

Chapter 18

Price Elasticity of Demand

Total Revenue Test

Elasticity on a Linear Demand Curve

Price Elasticity and the Total-Revenue Curve

Determinants of Price Elasticity of Demand

Price Elasticity of Supply

Cross Elasticity

Income Elasticity

Consumer and Producer Surplus

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Extensions of Demand and Supply Analysis

Key Terms



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Chapter Objectives

- **Price Elasticity of Demand and How It Can Be Applied**
- **The Usefulness of the Total Revenue Test for Price Elasticity of Demand**
- **Price Elasticity of Supply and How It Can Be Applied**
- **Cross Elasticity of Demand and Income Elasticity of Demand**
- **Consumer Surplus, Producer Surplus, and Efficiency Losses**

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Price Elasticity of Demand

- **Measuring Responsiveness to Price Changes**
- **Relatively Elastic** (small change in P, large change in Q Demanded)
- **Relatively Inelastic** (large change in P, small change in Q Demanded)
- **Price-Elasticity Coefficient and Formula**



$$E_d = \frac{\text{Percentage Change in Quantity Demanded of Product X}}{\text{Percentage Change in Price of Product X}}$$

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Price Elasticity of Demand

• Formula Restated

$$E_d = \frac{\text{Change in Quantity Demanded of } X}{\text{Original Quantity Demanded of } X} \div \frac{\text{Change in Price of } X}{\text{Original Price of } X}$$

Midpoint Formula (best option)



W 18.1

$$E_d = \frac{\text{Change in Quantity}}{\text{Sum of Quantities}/2} \div \frac{\text{Change in Price}}{\text{Sum of Prices}/2}$$

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Price Elasticity of Demand

- Interpretations
- $E_d > 1 = \text{elastic} / < 1 = \text{inelastic} / = 1 \text{ unit elastic}$

Elastic Demand

$$E_d = \frac{.04}{.02} = 2$$

Inelastic Demand

$$E_d = \frac{.01}{.02} = .5$$

Unit Elasticity

$$E_d = \frac{.02}{.02} = 1$$

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Determinants of Price Elasticity of Demand

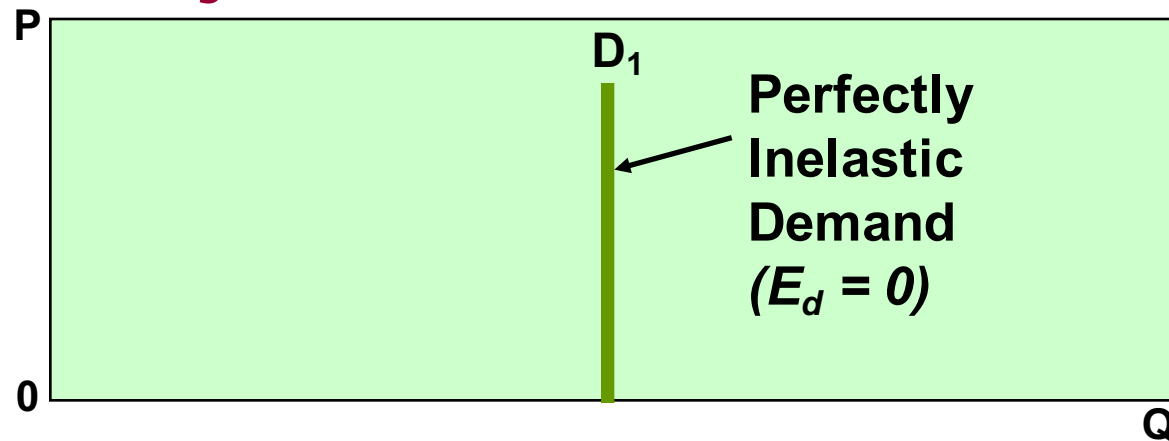
- **Substitutability** (more substitutes = more elastic)
- **Proportion of Income** (larger the portion of income = more elastic)
- **Luxuries** (more elastic) **versus Necessities** (less elastic/inelastic)
- **Time** (more time = more elastic)

