

Lecture 8: Taxation and Economic Efficiency

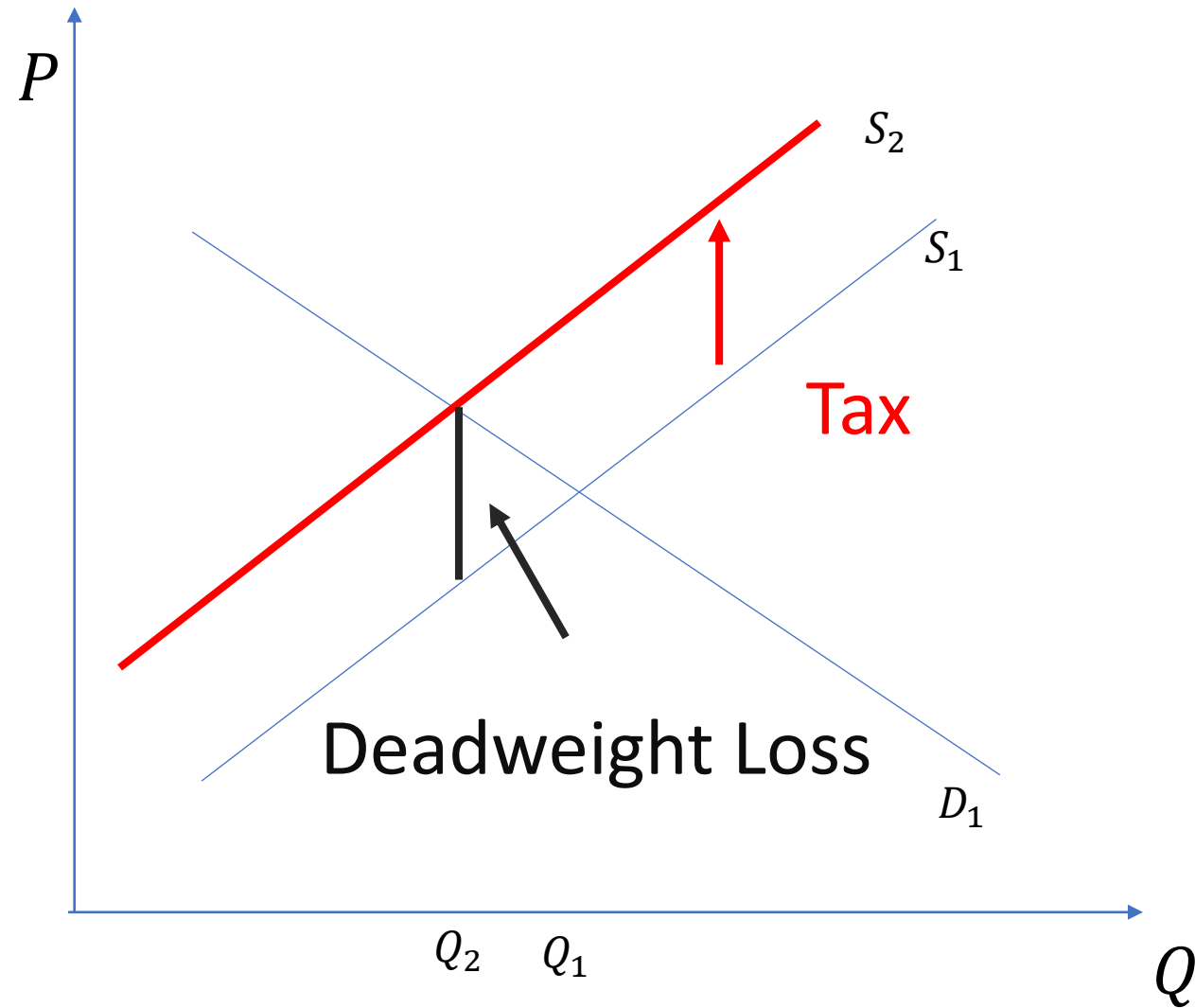
