Microeconomics, Module 1: "Supply, Demand, and Equilibrium"

Practice problem

(The attached PDF file has better formatting.)

The following practice problem shows the procedure for working with sales taxes and excise taxes. The first homework assignment asks you to use this procedure on different supply and demand curves. Expect a final exam question on this topic as well.

The supply and demand curves for flasks of wine are

● Supply: Q = 200P – 4,500
● Demand: Q = 27,000 – 100P

A. What is the equilibrium price and quantity?
B. If a sales tax of $10 per flask is levied on consumers, what is the new equilibrium price and quantity?
C. If an excise tax of $10 per flask is levied on suppliers, what is the new equilibrium price and quantity?

Part A: The equilibrium is the intersection of the supply and demand curves:

$$200P – 4,500 = –100P + 27,000$$
$$\Rightarrow P = 105$$

$$Q = 200P – 4,500 = 200 \times 105 – 4,500 = 16,500.$$

Part B: With a sales tax, the consumers pay $10 tax for each flask bought. The full cost is the pre-tax price + the tax, so the demand curve shifts down: Q = –100(P+10) + 27,000.

We solve for the equilibrium:

$$200P – 4,500 = –100(P+10) + 27,000$$
$$\Rightarrow P = 101.67$$

$$Q = 200P – 4,500 = 200 \times 101.67 – 4,500 = 15,833$$

Part C: With an excise tax, the sellers pay $10 tax for each flask sold. The net amount received is the pre-tax price minus the tax. The supply curve is Q = 200(P – 10) – 4,500.

We solve for the equilibrium:

$$200(P – 10) – 4,500 = –100P + 27,000$$
$$\Rightarrow P = 111.67$$
(This is the same net price as in Part B.)

$$Q = 200(P – 10) – 4,500 = 200 \times 101.67 – 4,500 = 15,833$$