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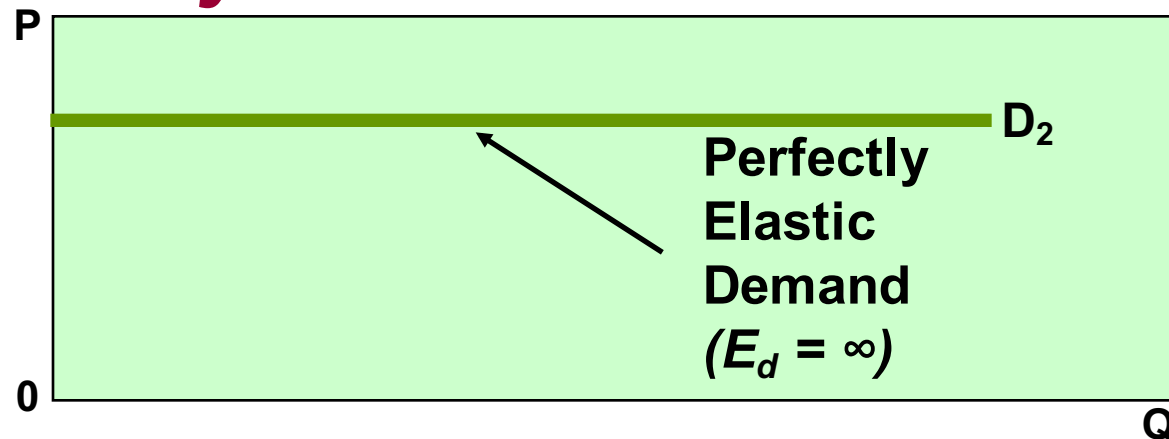
Price Elasticity of Demand

Extreme Cases

Perfectly Inelastic Demand



Perfectly Elastic Demand



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The Total Revenue Test

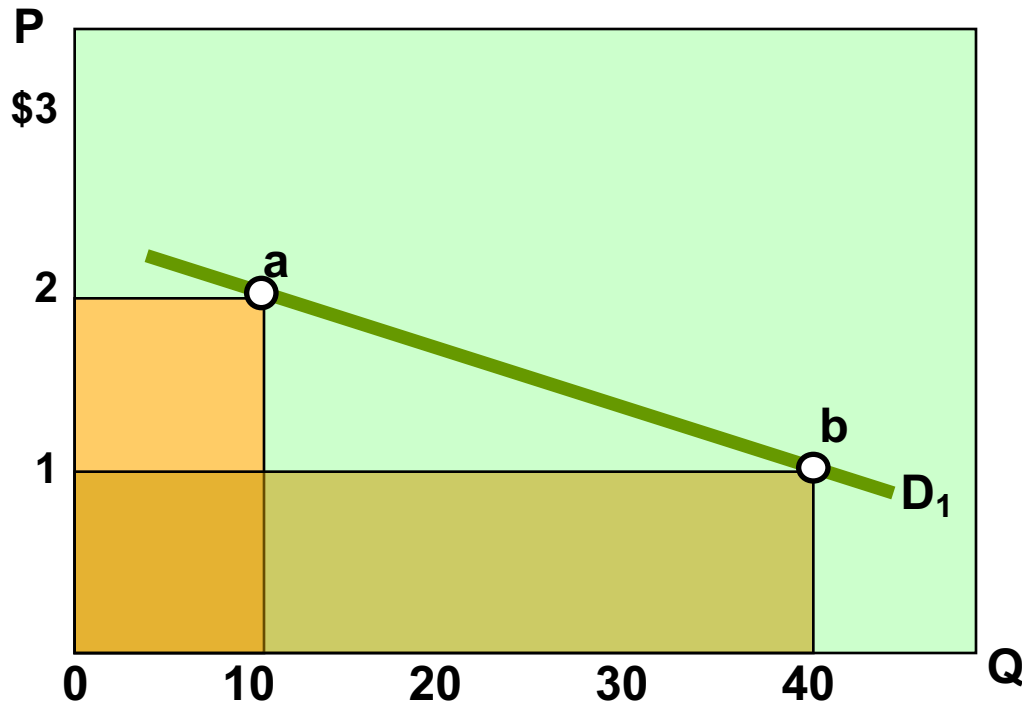
- **Total Revenue (TR)**

$$TR = P \times Q$$

Elastic Demand (lower prices = higher total revenue, higher prices = lower total revenue, Inverse relationship)



