investment? (Show graphically in Exhibit 3.)

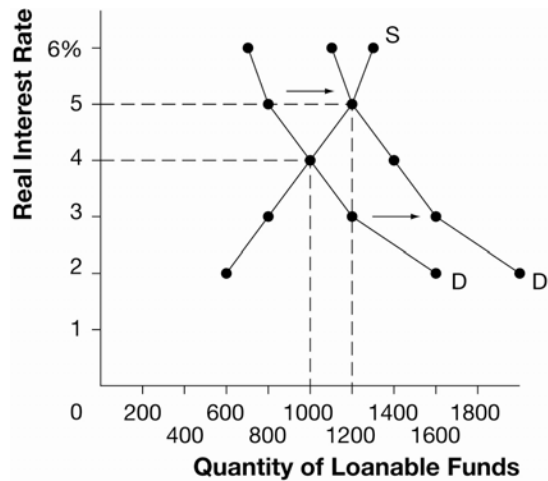
### Exhibit 3



Answer:

Equilibrium real interest rate = 5%, equilibrium  $S$  and  $I$  = €1200 billion.

### Exhibit 6



- e. With regard to (c) and (d), which policy is most likely to increase growth? Why?

Answer:

An investment tax credit, because it shifts the demand for loanable funds to invest in capital to the right, raising the level of investment in capital and stimulating growth.

## Chapter 27

1. Whitewater Raft Tour Company can purchase rafts today for €100,000. They will earn a €40,000 return on the rafts at the end of each of the next three years.

- a. If the interest rate were 12 per cent, what is the present value of each of the future returns that Whitewater Raft expects to receive?

Answer:

$$€40,000/1.12 = €35,714.29; €40,000/(1.12)^2 = €31,887.76; €40,000/(1.12)^3 = €28,471.21$$

- b. If the interest rate were 12 per cent, should Whitewater Raft invest in the rafts? Explain.

Answer:

No, the cost is €100,000 but the present value of the return is only €96,073.26.

- c. If the interest rate were 7 per cent, should Whitewater Raft invest in the rafts? Explain.

Answer:

Yes. Although the cost is still €100,000, the present value of the returns is now the sum of  $€40,000/1.07$ ;  $€40,000/(1.07)^2$ ;  $€40,000/(1.07)^3$  which is €104,972.65.

- d. Compare your answers to parts (b) and (c) above. What general principle about the relationship between investment and the interest rate is demonstrated?

Answer:

Investment is inversely related to the interest rate—lower interest rates stimulate investment.

2. Use the rule of 70 to answer the following questions. Suppose that real GDP/person in Fastcountry grows at an annual rate of 2 per cent and that real GDP/person in Slowcountry grows at an annual rate of 1 per cent.

- a. How many years does it take for real GDP/person to double in Fastcountry?

Answer:

$$70/2 = 35 \text{ years.}$$

- b. If real GDP/person in Fastcountry is €2000 in 1935, how much will it be in the year 2005?

Answer:

$$€8,000$$

- c. How many years does it take for real GDP/person to double in Slowcountry?

Answer:

$$70/1 = 70 \text{ years.}$$

- d. If real GDP/person in Slowcountry is €2000 in 1935, how much will it be in the year 2005?

Answer:

€4,000

- e. Use the numbers you calculated above to help explain the concept of compound growth.

Answer:

Fastcountry adds €2,000 to its GDP/person in the first 35 years. Growing at the same percent, it adds €4,000 to its GDP over the next 35 years because the same growth rate is now applied to a larger base.

- f. If Fastcountry stopped growing in the year 2005, how many years would it take for the standard of living in Slowcountry to catch that of Fastcountry?

Answer:

Another 70 years.

3. For each of the following, determine the type of problem from which the insurance market suffers (adverse selection or moral hazard) and explain.

- a. Susan buys health insurance at the non-smoker rate. After she obtains the insurance, she begins smoking again.

Answer:

Moral hazard, because after she obtained the insurance, she is less careful with her health.

- b. Bruce discovers that he has a liver condition that will shorten his life. He seeks life insurance to help pay for his children's college expenses.

Answer:

Adverse selection, because after he knows that his probability of death is higher than average, he seeks life insurance.

- c. After Lisa gets fire insurance on her house, she burns fires in the fireplace without placing a fireguard in front of it.

Answer:

Moral hazard, because after she obtains the insurance, she becomes less careful with fire.

4. Rachel is an extremely picky eater. When choosing a restaurant, she always chooses to eat at a buffet. At a buffet, she doesn't have to order off a menu so she doesn't have to risk ordering something she may not like. Rachel knows that buffet food is very ordinary and, because she avoids nice restaurants, she misses the chance to eat some exceptional foods that she would enjoy very much. On the other hand, she never has a meal that she is unwilling to eat.
- a. Does Rachel gain as much utility from a truly great meal as she loses from eating a meal she dislikes? Explain.

Answer:

No. She dislikes bad food more than she likes good food.

- b. What can you say about Rachel's utility function with regard to her preferences toward risk? Explain.

Answer:

Rachel is risk averse because she exhibits diminishing marginal utility of wealth (she dislikes spending, say, €30 on a meal she dislikes more than she enjoys spending €30 on a meal she loves.)

- c. How does the availability of a buffet help Rachel reduce her risk? Explain.

Answer:

She can diversify her risk at a buffet – she does not "put all of her eggs in one basket" at a buffet. This reduces her standard deviation of meals because her meals are always adequate but never terrible or great. A buffet is like an investment fund of food.

## Chapter 28

1. Use the following information about Employment Country to answer question 1. Numbers are in millions.

	2004	2005
Population	223.6	226.5
Adult population	168.2	169.5
Number of unemployed	7.4	8.1
Number of employed	105.2	104.2

- a. What is the labour force in 2004 and 2005?

Answer:

2004:  $7.4 + 105.2 = 112.6$  million

2005:  $8.1 + 104.2 = 112.3$  million

- b. What is the labour force participation rate in 2004 and 2005?

Answer:

2004:  $(112.6/168.2) \times 100 = 66.9\%$

2005:  $(112.3/169.5) \times 100 = 66.3\%$

- c. What is the unemployment rate in 2004 and 2005?

Answer:

2004:  $(7.4/112.6) \times 100 = 6.6\%$

2005:  $(8.1/112.3) \times 100 = 7.2\%$

- d. From 2004 to 2005, the adult population went up while the labour force went down. Provide a number of explanations why this might have occurred.

Answer:

Earlier retirements, students staying in college longer, more parents staying at home with children, discouraged workers discontinuing their job search.

- e. If the natural rate of unemployment in Employment Country is 6.6 percent, how much is cyclical unemployment in 2004 and 2005? Is Employment Country likely to be experiencing a recession in either of these years?

Answer:

2004:  $6.6\% - 6.6\% = 0\%$

2005:  $7.2\% - 6.6\% = 0.6\%$

In 2004, unemployment is "normal" for Employment Country; therefore, there is no recession. However, in 2005, unemployment is above normal (positive cyclical unemployment), so Employment Country may be in a recession.

2. Suppose the labour market is segmented into two distinct markets: the market for low-skill workers and the market for high-skill workers. Further, suppose the competitive equilibrium wage in the low-skill market is €3.00/hour while the competitive equilibrium wage in the high-skill market is €15.00/hour.
- a. If the minimum wage is set at €5.00/hour, which market will exhibit the greatest amount of unemployment? Demonstrate it graphically in Exhibit 1.

