Lecture 8: Taxation and Economic Efficiency

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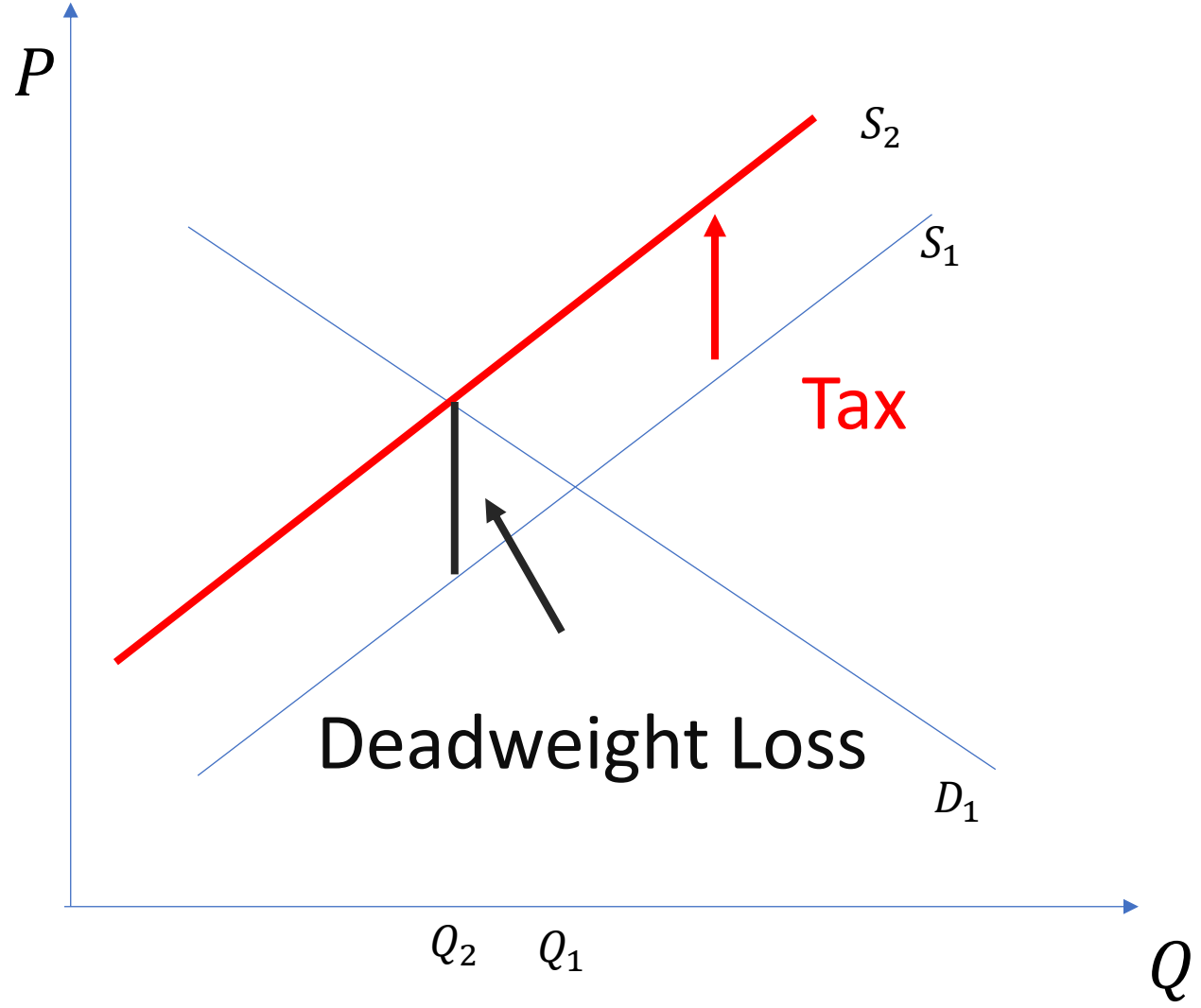
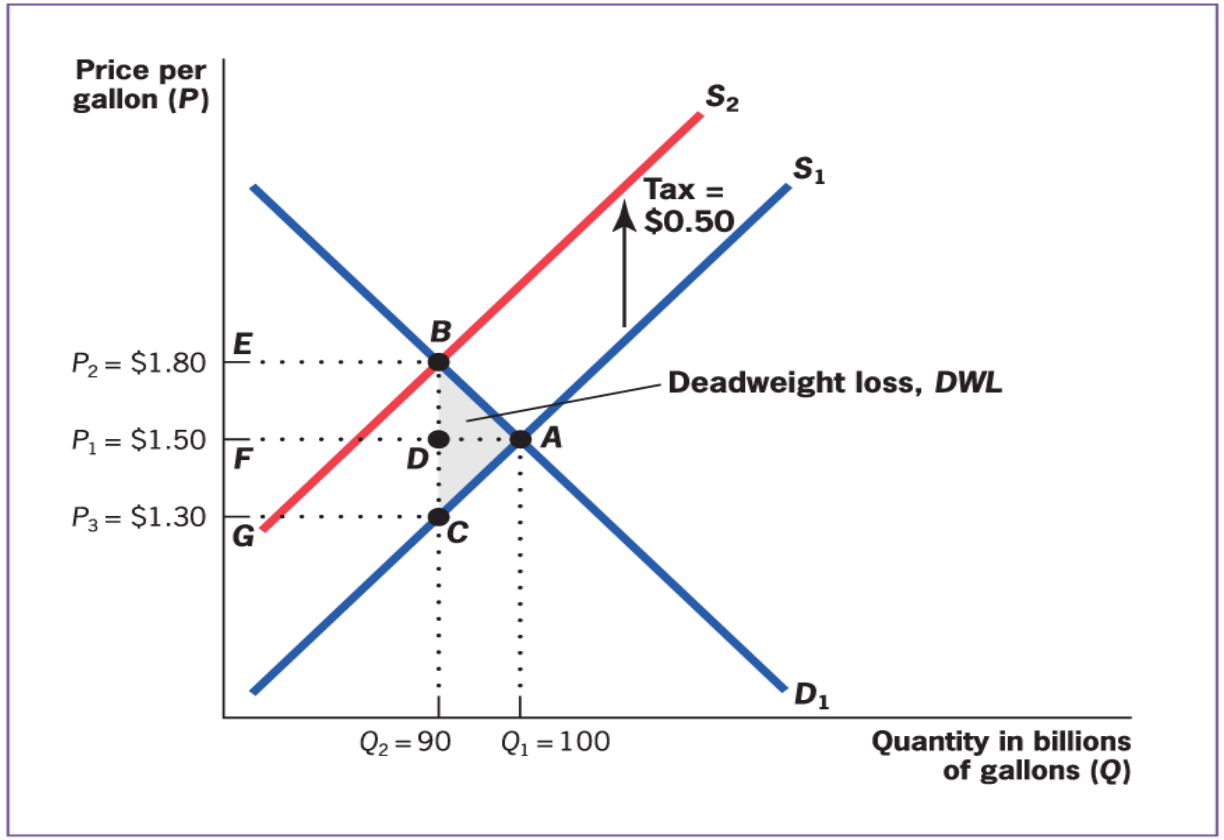
Taxation and Economic Efficiency

