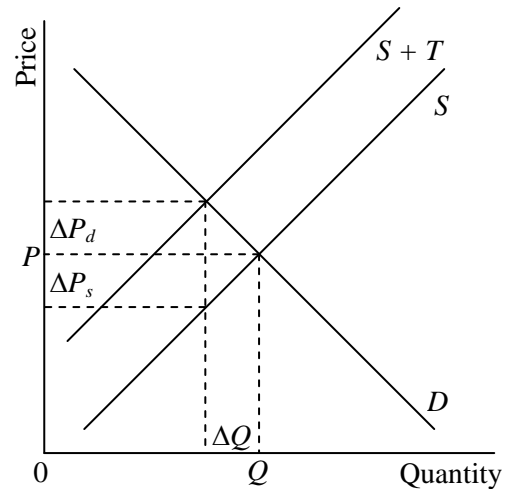


Elasticity and tax incidence

Consider the adjacent graph, which shows the impact of a unit tax of $\$T$ in a competitive market. Initially, the equilibrium price is P , and the equilibrium quantity is Q . The imposition of the tax causes the equilibrium quantity to fall by ΔQ , and the price to consumers increases by ΔP_d while the price to sellers falls by ΔP_s . The *incidence* of the tax measures the shares of the tax that fall on consumers and sellers. Since $\Delta P_d + \Delta P_s = T$, it is clear that the consumers' share is $\frac{\Delta P_d}{T}$ and the sellers' share is $\frac{\Delta P_s}{T}$.

Our goal in this note is to relate these two shares to the elasticities of demand and supply.



To begin, recall that the elasticity of demand, E_d , can be written as $E_d = \frac{\Delta Q/Q}{\Delta P_d/P} = \frac{\Delta Q}{\Delta P_d} \frac{P}{Q}$. (We ignore the minus sign, treating both ΔP_d and ΔQ as positive amounts.) Suppose we solve this for ΔP_d as follows: $\Delta P_d = \frac{P}{Q} \frac{\Delta Q}{E_d}$. Likewise, we could find that $\Delta P_s = \frac{P}{Q} \frac{\Delta Q}{E_s}$.

Next, we make use of the fact that $T = \Delta P_d + \Delta P_s$, so $T = \frac{P}{Q} \frac{\Delta Q}{E_d} + \frac{P}{Q} \frac{\Delta Q}{E_s}$. If we multiply and divide the first term in this sum by E_s and the second term by E_d , we get a common denominator and can add the two terms to get $T = \frac{P\Delta Q E_s + P\Delta Q E_d}{Q E_d E_s} = \frac{P\Delta Q}{Q} \left(\frac{E_s + E_d}{E_d E_s} \right)$.

Making these two substitutions for ΔP_d and T , we can find that consumers' share of the tax is:

$$\frac{\Delta P_d}{T} = \frac{\frac{P\Delta Q}{Q E_d}}{\frac{P\Delta Q}{Q} \left(\frac{E_s + E_d}{E_d E_s} \right)} = \frac{\frac{1}{E_d}}{\left(\frac{E_s + E_d}{E_d E_s} \right)} = \left(\frac{E_s}{E_d + E_s} \right).$$

A similar calculation shows that sellers' share of the tax is $\frac{\Delta P_s}{T} = \left(\frac{E_d}{E_d + E_s} \right)$.

Several conclusions emerge from these two share formulas:

- If the elasticities of demand and supply are equal, consumers' and sellers' share of the tax burden will be equal.
- For a given elasticity of supply, the larger is the elasticity of demand, the larger is the sellers' share, approaching 1 (100%) as demand becomes perfectly elastic.
- For a given elasticity of demand, the larger is the elasticity of supply, the larger is the consumers' share, approaching 1 (100%) as supply becomes perfectly elastic.