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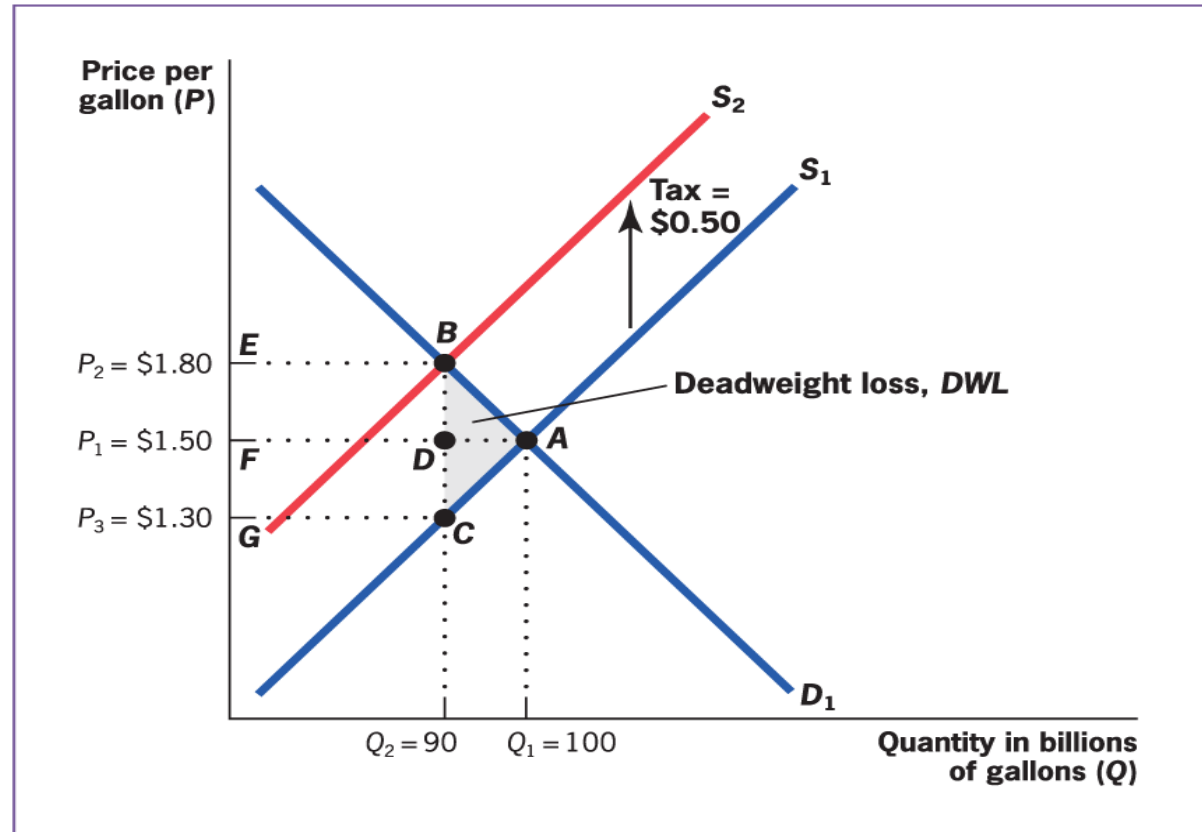
Taxation and Economic Efficiency

