

Chapter 8

Application: The Costs of Taxation

Deadweight Loss of Taxation

- Tax on a good levied on buyers
 - Demand curve shifts downward
 - By the size of tax
- Tax on a good levied on sellers
 - Supply curve shifts upward
 - By the size of tax

Deadweight Loss of Taxation

- Tax on a good levied on buyers or on sellers
 - Same outcome: a price wedge
 - **Price paid by buyers rises**
 - **Price received by sellers falls**
 - Lower quantity sold

Deadweight Loss of Taxation

- Tax burden
 - Distributed between producers and consumers
 - Determined by elasticities of supply and demand
- Market for the good
 - Smaller

Figure 1 The Effects of a Tax

FIGURE 1

The Effects of a Tax

A tax on a good places a wedge between the price that buyers pay and the price that sellers receive. The quantity of the good sold falls.

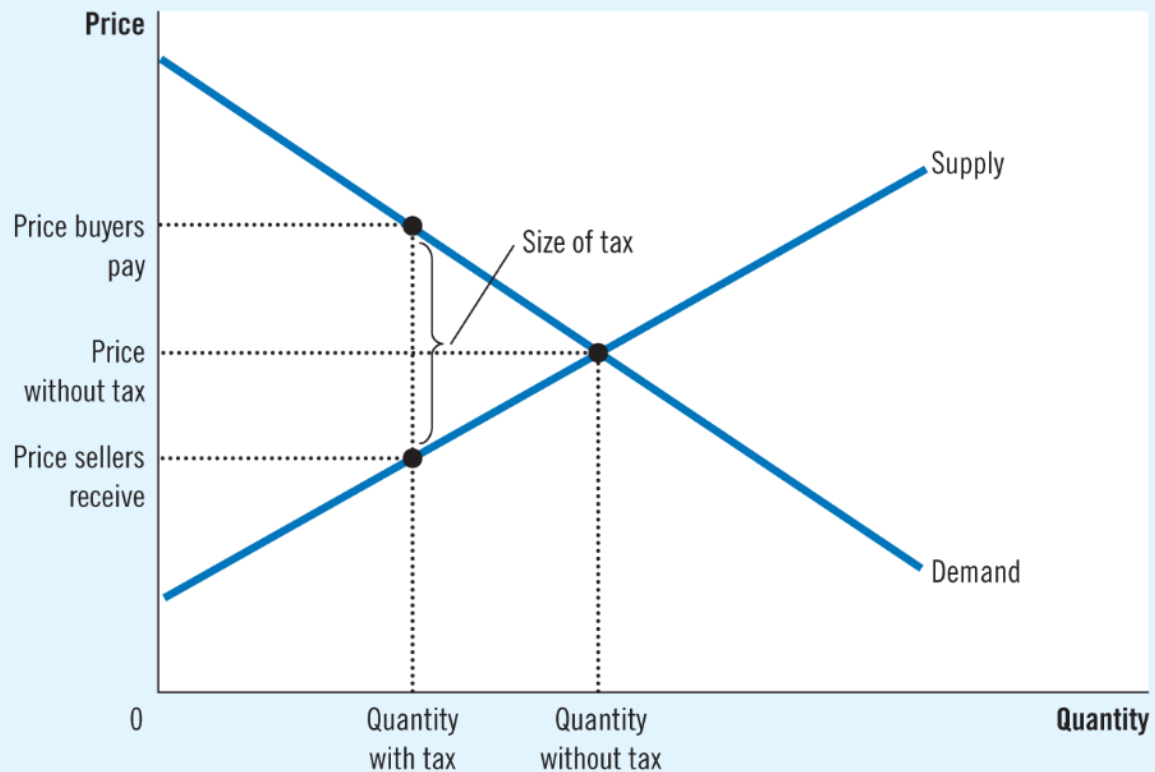


Figure 2 Tax Revenue

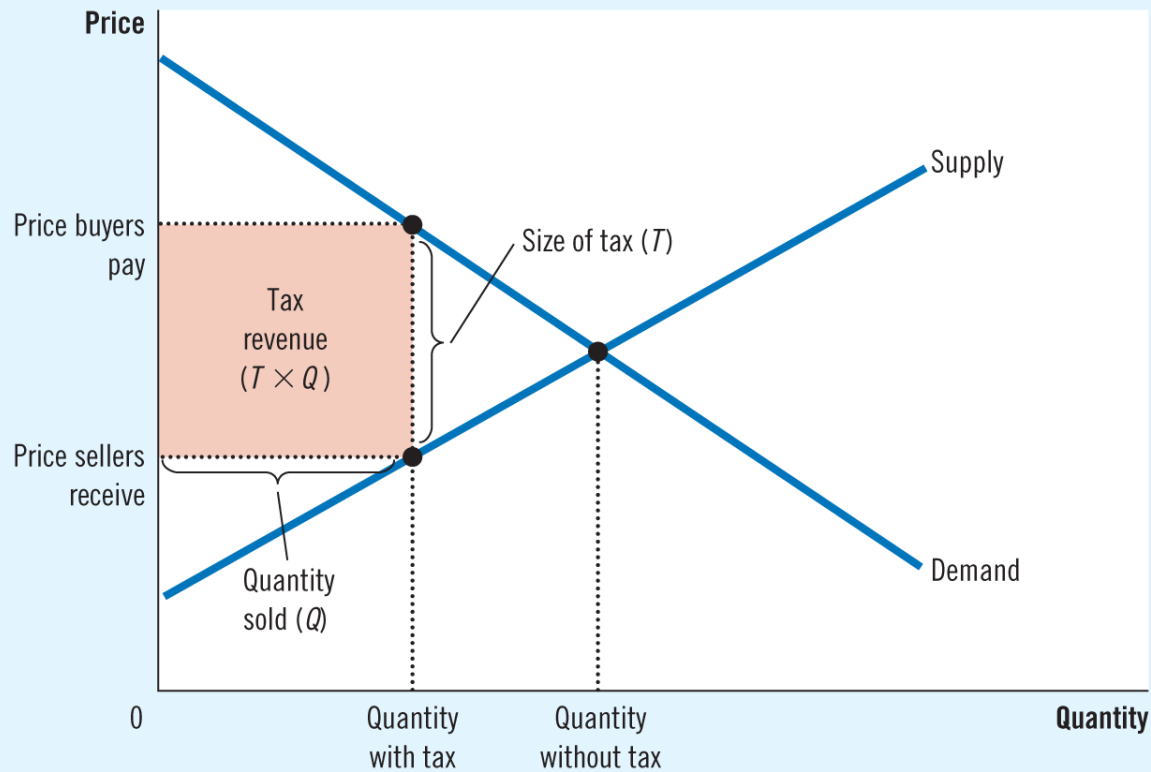


FIGURE 2

Tax Revenue

The tax revenue that the government collects equals $T \times Q$, the size of the tax T times the quantity sold Q . Thus, tax revenue equals the area of the rectangle between the supply and demand curves.