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The Total Revenue Test

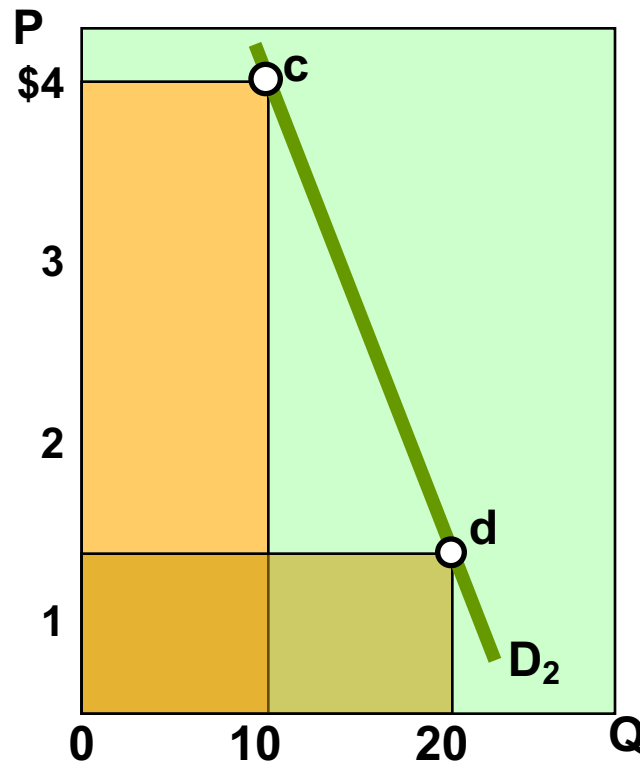
- **Total Revenue (TR)**

$$TR = P \times Q$$

Inelastic Demand (lower prices = lower total revenue, higher prices = higher total revenue, direct relationship)



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The Total Revenue Test

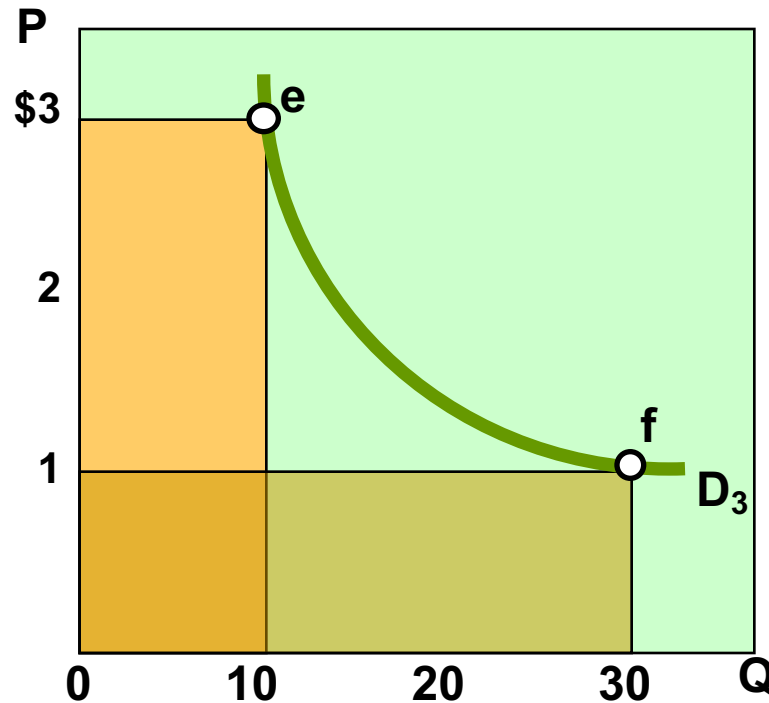
- **Total Revenue (TR)**

$$TR = P \times Q$$

Unit-Elastic (changes in price do not change total revenue)



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Elasticity on a Linear Demand Curve



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Price Elasticity of Demand for Movie Tickets as Measured by the Elasticity Coefficient and the Total-Revenue Test

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(1) Total Quantity of Tickets Demanded Per Week, Thousands	(2) Price Per Ticket	(3) Elasticity Coefficient (E_d)	(4) Total Revenue (1) X (2)	(5) Total-Revenue Test
1	8	5.00	\$8,000	Elastic
2	7	2.60	14,000	Elastic
3	6	1.57	18,000	Elastic
4	5	1.00	20,000	Unit Elastic
5	4	0.64	20,000	Inelastic
6	3	0.38	18,000	Inelastic
7	2	0.20	14,000	Inelastic
8	1		8,000	

Graphically...