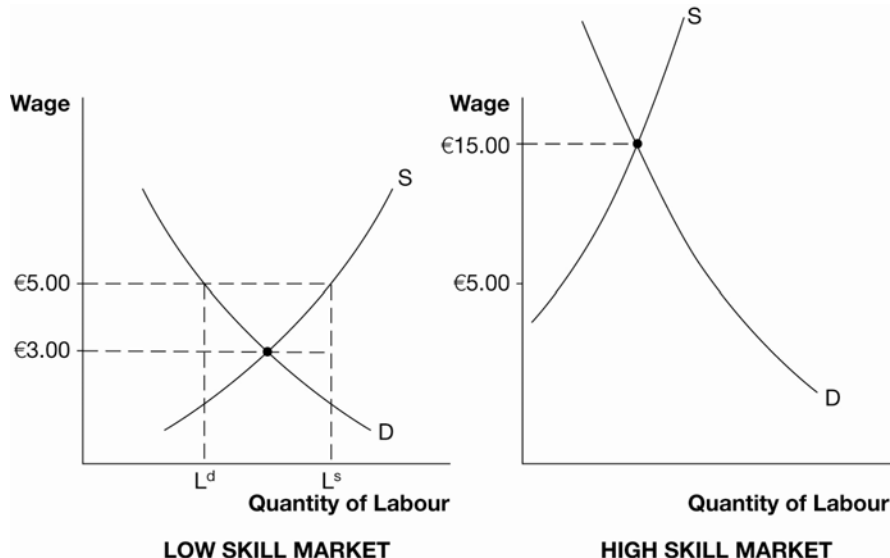
Exhibit 1



Answer:

The low-skill market will experience unemployment because there will be an excess supply of labour. (See Exhibit 2.)

Exhibit 2



- b. Does the minimum wage have any impact on the high skill market? Why?

Answer:

No, because the competitive equilibrium wage is above the wage floor.

- c. Do your results seem consistent with labour market statistics? Explain.

Answer:

Yes. We observe a greater amount of unemployment among low-skill workers who are often young and inexperienced.

- d. Suppose the high-skill market becomes unionised and the new negotiated wage is €18.00/hour. Will this have any effect on the low skill market? Explain.

Answer:

Yes. There will now be excess supply of skilled workers, and this may cause some skilled workers to move to the unskilled market increasing the supply of labour in the unskilled market, further reducing the competitive equilibrium wage and causing even more unemployment there.

3. Answer the following questions about the composition of unemployment.

- a. What are some of the sources of unemployment?

Answer:

Job search, minimum wage, unions, efficiency wages.

- b. Which type of unemployment is initiated by the firm?

Answer:

Efficiency wages.

- c. Why might a firm pay wages in excess of the competitive equilibrium?

Answer:

To improve worker health, lower worker turnover, increase worker effort, improve worker quality.

- d. Which type of efficiency wage is unlikely to be relevant in the west European economies? Why?

Answer:

Worker health, because in western Europe workers' wages are significantly above subsistence.

- e. How does frictional unemployment differ from the other sources of unemployment?

Answer:

Frictional unemployment exists even when the wage is at a competitive equilibrium.

## Chapter 29

1. Suppose the Bank of England purchases a UK government bond from you for £10,000.
  - a. What is the name of the Bank's action?

Answer:

Open market operations

- b. Suppose you deposit the £10,000 in First Student Bank. Show this transaction on First Student Bank's T-account.

First Student Bank	
Assets	Liabilities

Answer:

First Student Bank	
Assets	Liabilities
Reserves     £10,000	Deposits     £10,000

- c. Suppose the reserve requirement is 20 percent. Show First Student Bank's T-account if they loan out as much as they can.

First Student Bank	
Assets	Liabilities

Answer:

First Student Bank	
Assets	Liabilities
Reserves     £2,000	Deposits     £10,000
Loans        £8,000	

- d. At this point, how much money has been created from the Bank of England's policy action?

Answer:

$$£10,000 + £8,000 = £18,000$$

e. What is the value of the money multiplier?

Answer:

$$1/.20 = 5$$

f. After infinite rounds of depositing and lending, how much money could be created from the Bank of England's policy action?

Answer:

$$£10,000 \times 5 = £50,000$$

g. If during the rounds of depositing and lending some people keep extra currency and fail to deposit all of their receipts, will there be more or less money created from the Bank of England's policy action than you found in part (f)? Why?

Answer:

Less, because a smaller amount of each loan gets re-deposited to be available to be loaned again.

h. If during the rounds of depositing and lending, some banks fail to loan the maximum amount of reserves allowed but instead keep excess reserves, will there be more or less money created from the Bank of England's policy action than you found in part (f)? Why?

Answer:

Less, because a smaller amount of each deposit gets loaned out to be available to be deposited again.

2. Suppose the entire economy contains €1,000 worth of one euro notes.

a. If people fail to deposit any of the euro notes but instead hold all €1,000 as currency, how large is the money supply? Explain.

Answer:

€1,000, because there is €1,000 of currency and €0 of deposits.

b. If people deposit the entire €1,000 worth of euro notes in banks that are required to observe a 100 percent reserve requirement, how large is the money supply? Explain.

Answer:

€1,000, because there is now €0 of currency and €1,000 of deposits.

c. If people deposit the entire €1,000 worth of euro notes in banks that are required to observe a 20 per cent reserve requirement, how large could the money supply become? Explain.

Answer:

$€1,000 \times (1/0.20) = €5,000$ , because €1,000 of new reserves can support €5,000 worth of deposits.

- d. In part (c), what portion of the money supply was created due to the banks? (Hint: €1,000 of euro notes already existed).

Answer:

The total potential increase is €5,000, but €1,000 was currency already in the system. Thus, an additional €4,000 was created by the banks.

- e. If people deposit the entire €1,000 worth of euro notes in banks that are required to observe a 10 per cent reserve requirement, how large could the money supply become?

Answer:

$€1,000 \times (1/0.10) = €10,000$ .

- f. Compare your answer in part (e) to part (c). Explain why they are different.

Answer:

Banks can create more money from the same amount of new reserves when reserve requirements are lower because they can lend a larger portion of each new deposit.

- g. If people deposit the entire €1,000 worth of bills in banks that are required to observe a 10 per cent reserve requirement, but they choose to hold another 10 per cent as excess reserves, how large could the money supply become?

Answer:

$€1,000 \times 1/(0.10+0.10) = €5,000$ .

- h. Compare your answer in part (c) to part (g). Are these answers the same? Why?

Answer:

Yes, they are the same. With regard to deposit creation, it doesn't matter why banks hold reserves. It only matters how much they hold.

## Chapter 30

1. Use the quantity equation for this problem. Suppose the money supply is €200, real output is 1,000 units, and the price per unit of output is €1.

- a. What is the value of velocity?

Answer:

$$(1,000 \times €1)/€200 = 5$$

- b. If velocity is fixed at the value you solved for in part (a), what does the quantity theory of money suggest will happen if the money supply is increased to €400?

Answer:

$$€400 \times 5 = €2 \times 1,000, \text{ prices will double from €1 to €2}$$

- c. Is your answer in part (b) consistent with the classical dichotomy? Explain.

Answer:

Yes. The classical dichotomy divides economic variables into real and nominal. Money affects nominal variables proportionately and has no impact on real variables. In part (b), prices double, but real output remains constant.

- d. Suppose that when the money supply is doubled from €200 to €400, real output grows a small amount (say 2 per cent). Now what will happen to prices? Do prices more than double, less than double, or exactly double? Why?

Answer:

The quantity equation says that nominal output must change in proportion to money. Prices will still rise, but since real output is larger, prices will less than double.

- e. When inflation gets very high, people do not like to hold money because it is losing value quickly. Therefore, they spend it faster. If, when the money supply is doubled, people spend money more quickly, what happens to prices? Do prices more than double, less than double, or exactly double? Why?

Answer:

Money has a proportional impact on nominal output if  $V$  is constant. If  $V$  grows, a doubling of  $M$  will cause  $P$  to more than double.

- f. Suppose the money supply at the beginning of this problem refers to  $M_1$ . That is, the  $M_1$  money supply is €200. What would the  $M_2$  quantity equation look like if the  $M_2$  money supply were €500 (and all other values were as stated at the beginning of the problem)?