Figure 3 How a Tax Affects Welfare

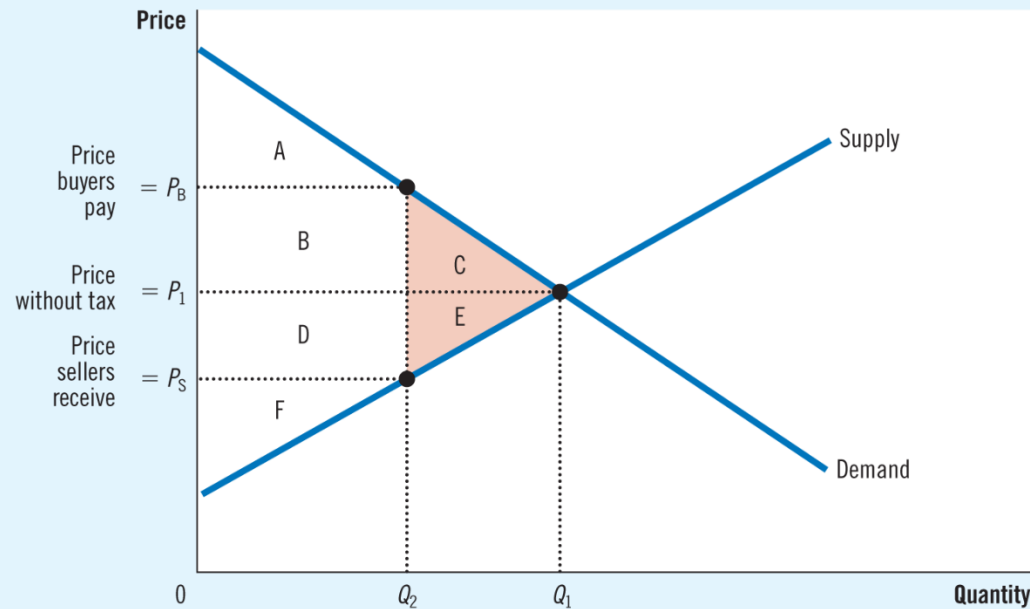
FIGURE 3

How a Tax Affects Welfare

A tax on a good reduces consumer surplus (by the area B + C) and producer surplus (by the area D + E). Because the fall in producer and consumer surplus exceeds tax revenue (area B + D), the tax is said to impose a deadweight loss (area C + E).

	Without Tax	With Tax	Change
Consumer Surplus	A + B + C	A	− (B + C)
Producer Surplus	D + E + F	F	− (D + E)
Tax Revenue	None	B + D	+ (B + D)
Total Surplus	A + B + C + D + E + F	A + B + D + F	− (C + E)

The area C + E shows the fall in total surplus and is the deadweight loss of the tax.



Deadweight Loss of Taxation

- Deadweight losses and gains from trade
 - Taxes cause deadweight losses
 - Prevent buyers and sellers from realizing some of the gains from trade
 - The gains from trade
 - Difference between buyers' value and sellers' cost are less than the tax
 - Once the tax is imposed some trades are not made: deadweight loss

Determinants of Deadweight Loss

- Price elasticities of supply and demand
 - More elastic supply curve
 - Larger deadweight loss
 - More elastic demand curve
 - Larger deadweight loss
- The greater the elasticities of supply and demand
 - The greater the deadweight loss of a tax

Figure 5 Tax Distortions and Elasticities (a, b)

In panels (a) and (b), the demand curve and the size of the tax are the same, but the price elasticity of supply is different. Notice that the more elastic the supply curve, the larger the deadweight loss of the tax.

