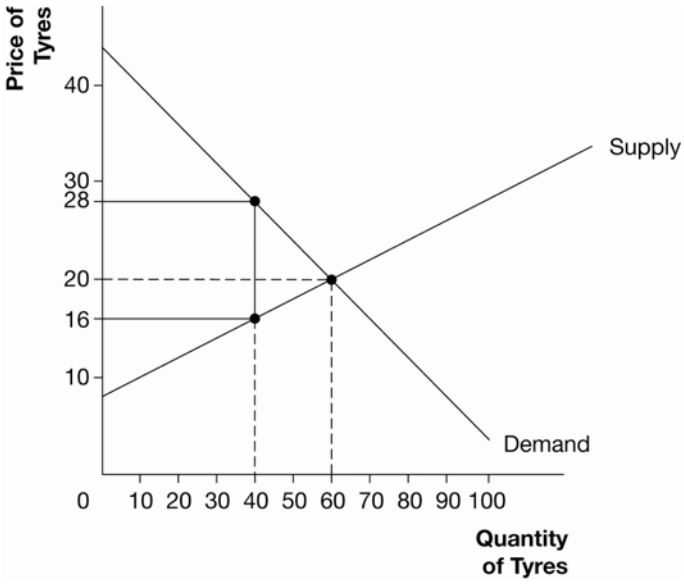
Chapter 8

1. Exhibit 2 shows the market for tyres. Suppose that a €12 road use tax is placed on each tyre sold.

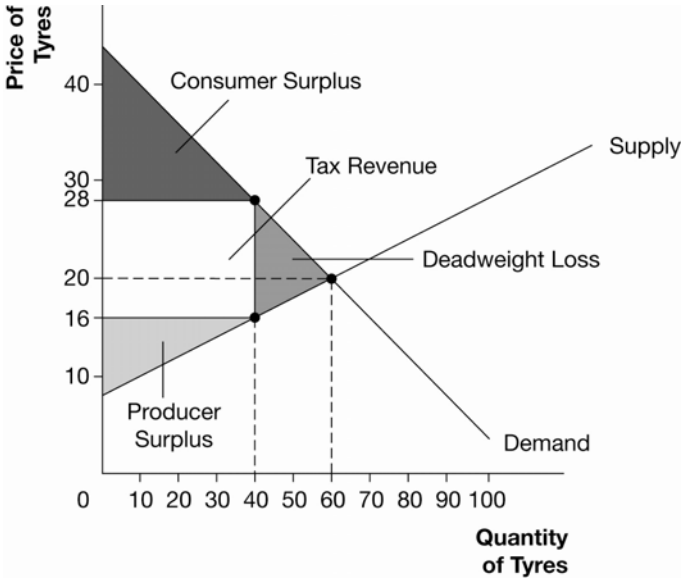
a. In Exhibit 2, locate consumer surplus, producer surplus, tax revenue, and the deadweight loss.

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 x 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?

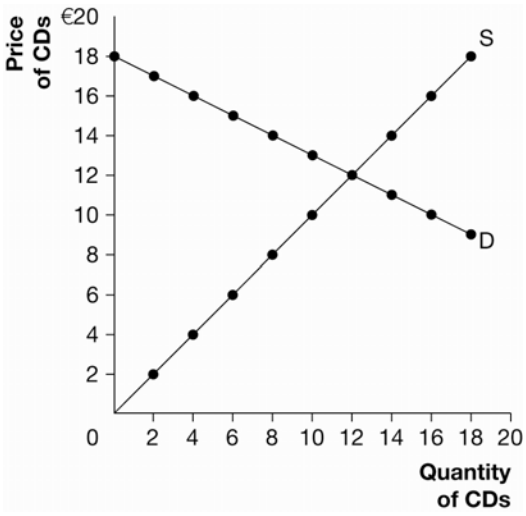
Answer:
€8 x 40 = €320 from buyers. €4 x 40 = €160 from sellers. The burden fell more heavily on the buyers because the demand for tyres was less price elastic than the supply of tyres.

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 × 2)/2 = €3
6	48	(€6 × 4)/2 = €12
9	54	(€9 × 6)/2 = €27
12	48	(€12 × 8)/2 = €48
15	30	(€15 × 10)/2 = €75
18	0	(€18 × 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.