Answer:

$$€500 \times 2 = €1 \times 1,000, \text{ M2 velocity is 2.}$$

2. The following questions are related to the Fisher effect.
- a. To demonstrate your understanding of the Fisher effect, complete the following table.

Real interest rate	Nominal interest rate	Inflation rate
3%	10%	
	6	2%
5		3

Answer:

Real interest rate	Nominal interest rate	Inflation rate
3%	10%	7%
4	6	2
5	8	3

The following questions about the Fisher effect are unrelated to the table above.

- b. Suppose people expect inflation to be 3 per cent and suppose the desired real interest rate is 4 per cent. What is the nominal rate?

Answer:

$$3\% + 4\% = 7\%$$

- c. Suppose inflation turns out to be 6 per cent. What is the actual real interest rate on loans that were signed based on the expectations in part (b)?

Answer:

People would have signed loan contracts for 7 per cent nominal interest. Therefore,  $7\% - 6\% = 1\%$ .

- d. Was wealth redistributed to the lender from the borrower or to the borrower from the lender when inflation was expected to be 3 per cent, but in fact, turned out to be 6 per cent?

Answer:

People expected a real interest rate of 4 per cent, but the actual real interest rate turned out to be 1 per cent. Wealth was redistributed to the borrower from the lender.

- e. What would have happened had inflation turned out to be only 1 per cent?

Answer:

The original loan contract would be the same. Thus  $7\% - 1\% = 6\%$ . The actual real rate is 6 per cent instead of 4 per cent so wealth is redistributed to lenders from borrowers.

3. Income taxes treat nominal interest earned on savings as income even though much of the nominal interest is simply to compensate for inflation.
- a. To see what this does to the incentive to save, complete the following table for both the low inflation and high inflation country.

	Low inflation country	High inflation country
Real interest rate	5%	5%
Inflation rate	3	11
Nominal interest rate		
Reduced interest rate due to a 25% tax		
After-tax nominal interest rate		
After-tax real interest rate		

Answer:

	Low inflation country	High inflation country
Real interest rate	5%	5%
Inflation rate	3	11
Nominal interest rate	8	16
Reduced interest rate due to a 25% tax	2	4
After-tax nominal interest rate	6	12
After-tax real interest rate	3	1

- b. In which country is there a greater incentive to save? Why?

Answer:

In the low inflation country because the after tax real interest rate is larger.

- c. What could the government do to eliminate this problem?

Answer:

They could eliminate inflation or tax only real interest income.

## Chapter 31

1. How would each of the following transactions affect UK *NCO* (net capital outflow)? Does the transaction affect direct investment or portfolio investment?

- a. UK bank Barclays buys shares in South African bank Absa.

Answer:

*NCO* rises. Foreign portfolio investment.

- b. UK firm JCB buys steel from a Japanese manufacturer to use in the production of its diggers, excavators and trucks.

Answer:

UK *NX* falls and a Japanese manufacturer is holding UK pounds, so *NCO* falls. Foreign portfolio investment.

- c. French car manufacturer Peugeot expands its plant in Coventry in England.

Answer:

*NCO* falls. Foreign direct investment.

- d. An American investment fund buys shares in UK aerospace and defence firm BAE Systems.

Answer:

*NCO* falls. Foreign portfolio investment.

- e. UK oil company BP builds a plant in Venezuela.

Answer:

*NCO* rises. Foreign direct investment.

2. Suppose a resident of Portugal buys a set of golf clubs from a UK manufacturer using euros.

- a. If the UK manufacturer holds on to the euros, does UK  $NX = NCO$  in this case? Explain.

Answer:

Yes, *NX* has risen by the size of the sale and *NCO* has risen an equal amount and is the size of the company's holdings of foreign currency.

- b. Suppose the UK manufacturer uses the euros to help build a factory in Portugal. Does  $NX = NCO$  in this case? Explain. What kind of foreign investment is this?

Answer:

Yes, *NX* has risen by the size of the sale and *NCO* has risen an equal amount and is the size of the company's purchase of foreign capital. Foreign direct investment.

- c. Suppose the UK manufacturer uses the euros to buy shares in a Portuguese company. Does  $NX = NCO$  in this case? Explain. What kind of foreign investment is this?

Answer:

Yes,  $NX$  has risen by the size of the sale and  $NCO$  has risen an equal amount and is the size of the company's purchase of foreign capital. Foreign portfolio investment.

- d. Suppose the UK manufacturer uses the euros to buy leather made in Portugal. Does  $NX = NCO$  in this case? Explain.

Answer:

Yes,  $NX$  and  $NCO$  are both unchanged because exports rise by the same amount as imports, leaving  $NX$  unchanged.  $NCO$  was not involved.

3. Suppose the nominal exchange rate is 1,000 Chilean pesos per UK pound. Further, suppose the price of a bushel of UK wine is £5 per bottle and the price of a bottle of Chilean wine is 7,500 pesos.

- a. What is the real exchange rate between Chile and the UK in terms of wine?

Answer:

$(1000 \text{ pesos}/\text{£} \times \text{£}5/\text{bottle}) / 7,500 \text{ pesos/bottle} = 0.67 \text{ Chilean bottle per UK bottle}$

- b. Does a pound have purchasing power parity in the UK and Chile? Explain.

Answer:

No. £1 buys £1/£5 bottles or 0.20 of a bottle of UK wine. £1 buys 1000 pesos and 1000 pesos buys  $1000/7500$  or 0.1333 of a bottle of Chilean wine. (Or 1 bottle costs £5 in the UK and £7.50 in Chile.)

- c. Is there a profit opportunity that you could exploit with arbitrage? Where would you buy and where would you sell?

Answer:

Yes. Buy wine in the UK and sell it in Chile.

- d. If the nominal exchange rate stayed the same, what should happen to the price of wine in the UK and Chile? Explain.

Answer:

The price should rise in the UK due to an increase in demand and fall in Chile due to an increase in supply.

- e. Suppose prices move as you have suggested in part (d). What has happened to the real exchange rate?

Answer:

The real exchange rate will rise until it is equal to one (1 Chilean bottle to 1 UK bottle).

4. Suppose the price of a pair of Levi's jeans is €40 in Spain and 400 pesos in the Philippines.

a. What is the nominal peso/euro exchange rate if purchasing-power parity holds?

Answer:

400 pesos/40 euros = 10 pesos/euro

b. Suppose the central bank in the Philippines is politically pressured to double the country's money supply, which doubles the price level in the Philippines. If purchasing-power parity holds, what is the new peso/euro exchange rate? Did the peso appreciate or depreciate?

Answer:

800 pesos/40 euros = 20 pesos/euro. The peso depreciated.

c. Suppose the ECB now doubles the Eurozone money supply, which doubles the price level in the Eurozone, including, of course, Spain. If purchasing power parity holds, what is the new value of the peso/euro exchange rate? Did the euro appreciate or depreciate?

Answer:

800 pesos/80 euros = 10 pesos/euro. The euro depreciated.

