An aerial photograph of a city landscape. In the foreground, there is a large green golf course with a winding path and a small pond. A multi-lane road curves through the middle of the image. In the background, there are various city buildings, including a large white building on the right. The sky is clear and blue.

Unit 1

Demand Curves (Ch. 2)

9/23

ECON 323 – MICROECONOMIC THEORY – DR. STRICKLAND

Characterizing Price Elasticity of Demand



When price elasticity of demand is high...

- **Elastic** $|\epsilon_D| > 1$
- Infinitely high? **Perfectly elastic** $|\epsilon_D| = \infty$

$$\epsilon_D = \frac{\% \Delta Q_D}{\% \Delta P} \Rightarrow$$

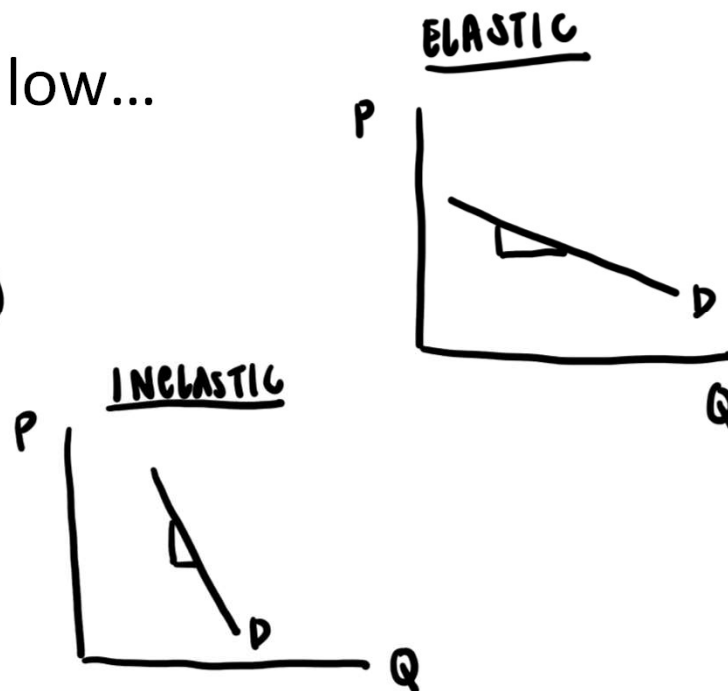
$$\text{A } 1\% \Delta P \Rightarrow \epsilon_D \% \Delta Q_D$$

$$\text{e.g. } \epsilon_D = -2$$

When price elasticity of demand is low...

- **Inelastic** $|\epsilon_D| < 1$
- Zero? **Perfectly inelastic** $|\epsilon_D| = 0$

UNIT. ELASTIC: $|\epsilon_D| = 1$



Cross-price Elasticity of Demand



Cross-price elasticity of demand: the percentage change in the *quantity demanded* of one good divided by the percentage change in the *price* of another good

$$\begin{aligned}\epsilon_{D_{xy}} &= \frac{\% \Delta Q_{D_x}}{\% \Delta P_y} \\ &= \frac{\Delta Q_{D_x}}{\Delta P_y} \cdot \frac{P_y}{Q_{D_x}} \quad \begin{array}{l} \text{OLD / ORIG.} \\ \text{OLD / ORIG.} \end{array}\end{aligned}$$

IF $< 0 \Rightarrow$ COMPLEMENTS

IF $> 0 \Rightarrow$ SUBSTITUTES

IF $= 0 \Rightarrow$ UNRELATED

Let's practice!



SLOPE OF DEMAND: $\frac{\Delta Q}{\Delta P} = -50$

Suppose the demand for Cinemark movie tickets is given by:

$$Q = f(P)$$

$$Q^D = 1,000 - 50P$$

SLOPE INVERSE DEMAND: $\frac{\Delta P}{\Delta Q} = -\frac{1}{50}$

a. Calculate the price elasticity of demand when the price of tickets (is) \$5.

$$\epsilon_D = \frac{1}{\text{slope}} \cdot \frac{P}{Q_D}$$

$$\epsilon_D = \frac{1}{(-1/50)} \cdot \frac{P}{Q_D} \xrightarrow{P=5} \text{AT A PRICE}$$

$$Q_D = 1000 - 50(5) = 750$$

$$\epsilon_D = \frac{1}{-0.02} \cdot \frac{5}{750}$$

$$= \boxed{-0.333} \quad * \text{INELASTIC}$$

INVERSE DEMAND:

$$Q_D = 1000 - 50P$$

$$50P = 1000 - Q_D$$

$$P = \frac{1000}{50} - \frac{1}{50} Q_D = 20 - 0.02 Q_D$$

b. Calculate the price elasticity of demand when the price of tickets increases from \$8 to \$9.

BTWN PRICES

$$\epsilon_D = \frac{\% \Delta Q_D}{\% \Delta P} = \frac{\Delta Q_D}{\Delta P} \cdot \frac{P}{Q_D}$$

$$P=8: Q_D = 1000 - 50(8) = 600$$

$$P=9: Q_D = 1000 - 50(9) = 550$$

$$\epsilon_D = \frac{\left[\frac{550 - 600}{600} \right]}{\left[\frac{9 - 8}{8} \right]} = \frac{550 - 600}{9 - 8} \cdot \frac{8}{600}$$

$$= \boxed{-0.667} \quad * \text{INELASTIC}$$

Let's practice!



Consider the demand for Stanley cups (the tumbler, not the hockey trophy). At a price of \$45, consumers purchase 4,500 cups each day.

$$P_x = \$45$$

Suppose the price of a related good falls from \$40 to \$30. Consumers then purchase 3,000 Stanley cups each day. What is the cross-price elasticity of demand?

$$\begin{aligned} \epsilon_{D_{xy}} &= \frac{\% \Delta Q_{Dx}}{\% \Delta P_y} = \frac{\Delta Q_{Dx}}{\Delta P_y} \cdot \frac{P_y}{Q_{Dx}} \\ &= \frac{\left[\frac{3,000 - 4,500}{4,500} \right]}{\left[\frac{30 - 40}{40} \right]} = \frac{3,000 - 4,500}{30 - 40} \cdot \frac{40}{4,500} \\ &= \boxed{1.33} > 0 \end{aligned}$$

RELATED GOOD
IS A SUBSTITUTE!

$$\begin{aligned} P_y &= \$40 \\ \Rightarrow Q_x &= 4,500 \end{aligned}$$

$$\begin{aligned} P_y &= \$30 \\ \Rightarrow Q_x &= 3,000 \end{aligned}$$