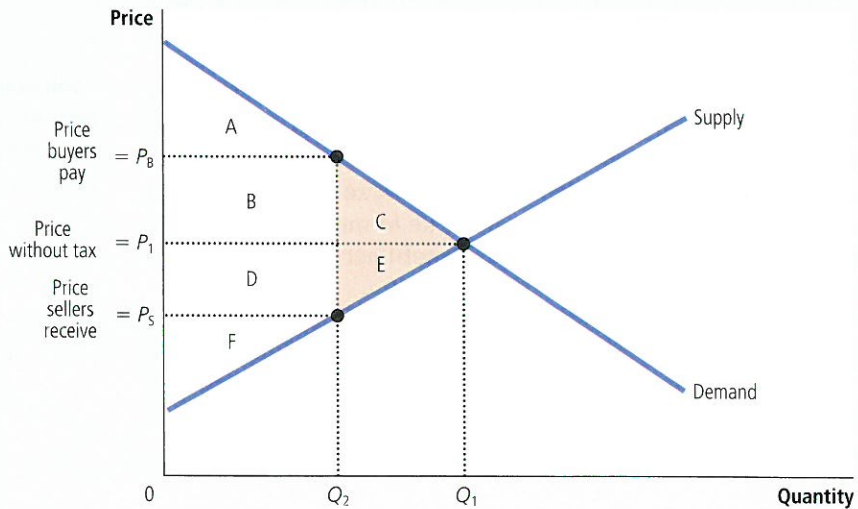**FIGURE 3**
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How a Tax Affects Welfare

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.

Welfare without a Tax   To see how a tax affects welfare, we begin by co ing welfare before the government imposes a tax. Figure 3 shows the supp demand diagram with the key areas marked by the letters A through F.

Without a tax, the equilibrium price and quantity are found at the inter of the supply and demand curves. The price is P_1, and the quantity sol Because the demand curve reflects buyers' willingness to pay, consumer is the area between the demand curve and the price, A + B + C. Similarly, l the supply curve reflects sellers' costs, producer surplus is the area betw supply curve and the price, D + E + F. In this case, because there is no revenue is zero.

Total surplus, the sum of consumer and producer surplus, equals t A + B + C + D + E + F. In other words, as we saw in Chapter 7, total su the area between the supply and demand curves up to the equilibrium q The first column of the table in Figure 3 summarizes these conclusions.

Welfare with a Tax   Now consider welfare after the tax is enacted. The pr by buyers rises from P_1 to P_B, so consumer surplus now equals only are