- 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:

price = social marginal benefit = social marginal cost

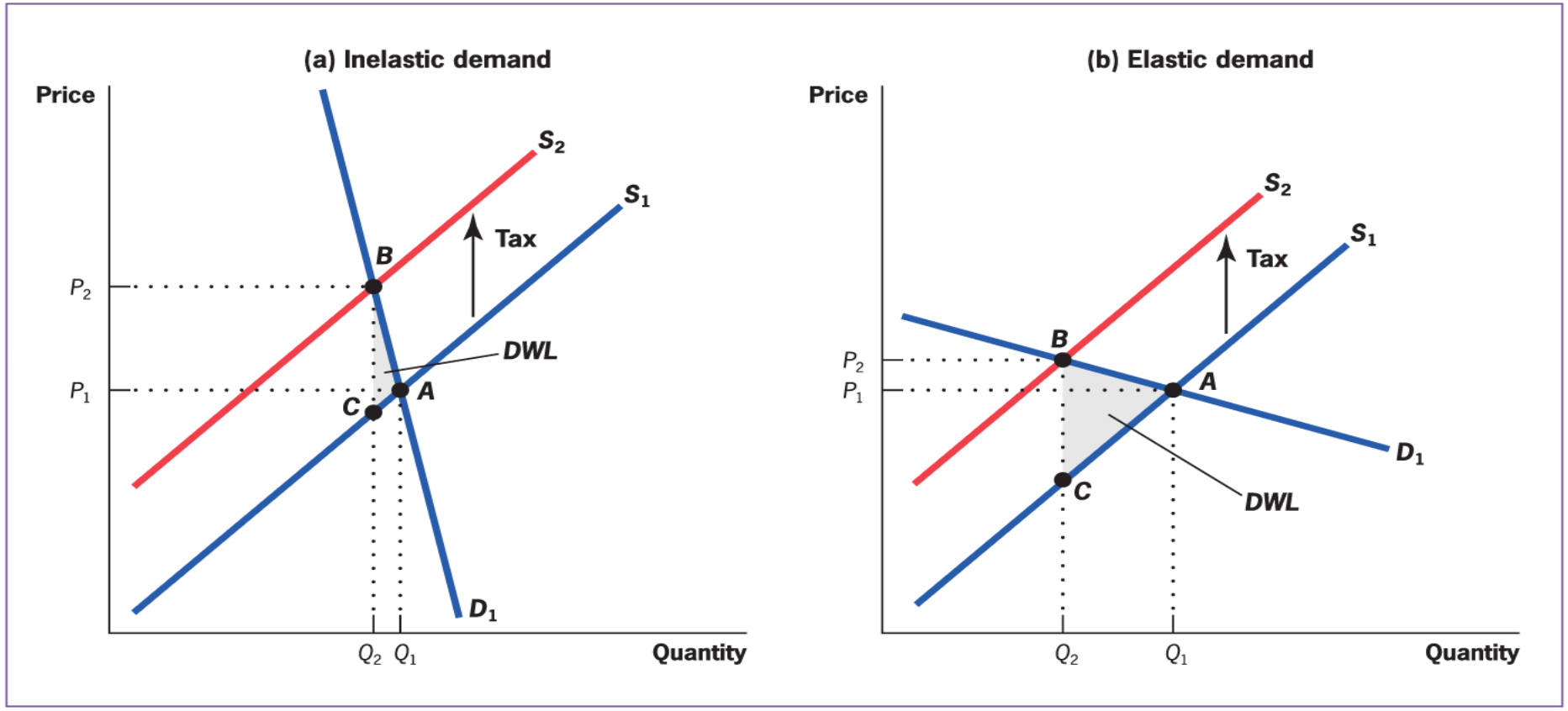
- The tax drives a wedge between *SMB* and *SMC*, preventing mutually