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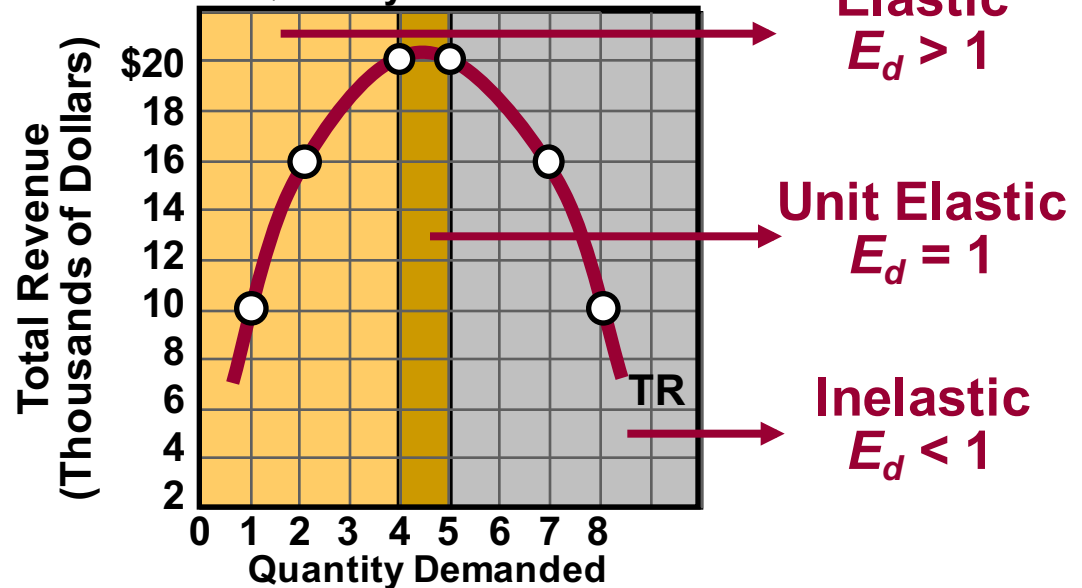
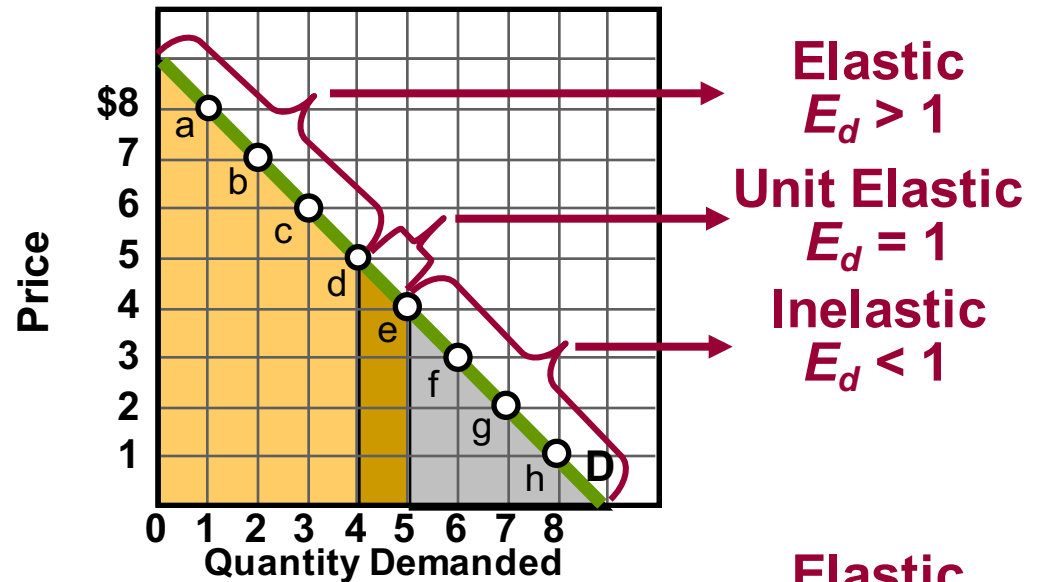
Price Elasticity and the Total-Revenue Curve

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Price Elasticity of Supply

Percentage Change in **Quantity Supplied** of Product **X**



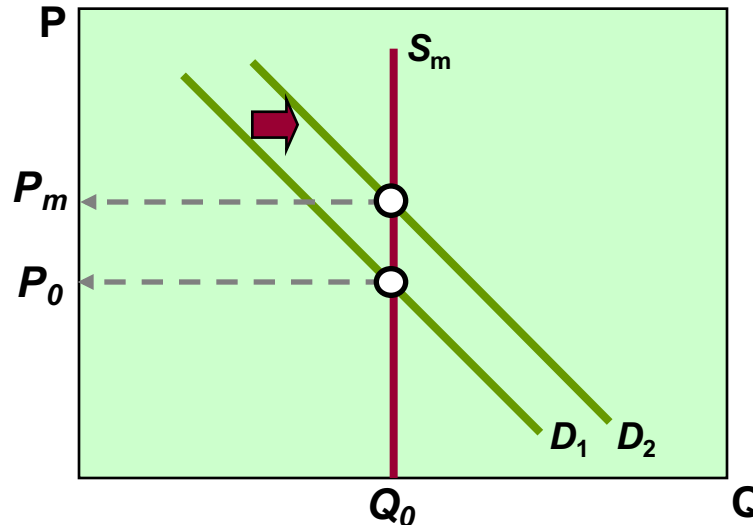
$$E_s = \frac{\text{Percentage Change in Quantity Supplied of Product X}}{\text{Percentage Change in Price of Product X}}$$

Perfectly Inelastic Supply $E_s = 0$

Market Period:

Not Enough Time to Shift Resources (immediate)