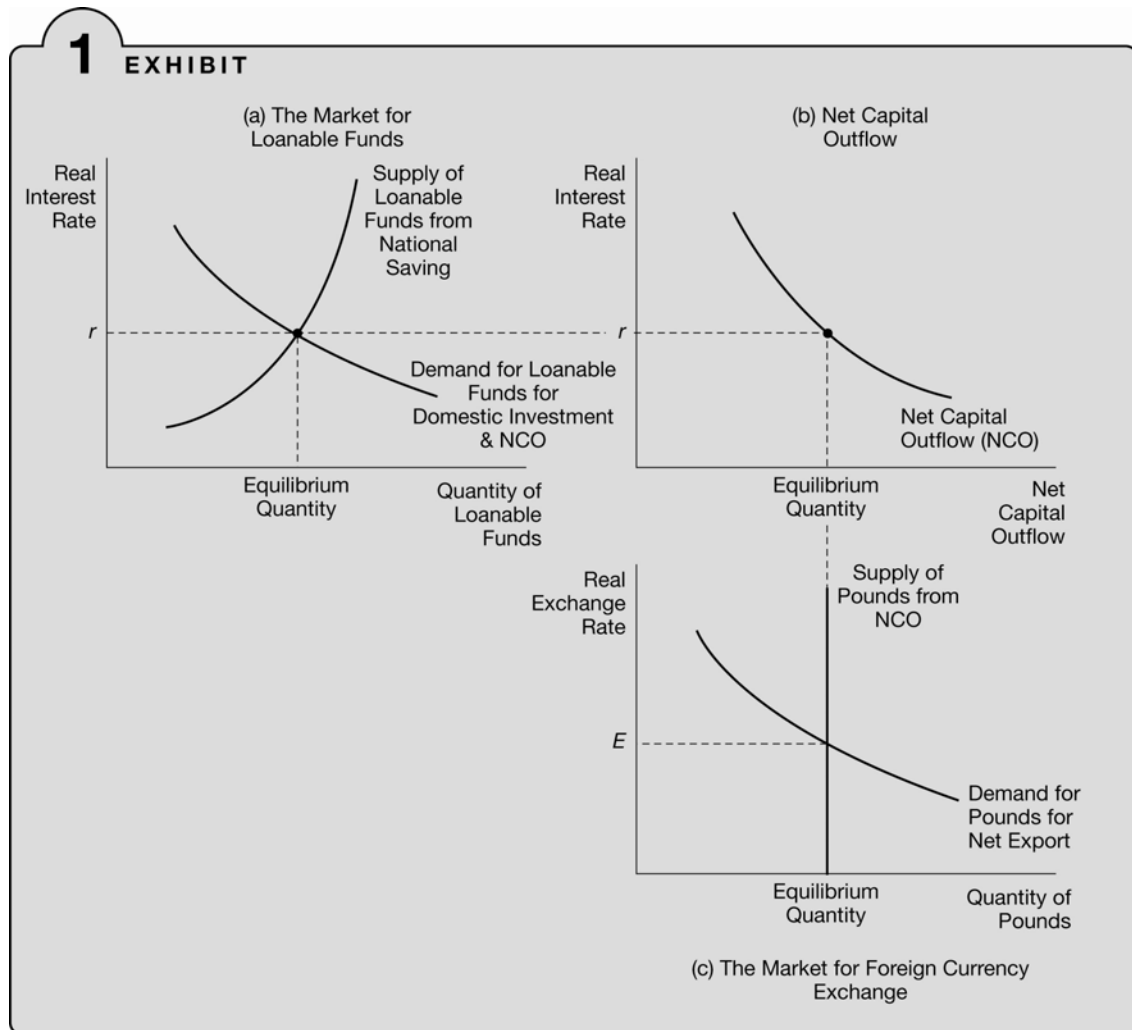
d. Compare your answer to part (a) and part (c). What has happened to the exchange rate? Why?

Answer:

It is unchanged. When prices rise symmetrically, it has no effect on the nominal exchange rate if purchasing power parity holds.

## Chapter 32

- This problem is composed of the examples found in the chapter except the direction of the change in each case has been reversed. Use the model described by Exhibit 1 to answer the following questions.



- Suppose the government reduces its budget deficit. Describe the sequence of events in the model by describing the shifts in the curves in Exhibit 1 and discuss the movements in the relevant macroeconomic variables.

**Answer:**

Panel (a), supply of loanable funds shifts right, real interest rate decreases. NCO increases, increasing the supply of pounds in the foreign currency exchange market and causing the real exchange rate to depreciate. Saving and domestic investment have increased and the trade balance has moved toward surplus.

- b. Suppose an existing quota on the importing of Japanese cars is removed. Describe the sequence of events in the model by describing the shifts in the curves in Exhibit 1 and discuss the movements in the relevant macroeconomic variables.

Answer:

Panel (c),  $NX$  fall at each exchange rate as imports increase causing the demand for pounds in the foreign currency exchange market to shift left; the real exchange rate falls increasing  $NX$  to their original level. No change in trade balance, but a higher volume of trade (more imports and more exports).

- c. Suppose there is a sudden inflow of capital into the United Kingdom because the country is believed to be more politically stable than other countries. Describe the sequence of events in the model by describing the shifts in the curves in Exhibit 1 and discuss the movements in the relevant macroeconomic variables.

Answer:

$NCO$  falls as UK residents and foreigners buy UK assets. In panel (a), demand for loanable funds shifts left. Panel (b),  $NCO$  shifts left because of a decrease in  $NCO$  at each interest rate causing the supply of pounds in the foreign currency exchange market to shift left and the exchange rate to rise. The result is: real interest rate down;  $NCO$  and  $NX$  down; value of the pound up; increase in domestic investment.

2. a. Suppose private saving increased at each real interest rate. What would happen to the important macroeconomic variables in our model of an open economy?

Answer:

Panel (a), supply of loanable funds shifts right, real interest rate decreases.  $NCO$  increases, increasing the supply of pounds in the foreign currency exchange market and causes the real exchange rate to depreciate. Saving and domestic investment have increased and the trade balance has moved toward surplus.

- b. Is there any difference between your answer above and the answer you would write if the government had reduced its deficit? Why?

Answer:

No, because it doesn't matter why national saving increased. Either one will shift the supply of loanable funds to the right.

- c. Suppose the government were to introduce an investment subsidy that increases domestic investment at each real interest rate. How would this change the important economic variables in the model?

Answer:

It would increase in the demand for loanable funds, raise the real interest rate, lower  $NCO$  and  $NX$ , decrease the supply of pounds in the foreign currency exchange market, and so raise the value of the pound. Domestic saving and investment would increase.

- d. Compare your answer in part (a) (an increase in saving at each real interest rate) to your answer in part (c) (an increase in domestic investment at each real interest rate). Are there any differences?

Answer:

Both increase domestic saving and investment, but an increase in saving moves the trade balance toward surplus while an increase in investment demand moves it toward deficit.

3. Suppose that UK consumers' taste for Japanese cars increases. Answer this question using the open economy model from the Japanese perspective.
- a. What happens to the demand for yen in the foreign currency exchange market?

Answer:

Shifts right.

- b. What happens to the value of yen in the foreign currency exchange market?

Answer:

Real exchange rate rises so value of yen rises.

- c. What happens to Japanese net exports? Why?

Answer:

$NCO$  is unchanged therefore  $NX$  as a total is unchanged.

- d. If the Japanese are selling more cars, what must be true about Japanese imports and exports of other items?

Answer:

If  $NX$  is constant, then Japan must be importing more or exporting less of other items.

- e. Keeping in mind your answers to (a) through (c), do you think Japan runs an overall trade surplus with the rest of the world because its cars are better built or because of its domestic saving and  $NCO$ ? Explain.

Answer:

$NX$  is determined by  $NCO$  so Japan's overall level of trade surplus is based on the saving behaviour of economic agents in Japan. However, the composition of its exports may be based on the relative quality of Japanese production.

4. Suppose the United Kingdom is perceived to be politically unstable, which induces capital flight to the United States.
- a. Describe what happens in the foreign currency exchange market from the perspective of the United Kingdom.

Answer:

The supply of pounds shifts right and the value of the pound falls.

- b. Describe what happens in the foreign currency exchange market from the perspective of the United States.

Answer:

The supply of US dollars shifts left and the value of the dollar rises.

- c. Are your answers to part (a) and (b) above consistent with one another? Why?

Answer:

Yes. A fall in the value of the pound relative to the US dollar should correspond to the rise in the value of the US dollar relative to the pound.

- d. If the economy of United Kingdom is small when compared to the economy of the United States, what should this event do to each country's balance of trade?