- Usually, the market produces efficient outcomes.
- Taxes interfere in the market and reduce efficiency.
- People substitute away from the taxed product, using less efficient alternatives.
- Some taxes have much larger efficiency costs than others.

Taxation and Economic Efficiency



Taxation and Economic Efficiency: Graphical Approach



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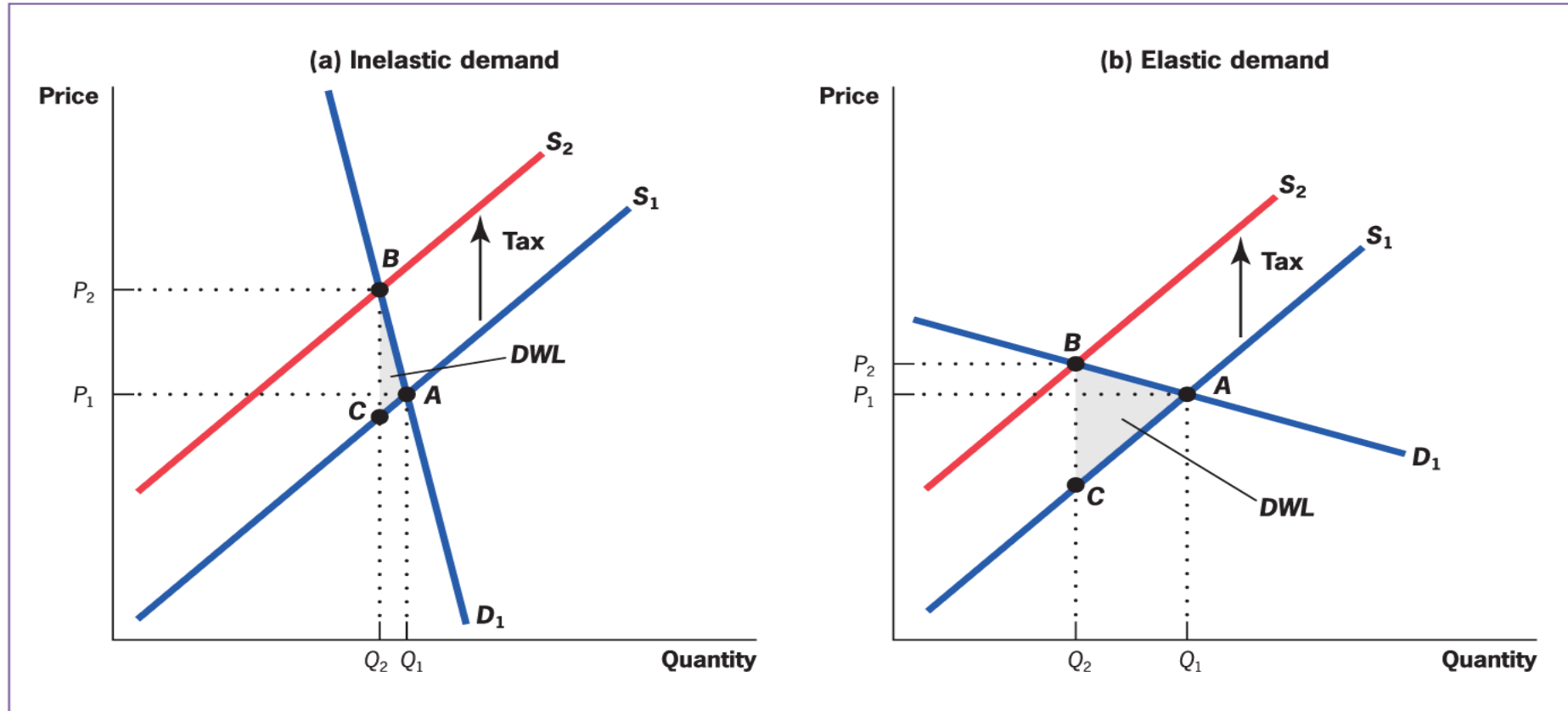
Taxation and Economic Efficiency

- Absent taxes:

$$\text{price} = \text{social marginal benefit} = \text{social marginal cost}$$

- The tax drives a wedge between *SMB* and *SMC*, preventing mutually beneficial trades from occurring.
- The units between 90 and 100 would have generated a consumer and producer surplus.
- The forgone surplus from taxation is called the deadweight loss (*DWL*).
- The size of the *DWL* depends on elasticities.