Greatest Price Impact {



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Price Elasticity of Supply

Percentage Change in **Quantity Supplied** of Product **X**



$$E_s = \frac{\text{Percentage Change in Quantity Supplied of Product X}}{\text{Percentage Change in Price of Product X}}$$

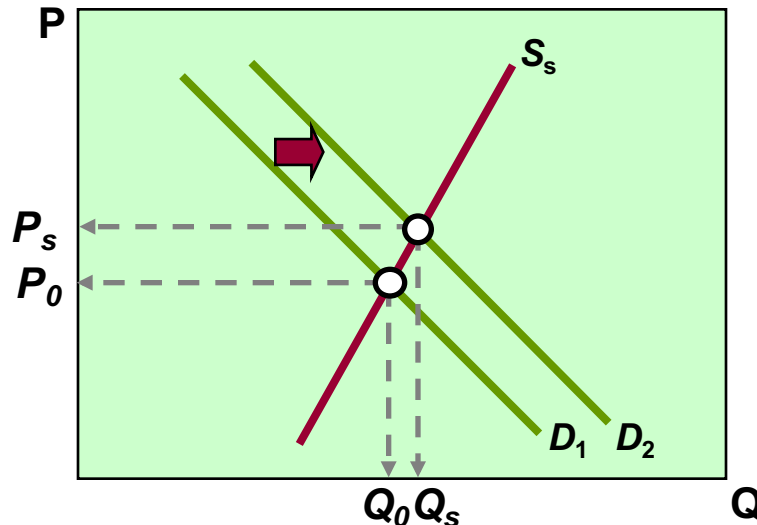
Inelastic Supply

$$E_s < 1$$

Short Run:

Resources Not Easily Shifted to Alternative Uses

Lower Price Impact { }



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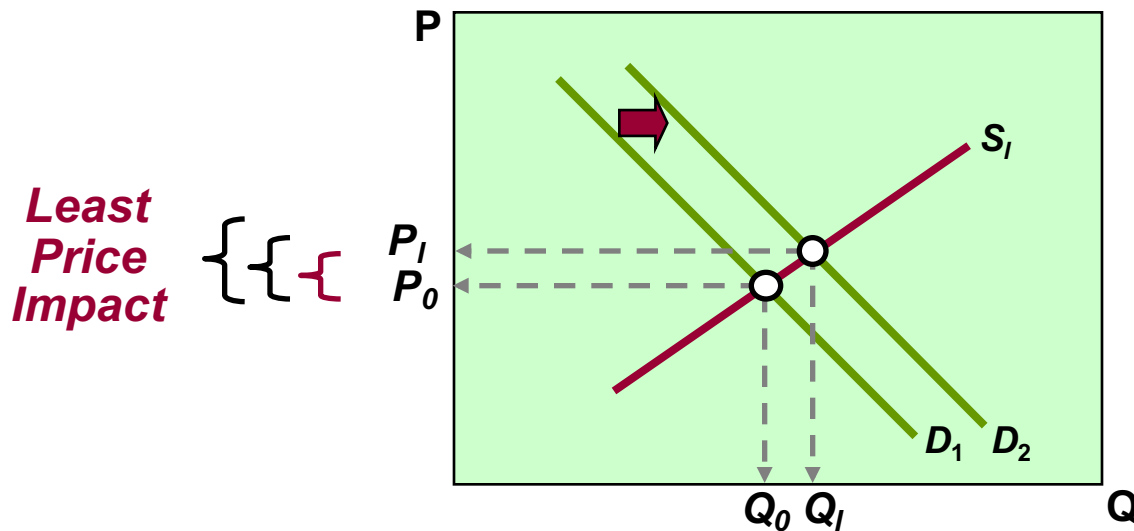
Price Elasticity of Supply

Percentage Change in **Quantity Supplied** of Product **X**



$$E_s = \frac{\text{Percentage Change in Quantity Supplied of Product X}}{\text{Percentage Change in Price of Product X}}$$

Elastic Supply $E_s > 1$
Long Run:
Resources Easily Shifted to Alternative Uses



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Percentage Change in **Quantity Demanded** of Product **X**

$$E_{xy} = \frac{\text{Percentage Change in Quantity Demanded of Product X}}{\text{Percentage Change in Price of Product Y}}$$

- **Substitute Goods – Positive Sign**
- **Complementary Goods – Negative Sign**
- **Independent Goods – Zero or Near-Zero Value**

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$$E_i = \frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Income}}$$