FIGURE 5

Tax Distortions and Elasticities

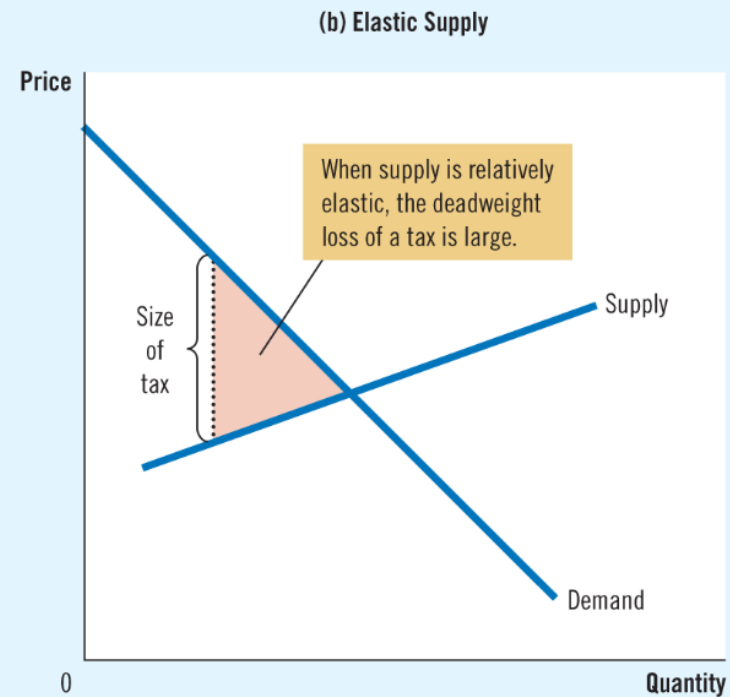