Elasticities Determine Tax Inefficiency

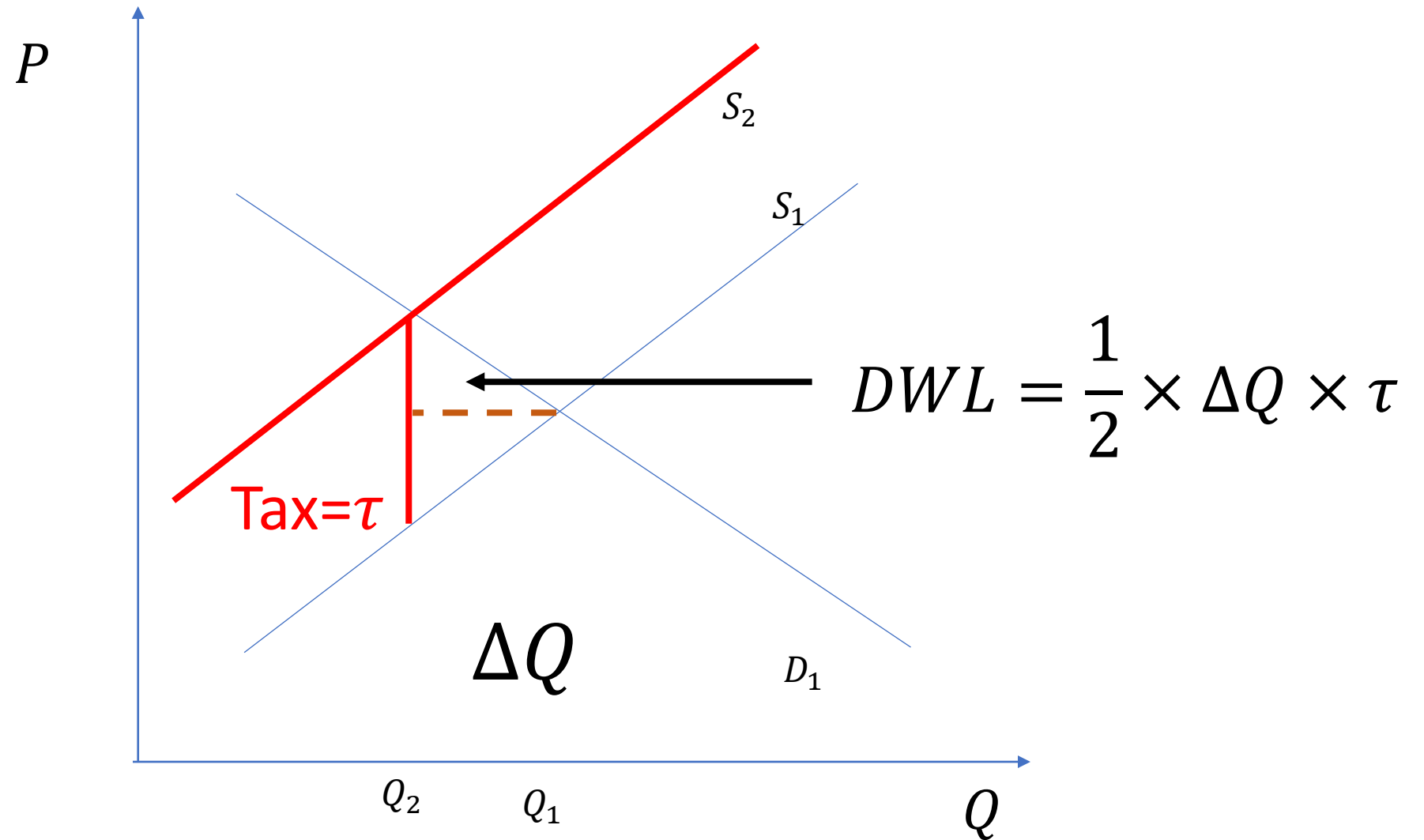


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Elasticities Determine Tax Inefficiency

- Deadweight loss is caused by individuals and firms making inefficient consumption and production choices in order to avoid taxation.
- The inefficiency of any tax is determined by the extent to which consumers and producers change their behavior to avoid the tax.
- The more elastic is demand or supply, the larger the *DWL*.

