

E: Tax burden refresher

Tax burden:

Portion of a tax borne by a given agent: buyer or seller

Notation and accounting:

P_i^d Price paid by **buyers** (demand side price) in equilibrium i

P_i^s Price received by **sellers** (supply side price) in equilibrium i

Q_i^m Market quantity traded in equilibrium i

t_i Tax rate

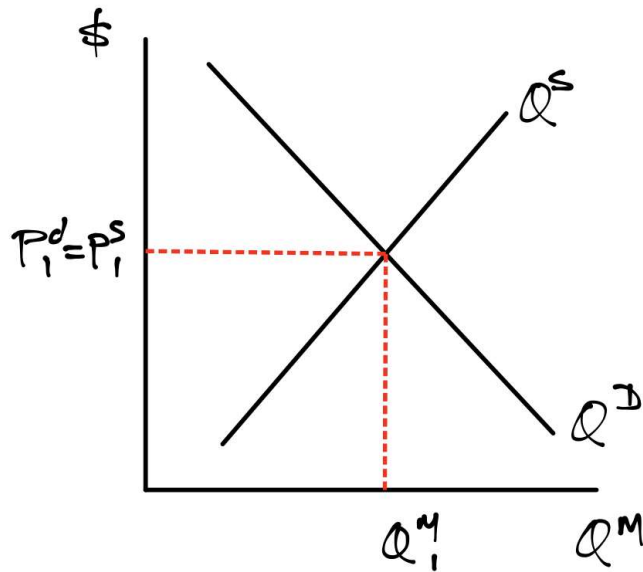
Relationship between prices: $P_i^d = P_i^s + t_i$

Example using hypothetical results:

Equilibrium 1: no tax ($t_1 = 0$)

Suppose result 1 is:

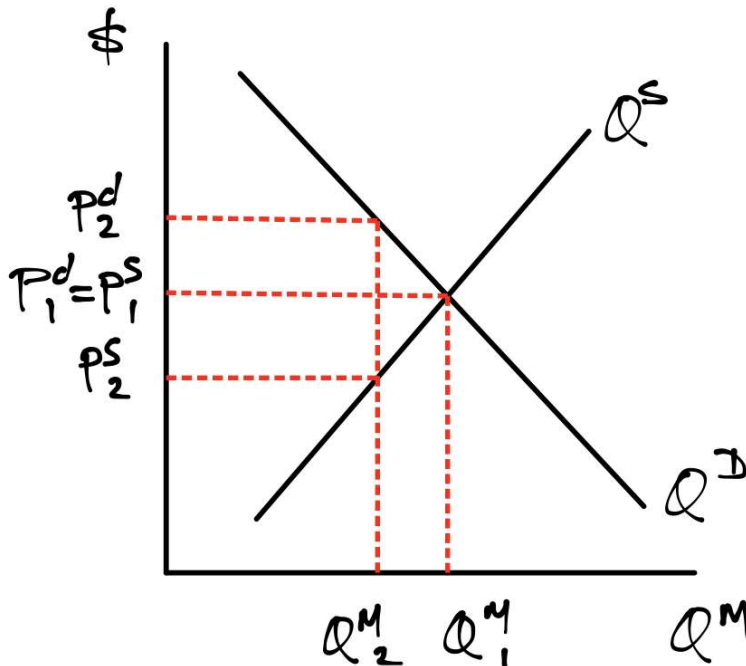
$$P_1^d = 80$$
$$P_1^s = 80$$
$$Q_1^m = 1000$$



Equilibrium 2: \$10 unit tax ($t_2 = 10$)

Suppose result 2 is:

$$P_2^d = 84$$
$$P_2^s = 74$$
$$Q_2^m = 900$$



Analysis:

Revenue collected:

$$t_2 * Q_2^m = \$10 * 900 = \$9000$$

Impact of tax on prices:

$$\Delta P^d = 84 - 80 = 4 \quad \text{Buyers worse off by } \mathbf{\$4} \text{ on each unit}$$

$$\Delta P^s = 74 - 80 = -6 \quad \text{Sellers worse off by } \mathbf{\$6} \text{ on each unit}$$

Contribution to revenue from each group:

| Group | Revenue | Share of revenue | Percent |
|----------|--------------------------------|-------------------------|---------|
| Buyers: | $\mathbf{\$4} * 900 = \$3,600$ | $\$3600 / \$9000 = 0.4$ | 40% |
| Sellers: | $\mathbf{\$6} * 900 = \$5,400$ | $\$5400 / \$9000 = 0.6$ | 60% |

Tax burdens via price changes alone:

| Group | Share of T | Percent |
|----------|-----------------------------|---------|
| Buyers: | $\mathbf{\$4} / \$10 = 0.4$ | 40% |
| Sellers: | $\mathbf{\$6} / \$10 = 0.6$ | 60% |