- **Normal Goods –**
Positive Sign
- **Inferior Goods–**
Negative Sign

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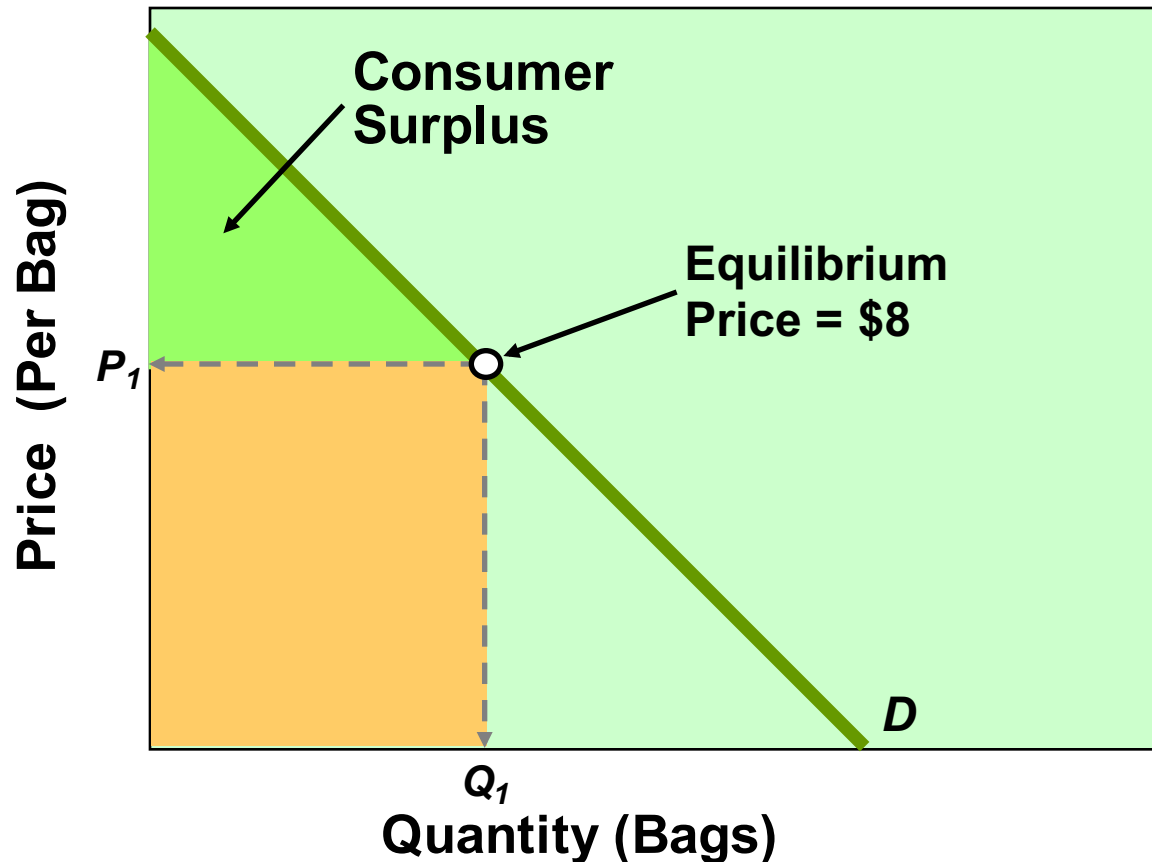
Consumer and Producer Surplus