Answer:

The fall in the value of the pound should increase the UK's  $NX$  while the rise in the value of the US dollar may be expected to reduce the USA's  $NX$ . But the change in  $NX$  will be greater in percentage terms for the UK than for the USA.

- d. Which country will tend to grow faster in the future? Why?

Answer:

The UK is increasing its  $NCO$  to the USA and the USA is decreasing its  $NCO$  to the UK so the USA will probably grow faster.

## Chapter 33

1. For the following four cases, trace the impact of each shock in the aggregate demand and aggregate supply model by answering the following three questions for each: What happens to prices and output in the short run? What happens to prices and output in the long run if the economy is allowed to adjust to long-run equilibrium on its own? If policy makers had intervened to move output back to the natural rate instead of allowing the economy to self-correct, in which direction should they have moved aggregate demand?

- a. aggregate demand shifts left

Answer:

Prices fall, output falls. Prices rise, output returns to the natural rate. Shift aggregate demand to the right.

- b. aggregate demand shifts right

Answer:

Prices rise, output rises. Prices fall, output returns to the natural rate. Shift aggregate demand to the left.

- c. short-run aggregate supply shifts left

Answer:

Prices rise, output falls. Price level returns to original value, output returns to the natural rate. Shift aggregate demand to the right.

- d. short-run aggregate supply shifts right

Answer:

Prices fall, output rises. Price level returns to original value, output returns to the natural rate. Shift aggregate demand to the left.

2. The following events have their *initial* impact on which of the following: aggregate demand, short-run aggregate supply, long-run aggregate supply, or both short-run and long-run aggregate supply? Do the curves shift to the right or left?

- a. The government repairs aging roads and bridges.

Answer:

aggregate demand, right

- b. OPEC raises oil prices.

Answer:

short-run aggregate supply, left

- c. The government raises unemployment benefits, which raises the natural rate of unemployment.

Answer:

both short-run and long-run aggregate supply, left

- d. People feel more secure in their jobs and become more optimistic.

Answer:

aggregate demand, right

- e. A technological advance takes place in the application of computers to the manufacture of steel.

Answer:

both short-run and long-run aggregate supply, right

- f. The government increases the minimum wage.

Answer:

both short-run and long-run aggregate supply, left

- g. Because price expectations are reduced, wage demands of new university graduates fall.

Answer:

short-run aggregate supply, right

- h. The central bank decreases the money supply.

Answer:

aggregate demand, left

- i. A drought dramatically reduces the country's agricultural output.

Answer:

both short-run and long-run aggregate supply, left

3. Suppose the economy is in long-run equilibrium. Then, suppose the central bank suddenly increases the money supply.

- a. Describe the initial impact of this event in the model of aggregate demand and aggregate supply by explaining which curve shifts which way.

Answer:

Aggregate demand shifts to the right.

- b. What happens to the price level and real output in the short run?

Answer:

Price level rises and real output rises.

- c. If the economy is allowed to adjust to the increase in the money supply, what happens to the price level and real output in the long run? (compared to their original levels)

Answer:

Price level rises and real output stays the same.

- d. Does an increase in the money supply move output above the natural rate indefinitely? Why?

Answer:

No. Over time, people and firms adjust to the new higher amount of spending by raising their prices and wages.

4. Suppose the economy is in long-run equilibrium. Then, suppose workers and firms suddenly come to expect higher prices in the future and agree to an increase in wages.
- a. Describe the initial impact of this event in the model of aggregate demand and aggregate supply by explaining which curve shifts which way.

Answer:

Short-run aggregate supply shifts left.

- b. What happens to the price level and real output in the short run?

Answer:

Prices rise and output falls.

- c. What name do we have for this combination of movements in output and prices?

Answer:

Stagflation.

- d. If policy makers wanted to move output back to the natural rate of output, what should they do?

Answer:

Shift aggregate demand to the right.

- e. If policy makers were able to move output back to the natural rate of output, what would the policy do to prices?

Answer:

Prices would rise more and remain there.

- f. If policy makers had done nothing at all, what would have happened to the wage rate as the economy self-corrected or adjusted back to the natural rate of output on its own?

Answer:

The high unemployment at the low level of output would put pressure on the wage to fall back to its original value shifting short-run aggregate supply back to its original position.

- g. Is it likely that an increase in price expectations and wages alone can cause a permanent increase in the price level? Why?

Answer:

No. Increases in the cost of production need to be "accommodated" by government policy to permanently raise prices.

5. Suppose the economy is at a point such as point B in Exhibit 2. That is, aggregate demand has decreased and the economy is in a recession. Describe the adjustment process necessary for the economy to adjust on its own to point C for each of the three theoretical short-run aggregate-supply curves.

- a. the sticky wage theory:

Answer:

At point B, nominal wage contracts are based on the expectation of a higher price level so the real wage has risen and workers were laid off. As workers and firms recognize the fall in the price level (learn to expect  $P_3$ ), new contracts will have a lower nominal wage, the real wage falls, and firms increase production at each price level shifting the short-run aggregate supply to the right.

- b. the sticky price theory:

Answer:

At point B, some firms have not reduced their prices because of menu costs. Their products are relatively more expensive and sales fall. When they realize the lower price level is permanent (learn to expect  $P_3$ ), they lower their prices and output rises at each price level, shifting the short-run aggregate supply to the right.

- c. the misperceptions theory:

Answer:

At point B, some firms mistakenly believe that only the price of their product has fallen and they have cut back on production. As they realize that all prices are falling (learn to expect  $P_3$ ), they will increase production at each price, which will shift short-run aggregate supply to the right.

- d. Do you think the type of adjustments described above would take place more quickly from a recession or from a period when output was above the long-run natural rate? Why?

Answer:

More slowly from a recession because it requires prices to be reduced, and prices are usually more sticky downward. The adjustment when output is above normal requires prices and wages to rise.

## Chapter 34

1. If a country's central bank were to engage in activist stabilization policy, in which direction should it move the money supply in response to the following events?

- a. A wave of optimism boosts business investment and household consumption.

Answer:

Decrease the money supply

- b. To balance its budget, the government raises taxes and reduces expenditures.

Answer:

Increase the money supply

- c. OPEC raises the price of crude oil.

Answer:

Increase the money supply

- d. The taste for the country's products amongst the residents of other countries declines.

Answer:

Increase the money supply

- e. The stock market falls.

Answer:

Increase the money supply

2. If a country's central bank were to engage in activist stabilization policy, in which direction should it move interest rates in response to the same events listed in the previous question?

- a. A wave of optimism boosts business investment and household consumption.

Answer:

Increase interest rates

- b. To balance its budget, the government raises taxes and reduces expenditures.

Answer:

Decrease interest rates

- c. OPEC raises the price of crude oil.

Answer:

Decrease interest rates

- d. The taste for the country's products amongst the residents of other countries declines.

Answer:

Decrease interest rates

- e. The stock market falls.

Answer:

Decrease interest rates

- f. Explain the relationship between central bank policy in terms of the money supply and policy in terms of the interest rate.

Answer:

In the short run, with prices sticky or fixed, an increase in the money supply implies a reduction in interest rates and a decrease in the money supply implies an increase in interest rates.

3. If policy makers were to use fiscal policy to actively stabilize the economy, in which direction should they move government spending and taxes?

- a. A wave of pessimism reduces business investment and household consumption.

Answer:

Increase spending, decrease taxes

- b. An increase in price expectations causes unions to demand higher wages.

Answer:

Increase spending, decrease taxes

- c. The taste for the country's products amongst the residents of other countries declines.

Answer:

Decrease spending, increase taxes

- d. OPEC raises the price of crude oil.

