

Price Elasticity of Demand

$$(1) \epsilon_d = \frac{\text{percentage change in quantity demanded of Good X}}{\text{percentage change in price of Good X}} = \frac{\% \Delta Q_d}{\% \Delta P}$$

(2) The Midpoint or Arc Method:

$$\epsilon_d = \frac{\left[\frac{(Q_2 - Q_1)}{(Q_2 + Q_1)/2} \right]}{\left[\frac{(P_2 - P_1)}{(P_2 + P_1)/2} \right]}$$

Example: When price increases from \$9 to \$10, the quantity demanded decreases from 12 units to 10 units.

$$\epsilon_d = \frac{\left[\frac{(10 - 12)}{(10 + 12)/2} \right]}{\left[\frac{(\$10 - \$9)}{(\$10 + \$9)/2} \right]} = \frac{\left(\frac{-2}{11} \right)}{\left(\frac{+\$1}{\$9.50} \right)} = \frac{-18.2\%}{+10.5\%} = -1.7.$$

As a result of the price rising by 10.5 percent, the quantity demanded fell by 18.2 percent. Since the absolute value of ϵ_d is greater than 1.0, the demand for the good is elastic over this price range.

(3) When price *increased*, total revenue *decreased* from \$108 to \$100. This means demand is elastic over this price range.

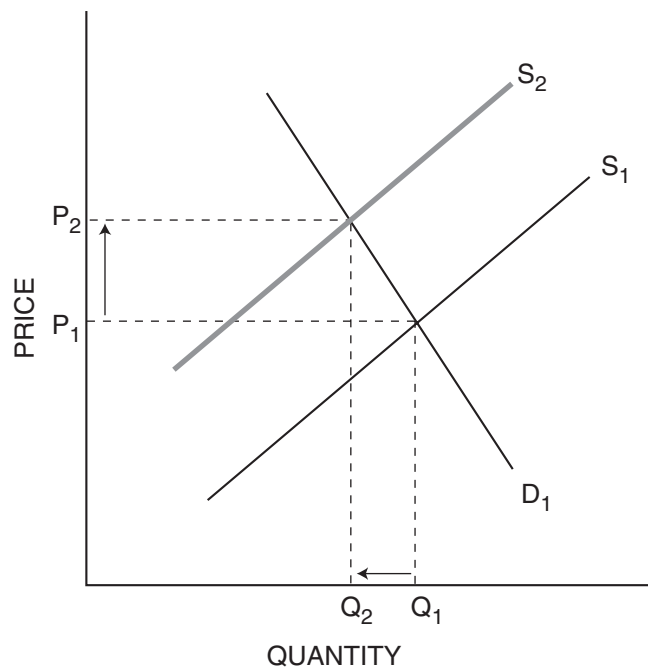
(4) Interpretation of the absolute value of the price elasticity of demand:

Absolute value of ϵ_d	Meaning
Greater than 1.0	Demand is <i>elastic</i> over this price range.
Equal to 1.0	Demand is <i>unit elastic</i> over this price range.
Less than 1.0	Demand is <i>inelastic</i> over this price range.