Deadweight Loss



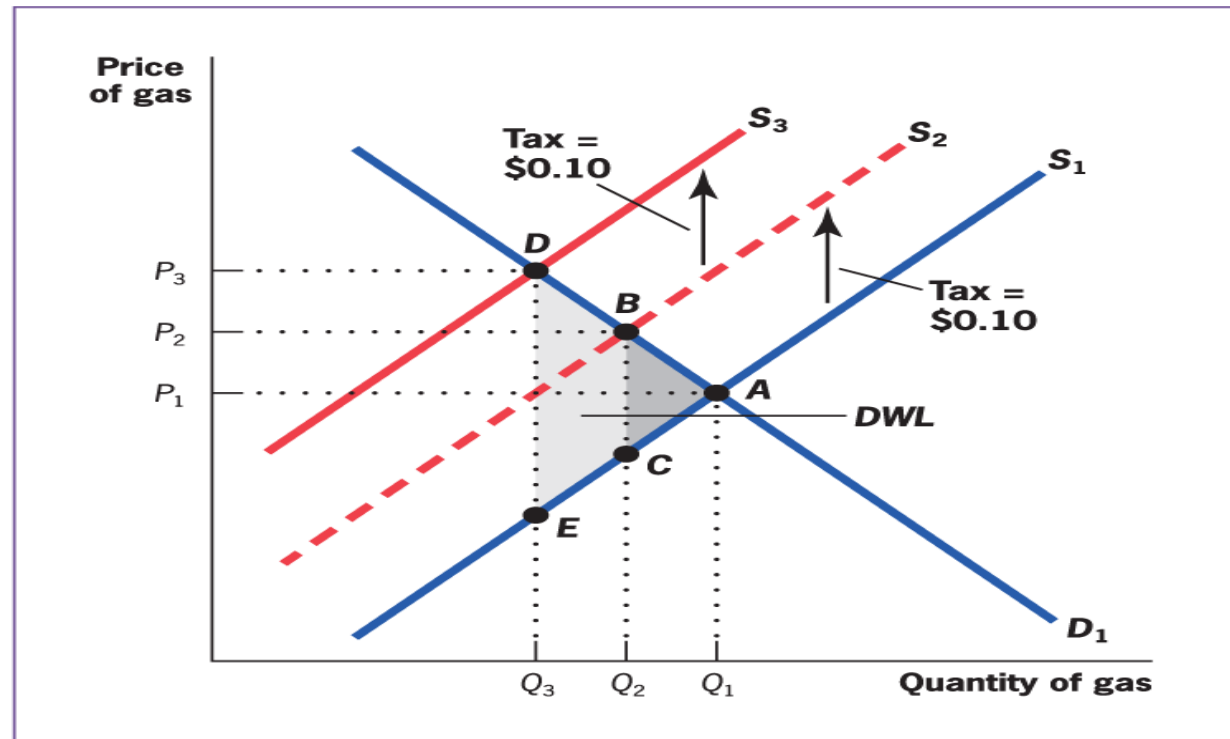
Determinants of Deadweight Loss

- The formula for DWL is:

$$DWL = -\frac{\eta_s \eta_d}{2(\eta_s - \eta_d)} \times \tau^2 \frac{Q}{P}$$

- η_s and η_d are the elasticity of supply and demand, τ is the tax rate, and Q and P are the quantity and price.
- DWL rises with the *square* of the tax, so marginal DWL rises with the tax rate.
 - **Marginal deadweight loss:** The increase in deadweight loss per unit increase in the tax.

Determinants of Deadweight Loss



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Example

The market demand is $Q = 240 - 6P$ and the market supply is $Q = -40 + 2P$.

1. Calculate the deadweight loss of a tax of \$4 per quantity imposed on producers.
2. How does deadweight loss change if the tax is levied on consumers?

Answer

- Equilibrium before tax:

$$240 - 6P = -40 + 2P$$

- $P=35$ and $Q=30$

Answer

- Equilibrium after tax:

$$240 - 6P = -40 + 2(P-4)$$

- $P=36$ and $Q=24$

Answer

Deadweight loss:

$$DWL = \frac{1}{2} \times \Delta Q \times \tau$$

$$DWL = \frac{1}{2} \times (30 - 24) \times 4 = 12$$

Exercise

The market demand is $Q = 240 - 6P$ and the market supply is $Q = 20 + 2P$.

1. Calculate the reduction in equilibrium quantity of a tax of 2 euros imposed on consumers.
2. Calculate the reduction in equilibrium quantity of a tax of 2 euros imposed on suppliers.
3. Calculate the deadweight loss in each case. Explain.

Answers

- Before taxes: $P=27.5$, $Q=75$
- After taxes: $P=28$, $Q=72$
- $DWL = (1/2) \times 3 \times 2 = 3$