Answer:

Increase spending, decrease taxes

4. Suppose the economy is in a recession. Policy makers estimate that aggregate demand is €100 billion short of the amount necessary to generate the long-run natural rate of output. That is, if aggregate demand were shifted to the right by €100 billion, the economy would be in long-run equilibrium.
- a. If the government chooses to use fiscal policy to stabilize the economy, by how much should they increase government spending if the marginal propensity to consume (MPC) is 0.75 and there is no crowding out?

Answer:

Multiplier =  $1/(1 - 0.75) = 4$ ; €100/4 = €25 billion.

- b. If the government chooses to use fiscal policy to stabilize the economy, by how much should they increase government spending if the marginal propensity to consume (MPC) is 0.80 and there is no crowding out?

Answer:

Multiplier =  $1/(1 - 0.80) = 5$ ; €100/5 = €20 billion.

- c. If there is crowding out, will the government need to spend more or less than the amounts you found in (a) and (b) above? Why?

Answer:

More, because as the government spends more, investors spend less so aggregate demand won't increase by as much as the multiplier suggests.

- d. If investment is very sensitive to changes in the interest rate, is crowding out more of a problem or less of a problem? Why?

Answer:

More of a problem. Government spending raises interest rates. The more sensitive investment is to the interest rate, the more it is reduced or crowded out by government spending.

- e. If policy makers discover that the lag for fiscal policy is two years, should that make them more likely to employ fiscal policy as a stabilization tool or more likely to allow the economy to adjust on its own? Why?

Answer:

More likely to allow the economy to adjust on its own because if the economy adjusts before the impact of the fiscal policy is felt, the fiscal policy will be destabilizing.

5. a. What does an increase in the money supply do to interest rates in the short run? Explain.

Answer:

It lowers interest rates because, in the short run, with prices sticky or fixed, money demand is unchanging. Thus, an increase in the money supply requires a decrease in interest rates to induce people to hold the additional money.

- b. What does an increase in the money supply do to interest rates in the long run? Explain.

Answer:

It has no effect because, in the long run, the increase in spending causes a proportional increase in prices, output is fixed at the natural rate, money is neutral, and interest rates are determined by the supply and demand for loanable funds which have not changed.

- c. Are these results inconsistent? Explain.

Answer:

No. Prices are likely to be sticky in the short run and flexible in the long run.

## Chapter 35

1. Describe the initial effect of the following events on the short-run and long-run Phillips curve. That is, describe the movements along a given curve or the direction of the shift in the curve.

- a. An increase in expected inflation

Answer:

Shifts short-run Phillips curve to the right (upward).

- b. An increase in the price of imported oil

Answer:

Shifts short-run Phillips curve to the right (upward).

- c. An increase in the money supply

Answer:

Move up the short-run Phillips curve.

- d. A decrease in government spending

Answer:

Move down the short-run Phillips curve.

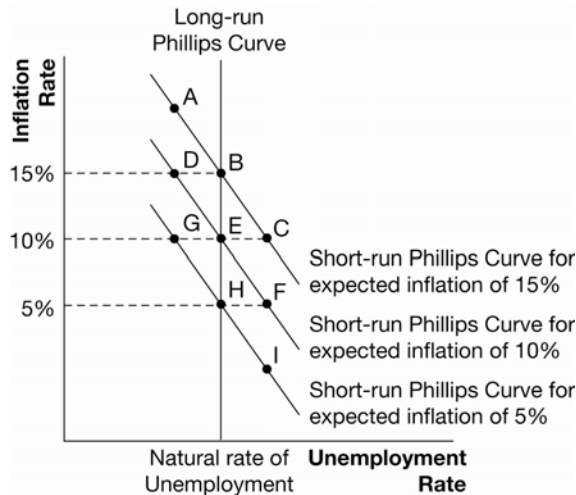
- e. A decrease in the minimum wage, which lowers the natural rate

Answer:

Long-run and short-run Phillips curves shift left (downward).

2. Use the Phillips curves in Exhibit 1 to answer the following questions.

Exhibit 1



- a. At what point is the economy located if people expect 10 per cent inflation and inflation actually is 10 per cent?

Answer:

E.

- b. Referring to (a) above, is unemployment above, below, or equal to the natural rate?

Answer:

Equal to the natural rate.

- c. At what point is the economy located if people expect 10 per cent inflation and the actual rate of inflation is 15 per cent?

Answer:

D.

- d. Suppose the economy is operating at point D. Over time, in which direction will people revise their expectations of inflation: up or down?

Answer:

Up.

- e. Suppose the economy is operating at point D. As people revise their expectations of inflation, in which direction will the short-run Phillips curve shift-right or left?

Answer:

Right.

- f. Suppose the economy is operating at point E. In the short run, a sudden decrease in aggregate demand will move the economy toward which point?

Answer:

F.

- g. Suppose the economy is operating at point E. In the long run, a decrease in government spending will tend to move the economy toward which point?

Answer:

H.

- h. Suppose people expect 5 per cent inflation. If inflation actually ends up being 10 per cent, in which direction will unemployment move: above or below the natural rate?

Answer:

Below the natural rate.

3. Use a Phillips curve graph to answer the following questions. Assume the economy is initially in long-run equilibrium.
- a. What happens to an economy's unemployment and inflation rate in the short run if the central bank increases the growth rate of the money supply?

Answer:

Inflation increases, unemployment decreases.

- b. What happens to an economy's unemployment and inflation rate in the long run if the central bank increases the growth rate of the money supply?

Answer:

Inflation increases, unemployment stays at the natural rate.

- c. Can printing money keep unemployment below the natural rate? Explain.

Answer:

No. Unemployment temporarily decreases, but as people grow to expect the higher inflation, unemployment returns to the natural rate.

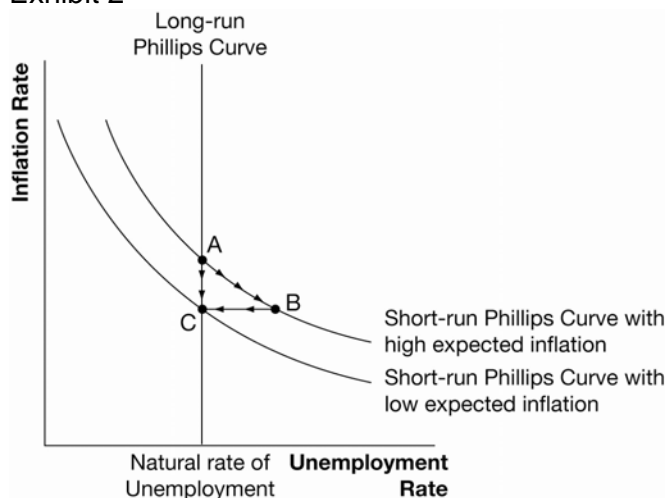
- d. What is the end result of a central bank repeatedly attempting to hold unemployment below the natural rate with expansionary monetary policy? Explain.

Answer:

Continued attempts to move unemployment below the natural rate simply causes inflation.

4. Suppose the economy is operating at the natural rate of unemployment with a high rate of inflation (point A in Exhibit 2). Suppose the central bank announces a sudden monetary contraction to reduce inflation. Shown below are two possible paths the economy might take to adjust to the new lower rate of money growth. Choose the path that best depicts what might happen in each of the following cases and explain your reasoning.

Exhibit 2



- a. The central bank's announcement is not believed.

Answer:

Economy moves from A to B because people fail to reduce their price expectations and wage demands, so unemployment rises as inflation falls.

- b. The central bank's announcement is believed and expectations of inflation are adjusted quickly.

Answer:

Economy moves from A to C because people reduce their prices and wages proportionately.

- c. The central bank's announcement is believed but all workers have long-term wage contracts that cannot be renegotiated.

Answer:

Economy moves from A to B because people are unable to actually reduce some of their wages and prices, so unemployment rises as inflation falls.

- d. Which of the above cases (a, b, or c) best describes what would happen if, in the past, the central bank had repeatedly announced that inflation was its number one priority, but it had failed to actually engage in the threatened monetary contraction? Why?