Consumer Surplus – the difference

between the maximum price consumers are willing to pay and the actual price



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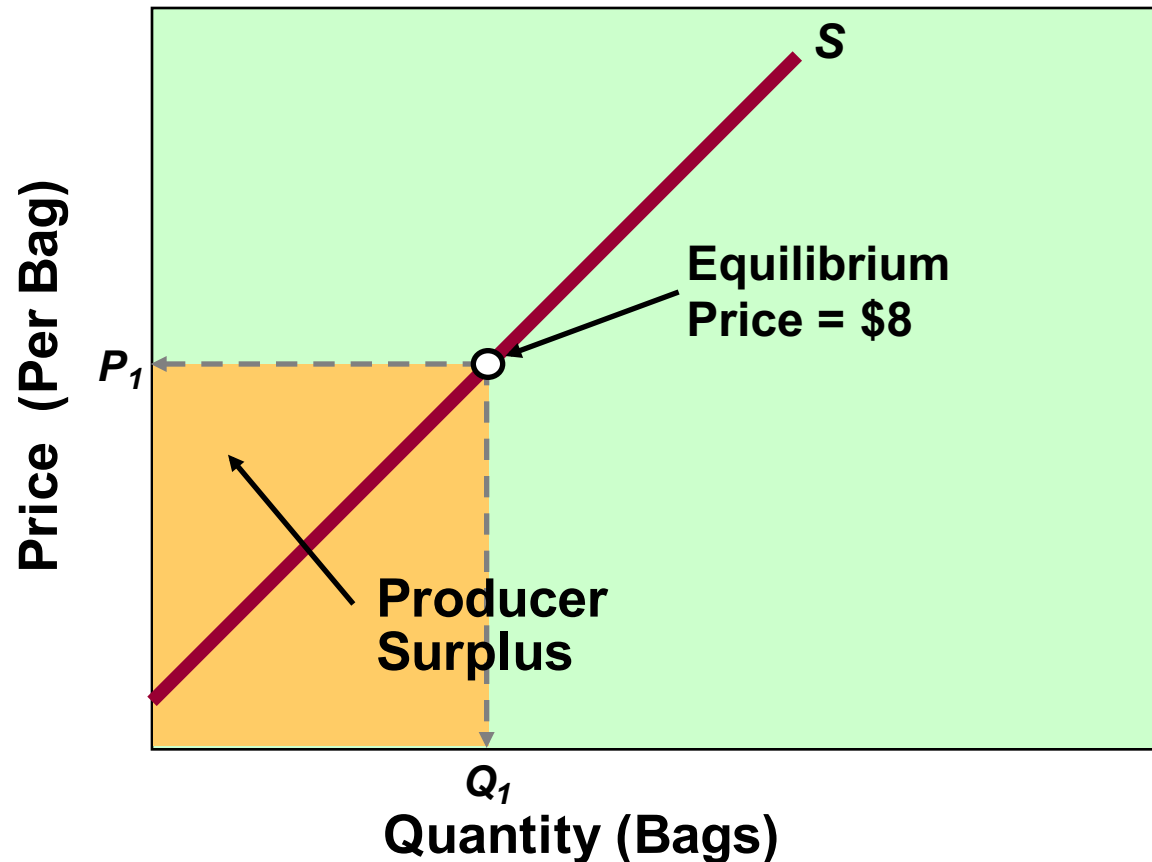
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Consumer and Producer Surplus

Producer Surplus – the difference between the actual price a producer receives and the minimum price they will accept



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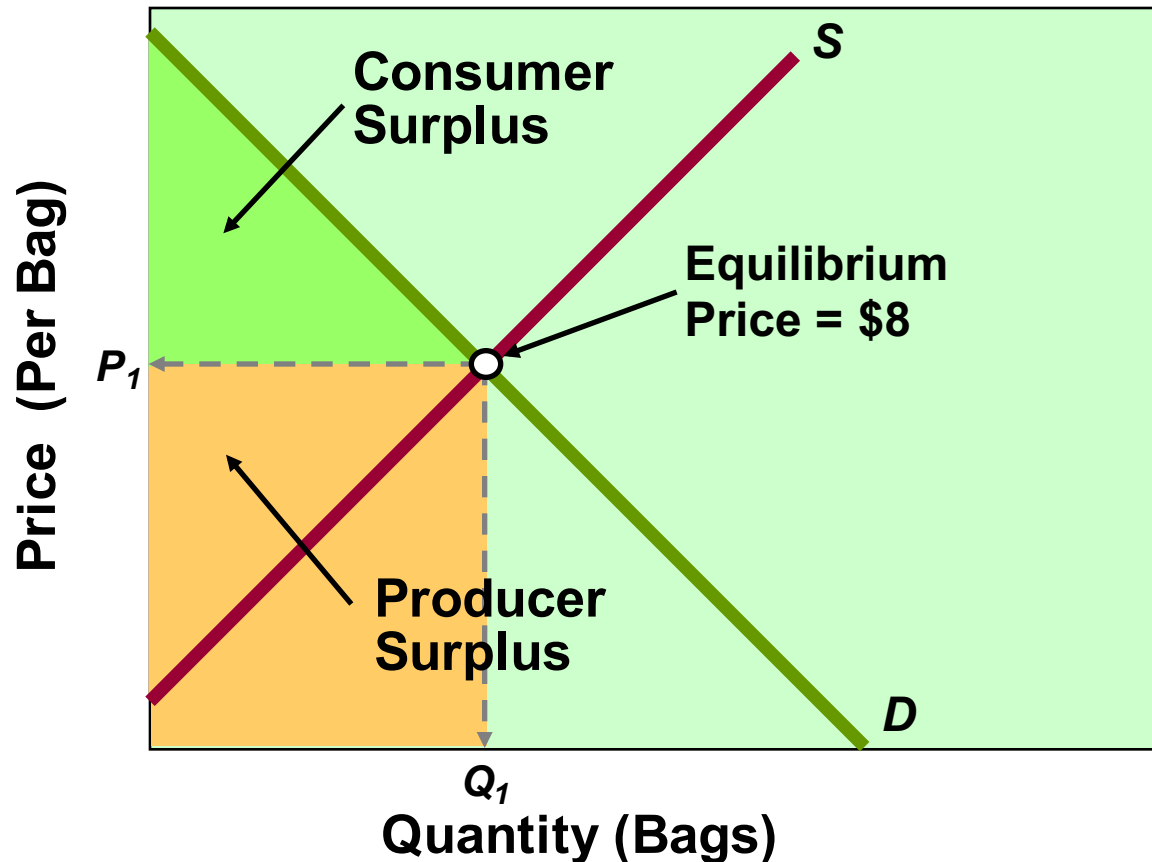