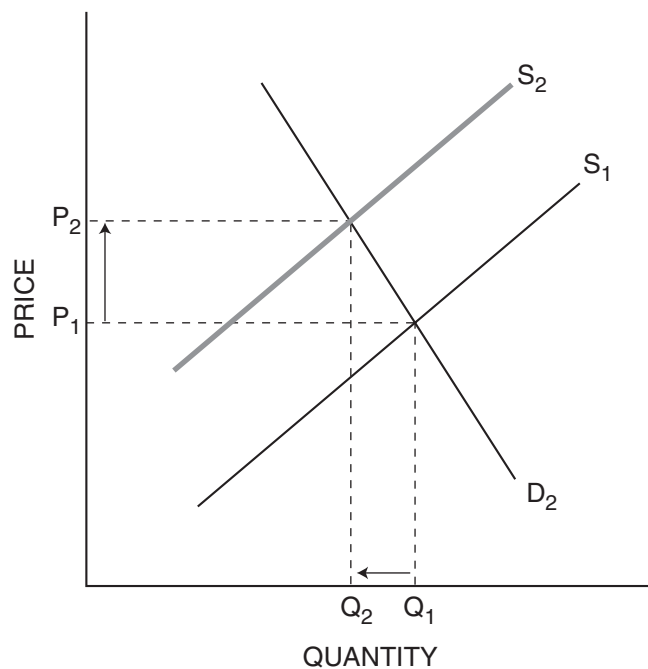
Summarizing Price Elasticity of Demand

Elasticity coefficient	Term	Description	Impact on total revenue of	
			Price increase	Price decrease
Greater than 1 $ \epsilon_d > 1$	Elastic	Quantity demanded changes by a larger percentage than does price.	Total revenue decreases.	Total revenue increases.
Equal to 1 $ \epsilon_d = 1$	Unit elastic	Quantity demanded changes by the same percentage as does price.	Total revenue is unchanged.	Total revenue is unchanged.
Less than 1 $ \epsilon_d < 1$	Inelastic	Quantity demanded changes by a smaller percentage than does price.	Total revenue increases.	Total revenue decreases.