Answer:

Case (a), because people are rational to distrust a policy maker that has previously been untruthful.

## Chapter 36:

1. Look at Table 36.1 reproduced below and answer the questions.

**TABLE 36.1**

**Quarterly Economic Growth in G7 Countries, 2006–2009.**

Country	Q4: 2006	Q1: 2007	Q2: 2007	Q3: 2007	Q4: 2007	Q1: 2008	Q2: 2008	Q3: 2008	Q4: 2008	Q1: 2009	Q2: 2009
Canada	0.5	0.9	1.0	0.5	0.3	−0.2	0.1	0.1	−0.9	−1.6	−0.9
France	0.7	0.7	0.4	0.7	0.3	0.5	−0.5	−0.2	−1.4	−1.3	0.3
Germany	1.0	0.3	0.3	0.8	0.1	1.6	−0.6	−0.3	−2.4	−3.5	0.3
Italy	0.9	0.3	0.1	0.2	−0.4	0.5	−0.6	−0.8	−2.1	−2.7	−0.5
Japan	0.8	1.4	−0.2	−0.1	0.8	1.0	−1.1	−1.0	−3.5	−3.1	0.9
UK	0.8	0.7	0.6	0.5	0.5	0.8	−0.1	−0.7	−1.8	−2.4	−0.7
US	0.7	0.3	0.8	0.9	0.5	−0.2	0.4	−0.7	−1.4	−1.6	−0.3

Source: OECD (<http://stats.oecd.org/index.aspx>) accessed September 14, 2009

- a) Which country was the first to enter recession and when?

**Answer:**

Japan – in quarter 3 2007. The technical definition of recession is two successive quarters of negative economic growth. Japan might be said to have had a double dip recession!

- b) From the data, which country suffered the most severe recession and why?

**Answer:**

From the data we can see that the UK suffered five successive quarters of negative growth which might be argued to be severe. The fall in output in Germany was significant especially in Q4 2008 and Q1 2009. Given that Japan suffered decline in 2007 and then again from Q2 2008 and that the size of the decline in Q4 2008 and Q1 2009 was considerable it might be argued that Japan suffered most.

2. Is it inevitable that a period of rising house prices will suffer a correction?

**Answer:**

Whether house price increases suffer some sort of correction would depend on the state of the market and the demand and supply of houses as well as what was driving the market upwards. It would also depend on how we interpret the word 'correction'. For homeowners the key is the difference between the price they buy a property at and the price they get when they sell it. Any talk of house price values when active trades are not being considered is largely irrelevant for those not involved. If an individual buys a house for €300 000 in year  $x$  and then sells it for €450 000 in year  $x + y$  does this represent a correction if a year before the sale the value of the property was rated at €500 000? There might be periods when house prices are falling but to get a better picture we might want to look at the trend in house prices over a period of time and history tends to show that the trend is essentially positive. This might suggest that it is far from inevitable that house prices will suffer a correction.

3. Why did the market for credit default swaps seem to be associated with lower risk?

Answer:

CDS are relatively new instruments which were developed during a period of relatively strong economic activity. The data on which default risks were based tended to be skewed, therefore, as it did not include periods where asset holders faced significant financial pressures.

5. Briefly describe the main stages to show how an increase in defaults on sub-prime mortgages led to the financial crisis.

Answer:

Owners of mortgages deemed sub-prime begin to default on payments (possibly because of job loss, death or illness in the family etc.). Bonds were sold on the basis of the stream of income coming from mortgage payers are used to pay investors. When this income stream slows, some investors do not get their payments. Bond holders may have insured the risk of default via a CDS and so the protection seller has to pay out the protection buyer. CDS were not only traded between those directly involved in the bond but to other interested parties and so the amount the protection seller has to find to pay holders of the CDS increases. To fund these liabilities, protection sellers look to borrow money from the interbank market. However, protection sellers, holders of bonds and sub-prime loans may also be banks who are themselves facing increased exposure. As these institutions look to protect their assets or build up their capital they cut back lending on the interbank market unless the interest rate is higher. For borrowers the higher cost of borrowing may mean it is not worth taking out the loan even if they could find a willing lender and so credit dries up. Banks with excess exposure least able to finance the extent of their obligations become insolvent and those that go under default on their obligations and so the process spirals.

## Chapter 37:

*A company's share price on 1<sup>st</sup> March is €2.50. The company releases a statement saying that one of the products it manufactures has been removed from sale following the release of an article in a medical journal which associates the product with an increased risk of cancer in young children.*

1. Explain what you would expect to happen to the share price of the company as a result of this new information.

**Answer:**

The information is bad news on the one hand but the company seems to have been proactive in removing the product swiftly. The effect is that the share price is likely to be depressed but how far it goes down depends on the seriousness of the allegations, the number of people involved, what other information comes to light and how the company respond to the situation in the coming weeks. The market will seek to take into account all this information in pricing the share price of the company and the extent to which it believes the information will impact on the future profitability of the business.

2. Is it morally corrupt to use the efficiency of markets to trade contracts in disasters and terrorist events?

**Answer:**

The answer will depend on the perceived benefits that might arise from such a market in relation to the costs. Is it morally corrupt to use a market to gather additional intelligence (which is after all what it would be) which might prevent serious events from occurring which may claim many lives? Would such a market mean that there would be an increased likelihood of such events occurring or would it encourage more people to share information and intelligence thus help to reduce them? Is there a risk that markets could be manipulated and resources diverted to preventing something which is not going to happen whilst being able to hide plans to cause problems elsewhere?

3. Why is high quality information so important to the efficient working of markets?

**Answer:**

Decisions of both buyers and sellers rely on high quality accurate information. If information is inaccurate or unreliable then risks assessed would also be inaccurate and decisions would be made based on incorrect information. Resources would not, as a result, be diverted to their most useful purpose and so the market would be inefficient, by definition.

4. Should economics base more of its assumptions on behavioural psychology rather than on rational behaviour?

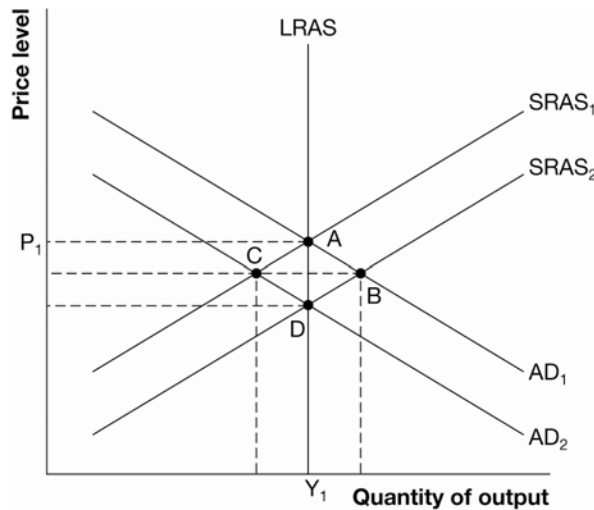
**Answer:**

In order to carry out any economic analysis some assumptions have to be made. What may be dangerous is relying on only one type of assumption which may be too far from reality and making economic policy on this type of assumption alone. Assumptions of rationality may have some relevance in certain situations but in others a behavioural approach may be more relevant. The future for economics is to find a way of rationalising our understanding of human behaviour and building these into models that will help better reflect the real world. This is one of the benefits of neuroeconomics, using advances in the understanding of how the brain works to help inform theory and the reasons for the behaviour of 'homoeconomicus'.

## Chapter 38

1. Use the aggregate supply and aggregate demand diagram in Exhibit 1 to answer the following questions.

Exhibit 1



- a. Suppose the economy is at long-run equilibrium at point A. Suppose that the economy suffers a macroeconomic shock in the form of a reduction in demand for its exports, but the shock is asymmetric – other economies are not affected similarly. If the exchange rate can adjust, what is the path followed by the economy as a result of this shock?