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Consumer and Producer Surplus

Efficiency Revisited – producer and consumer surpluses are maximized when at equilibrium

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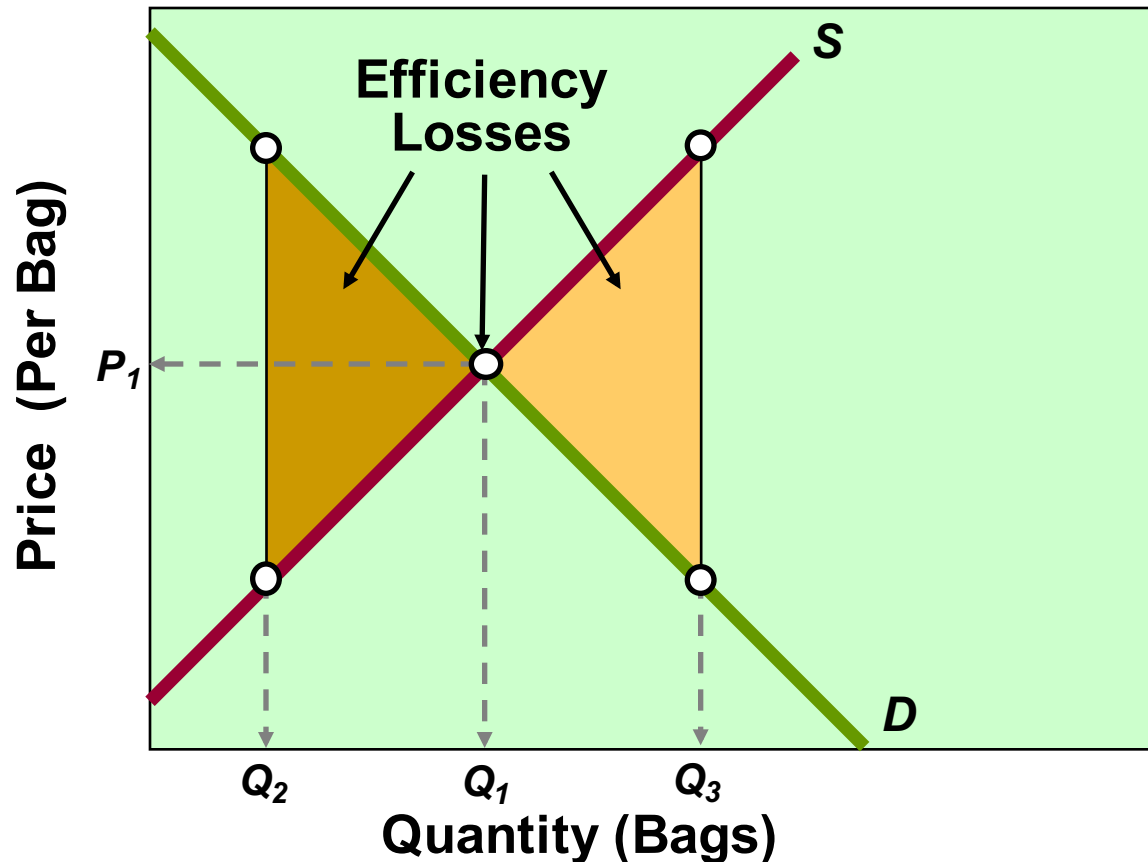


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Consumer and Producer Surplus

Efficiency Revisited – underproduction creates DWL (brown triangle), overproduction creates DWL (orange triangle)

Efficiency Losses (Deadweight Losses)



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Elasticity and Pricing Power:

Why Different Consumers Pay Different Prices

- All Buyers in a Highly Competitive Market Pay the Same Price Regardless of Their Elasticities
- Difficulty in Applying Different Prices
- Observe Differences in Group Elasticities
 - Business Travelers
 - Leisure Travelers
 - Discounting for Children
 - Different Net Prices for College Tuition

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- price elasticity of demand
- midpoint formula
- elastic demand
- inelastic demand
- unit elasticity
- perfectly inelastic demand
- perfectly elastic demand
- total revenue test (TR)
- total-revenue test
- price elasticity of supply
- market period
- short run
- long run
- cross-elasticity of demand
- income elasticity of demand
- consumer surplus
- producer surplus
- efficiency losses (deadweight losses)

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Next Chapter Preview...



Consumer Behavior And Utility Maximization

Chapter 19!