beneficial trades from occurring.

- 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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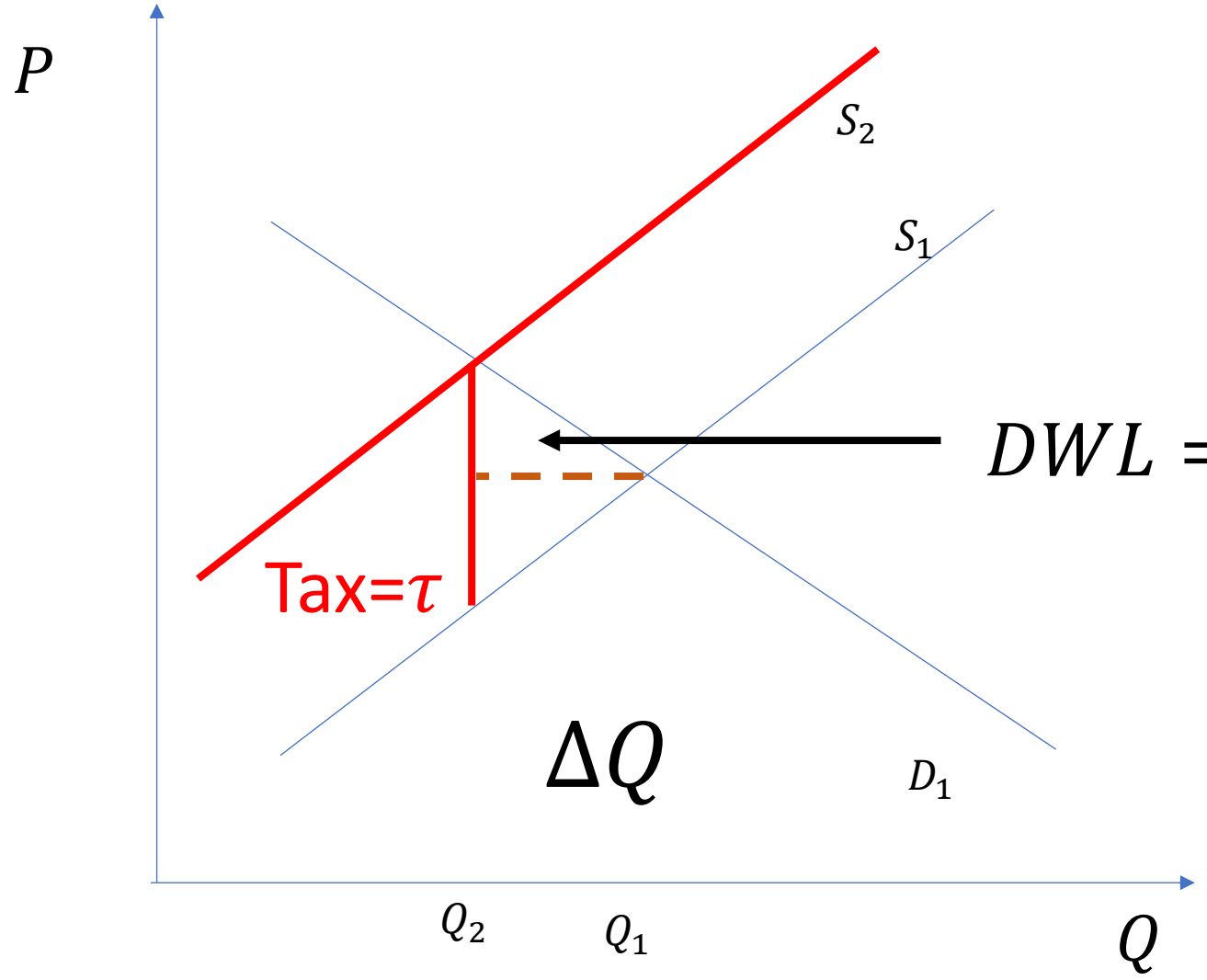
Elasticities Determine Tax Inefficiency