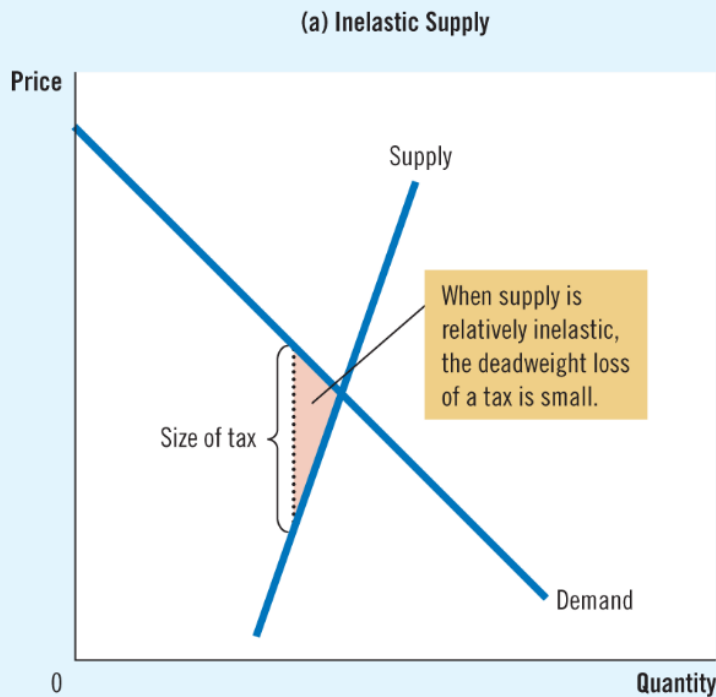
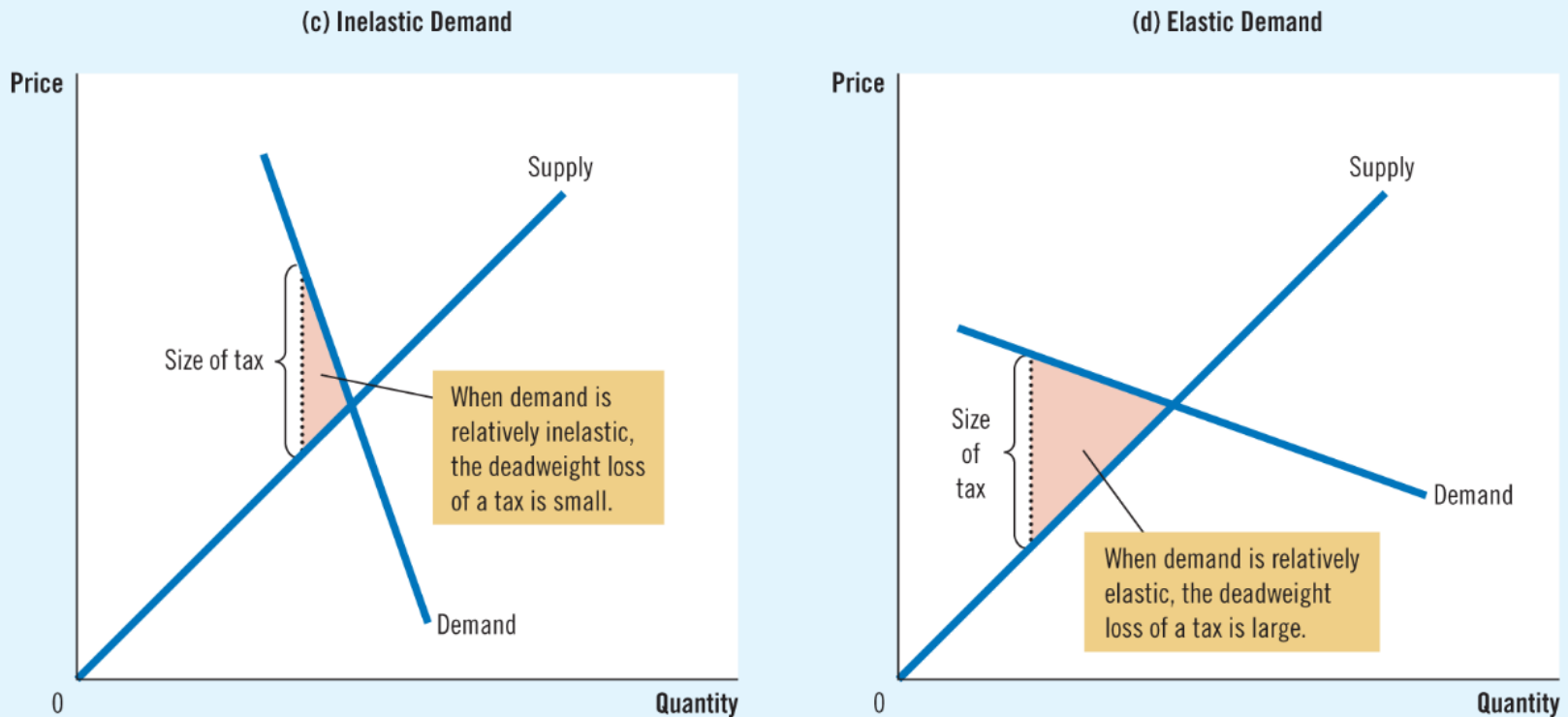