Answer:

The aggregate demand curve shifts to the left, from  $AD_1$  to  $AD_2$ , moving the economy initially to point C. Output falls and unemployment rises. Since demand for the country's exports has fallen, the foreign exchange value of the country's currency falls, making the country's exports cheaper to overseas buyers. This raises aggregate demand, so shifting the aggregate demand curve back from  $AD_2$  to  $AD_1$ . Thus long-run equilibrium is restored at point A, with output and the price level unchanged from their original levels.

- b. Suppose the same macroeconomic shock occurs but this time the economy concerned has joined a currency union that includes all its main trading partners. What is the path followed by the economy as a result of the macroeconomic shock now?

Answer:

The aggregate demand curve shifts to the left, from  $AD_1$  to  $AD_2$ , moving the economy initially to point C. Output falls and unemployment rises. Over time, as wages and prices adjust downwards, the short-run aggregate supply curve shifts to the left, from  $SRAS_1$  to  $SRAS_2$ , moving the economy to point D. Thus long-run equilibrium is restored and output is unchanged from its original level but the price level is lower.

- c. Referring to part (b) above, why might the government of the country illustrated in Exhibit 1 find itself in disagreement with the other countries in the currency union over monetary policy?

Answer:

The country illustrated in Exhibit 1 will suffer a period of falling output and rising unemployment as a result of the asymmetric demand shock, and will wish to see interest rates reduced to stimulate aggregate demand. However, the other countries in the currency union are unaffected and do not experience any reduction in output or rise in unemployment. They are likely to oppose any suggestion that interest rates should be reduced. Since there is one monetary policy across the currency union, this will lead to disagreement.

2. Suppose that the German economy is experiencing a recession while other countries in the Eurozone are in long-run macroeconomic equilibrium.
- a. What would happen to interest rates on long-term government bonds issued by Eurozone governments if the German government were to increase its budget deficit dramatically to finance additional government spending? Explain your answer.

Answer:

Interest rates on Eurozone government bonds would rise. A dramatic increase in the German government's budget deficit would increase the risk of holding German government debt and so the financial markets would demand a higher rate of return for holding this debt. Because the other Eurozone governments would be expected to assist the German government in the event that it ran into difficulty in meeting its obligations to its creditors, so transmitting some of the increased risk to them, the financial markets would not demand as high a return on German government bonds as would otherwise be the case. (There would be a free rider problem.) The markets would also demand a higher rate of return for holding the bonds of other Eurozone governments too.

- b. What might the members of a currency union do to counter this problem?

Answer:

They might agree limits on the size of the budget deficits that member governments would be permitted to run.

- c. What might reduce the need for the German government to increase its budget deficit in these circumstances?

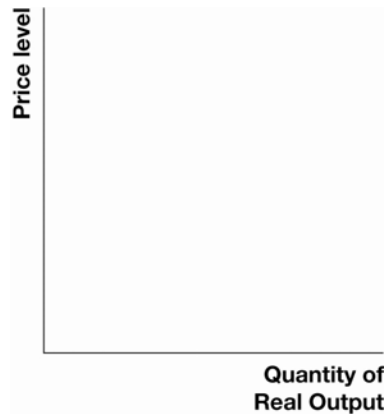
Answer:

Increased labour mobility and increased real wage flexibility, which would act to prevent unemployment rising so high in Germany when aggregate demand was depressed. The Eurozone countries could also agree to operate a Eurozone-wide fiscal policy so that additional government spending in recession-hit Germany could be financed by tax revenues raised from across the Eurozone.

## Chapter 39

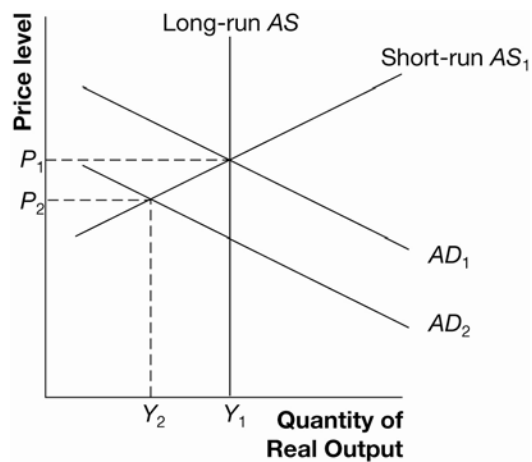
1. Suppose a wave of pessimism engulfs consumers and firms, causing them to reduce their expenditures.
  - a. Demonstrate this event in Exhibit 1 using the model of aggregate demand and aggregate supply and assuming that the economy was originally in long-run equilibrium.

Exhibit 1



Answer:  
See Exhibit 3.

Exhibit 3

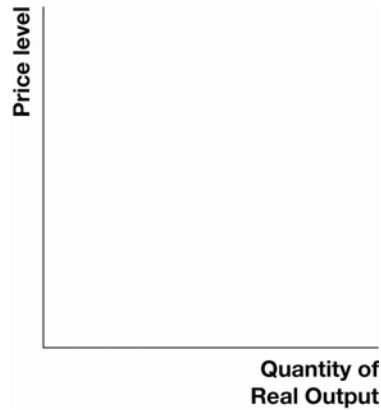


- b. What is the appropriate activist policy response for monetary and fiscal policy? In which direction would the activist policy shift aggregate demand?

Answer:  
Increase the money supply, increase government spending, decrease taxes. Shift aggregate demand to the right.

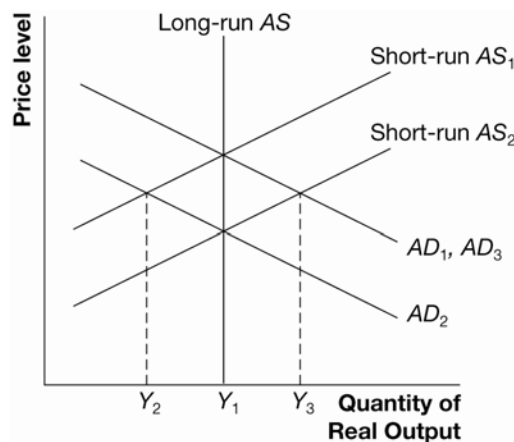
- c. Suppose the economy can adjust on its own in two years from the recession described in part (a). Suppose policy makers choose to use fiscal policy to stabilize the economy but the political battle over taxes and spending takes more than two years. Demonstrate these events in Exhibit 2 using the model of aggregate demand and aggregate supply.

Exhibit 2



Answer:  
See Exhibit 4.

Exhibit 4



- d. Describe the sequence of events shown in the graph you created in part (c) above.

Answer:  
Destabilize, because the economy had already adjusted back to the long-run natural rate so the increase in aggregate demand caused output to rise above the natural rate.

- e. Did the activist fiscal policy stabilize or destabilize the economy? Explain.

Answer:  
It destabilized the economy, because the economy had already adjusted back to the long-run natural rate so the increase in aggregate demand caused output to rise above the natural rate.

2. Suppose a country's central bank repeatedly announces that it desires price stability and that it is aiming for zero per cent inflation. However, it consistently generates 3 per cent inflation.
- a. Will this type of behaviour on the part of the central bank reduce unemployment below the natural rate in the long run? Why?

Answer:

No. In the long run, people will grow to expect 3 per cent inflation and wages and prices will rise accordingly.

- b. Once people have formed expectations of 3 per cent inflation, what would happen in the short-run if the central bank actually did target zero inflation?

Answer:

The economy would move down a short-run Phillips curve and inflation would fall while unemployment would rise above the natural rate.

- c. Would it help if the country's government passed a law requiring the central bank to target zero inflation?

Answer:

Yes. The central bank's announcement of a zero inflation target would be more credible and the movement toward zero inflation would create a smaller increase in unemployment.