- 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



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

Determinants of Deadweight Loss

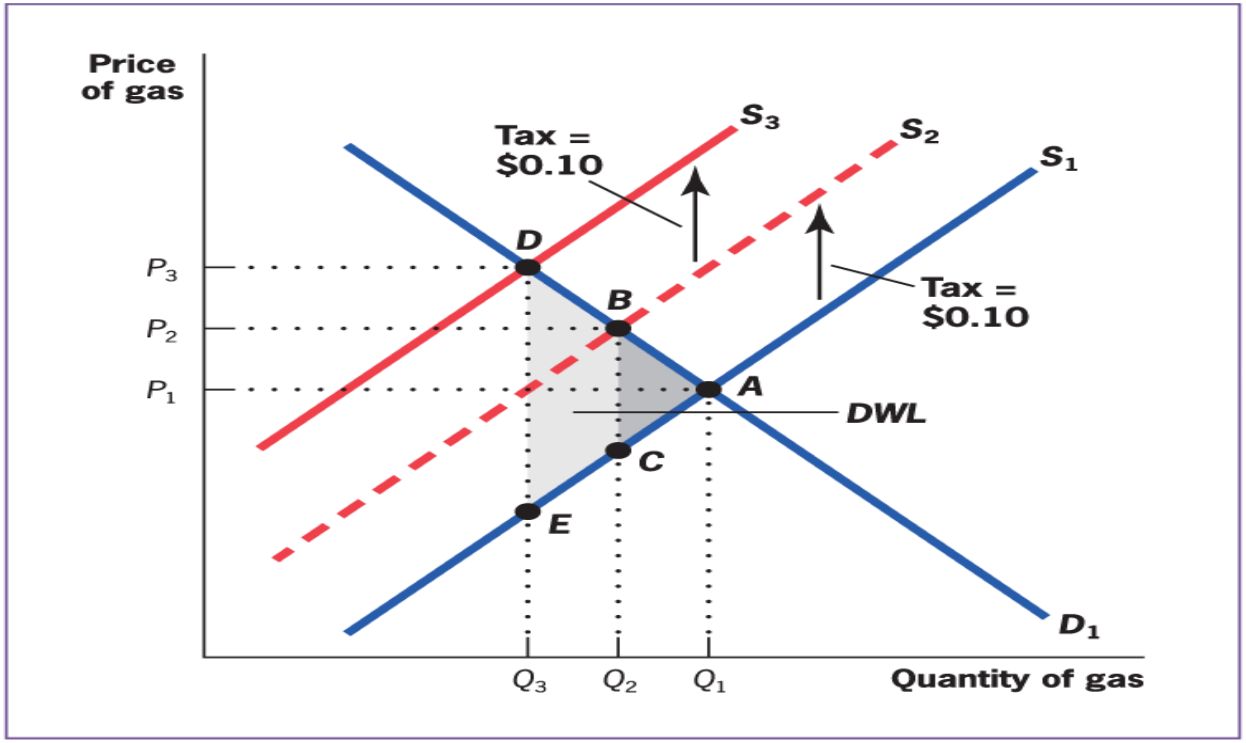
- The formula for *DWL* is:

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

  - 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)x3x2 = 3**