Figure 5 Tax Distortions and Elasticities (c, d)

In panels (c) and (d), the supply curve and the size of the tax are the same, but the price elasticity of demand is different. Notice that the more elastic the demand curve, the larger the deadweight loss of the tax.

FIGURE 5

Tax Distortions and Elasticities



Deadweight Loss & Tax Revenue

- As the tax increases
 - Deadweight loss increases
 - Even more rapidly than the size of the tax
 - Tax revenue
 - Increases initially
 - Then decreases
 - The higher tax: drastically reduces the size of the market

Figure 6 How Deadweight Loss and Tax Revenue Vary with the Size of a Tax (a, b, c)

FIGURE 6

How Deadweight Loss and Tax Revenue Vary with the Size of a Tax

The deadweight loss is the reduction in total surplus due to the tax. Tax revenue is the amount of the tax multiplied by the amount of the good sold. In panel (a), a small tax has a small deadweight loss and raises a small amount of revenue. In panel (b), a somewhat larger tax has a larger deadweight loss and raises a larger amount of revenue. In panel (c), a very large tax has a very large deadweight loss, but because it reduces the size of the market so much, the tax raises only a small amount of revenue.

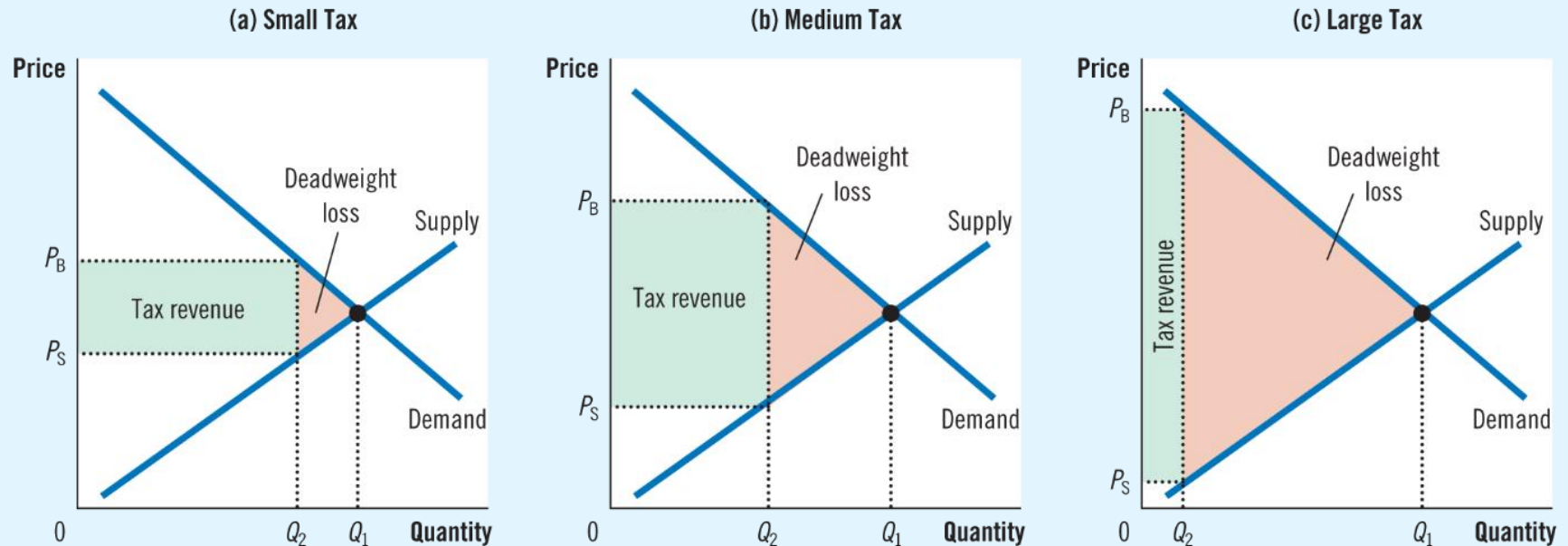


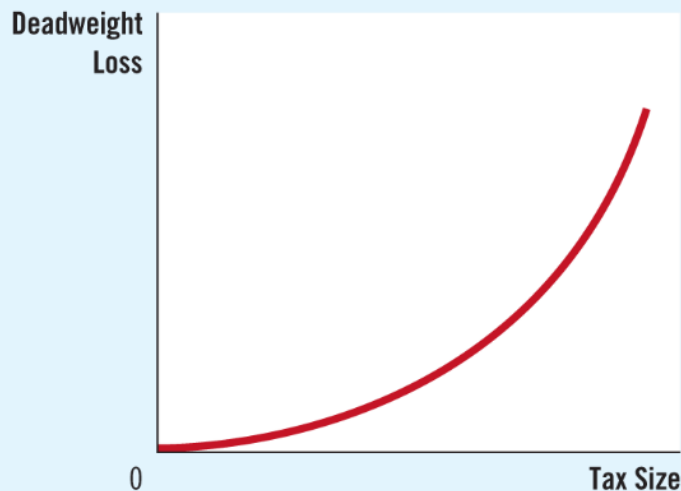
Figure 6 How Deadweight Loss and Tax Revenue Vary with the Size of a Tax (d, e)

FIGURE 6

How Deadweight Loss and Tax Revenue Vary with the Size of a Tax

Panels (d) and (e) summarize these conclusions. Panel (d) shows that as the size of a tax grows larger, the deadweight loss grows larger. Panel (e) shows that tax revenue first rises and then falls. This relationship is called the Laffer curve.

(d) From panel (a) to panel (c), deadweight loss continually increases.



(e) From panel (a) to panel (c), tax revenue first increases, then decreases.