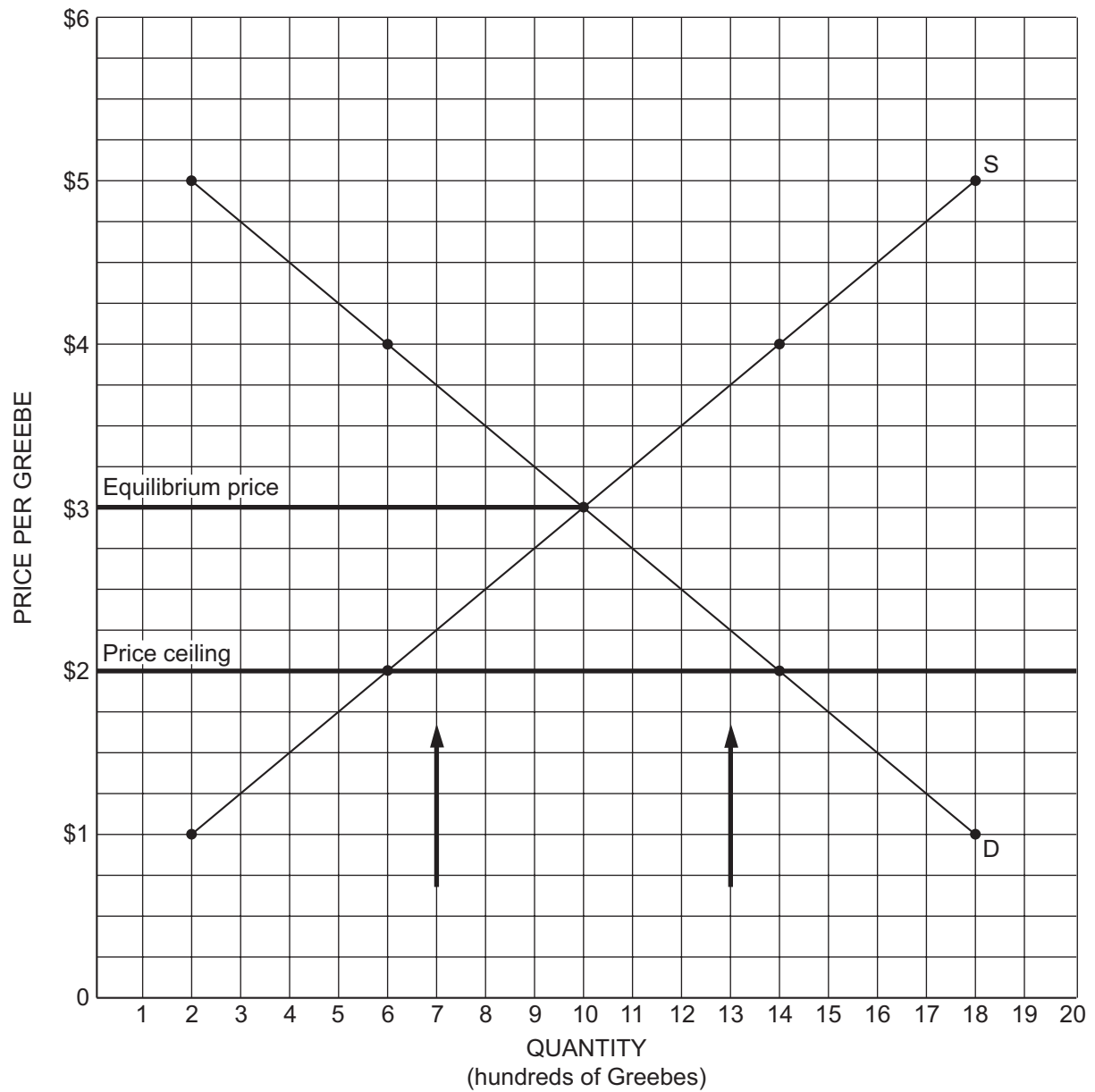
Tax Incidence and Elasticity of Demand



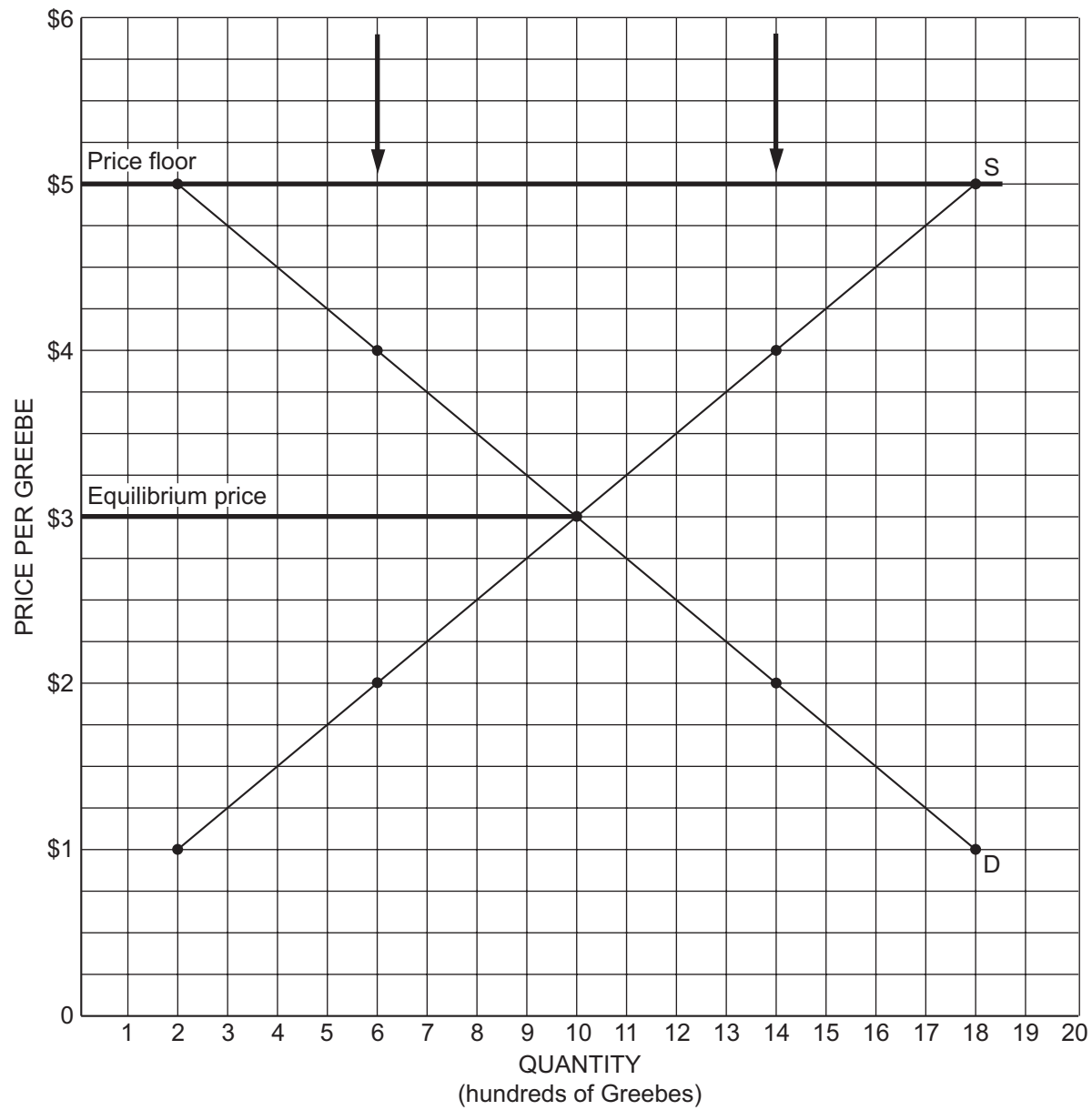
The more inelastic the demand for a good, the more the incidence of an excise tax can be shifted to the consumer.



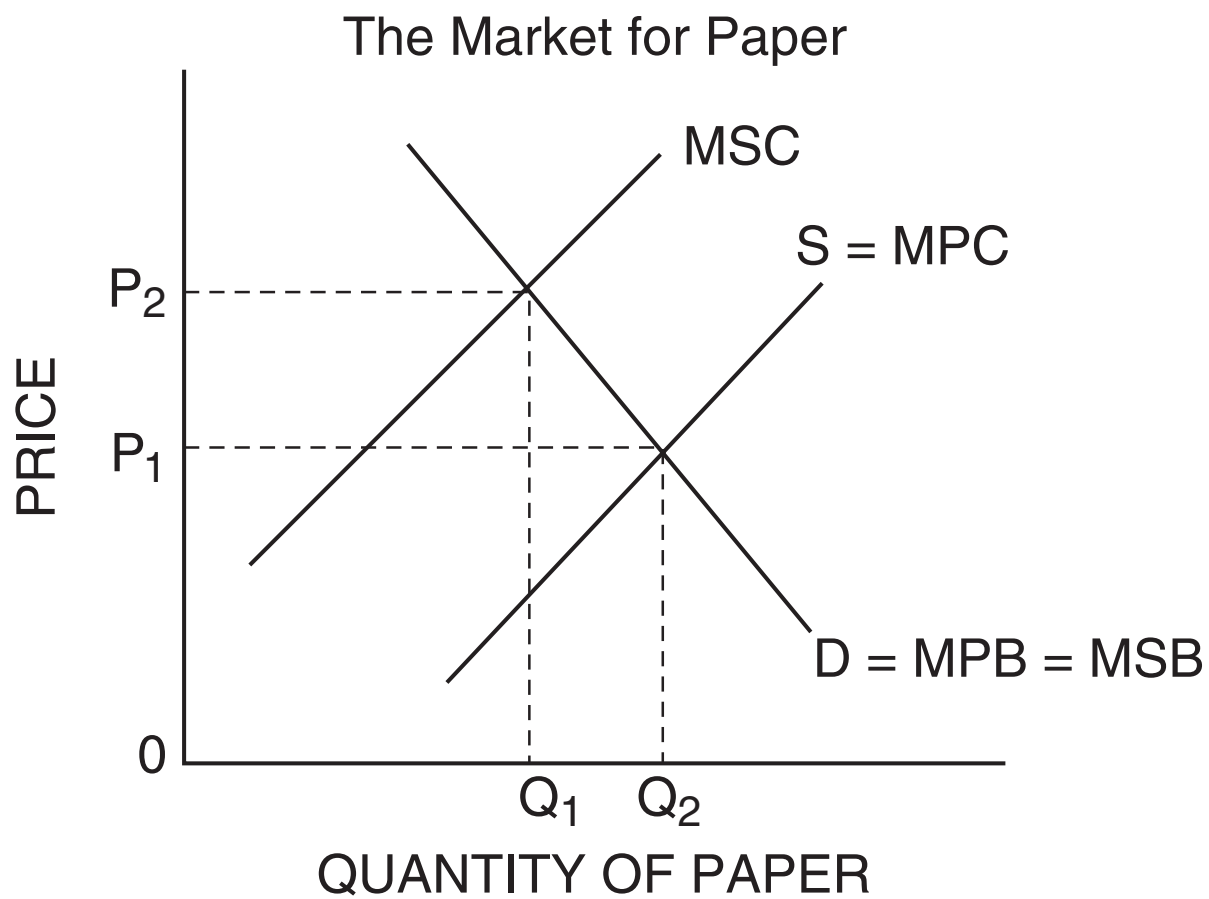
A Price Ceiling



A Price Floor



The Effect of Pollution



Deadweight Loss of a Price Ceiling

