

Chapter 5: Consumers and Incentives

Modified by Joseph Tao-yi Wang

Microeconomics

Do Facebook likes in college matter? How does a decision affect the rental cost of housing? How much more gasoline would people drive if the price were lower? Would a smoker quit the habit for \$100 a month? How would a \$100-a-month incentive affect school performance? How do environmental people maximize the overall well-being of society? Will free trade cause you to lose your job? How can the Queen of England lower her commute time to Windsor Stadium? What is the optimal size of government? Is there discrimination in the labor market? Can a monopoly ever be good for society? Is there value in putting yourself last sometimes? How many times are necessary to make a market competitive? Do people exhibit a preference for immediate gratification? Why do new cars lose considerable value the minute they are driven off the lot? How should you bid in an eBay auction? Do people care about fairness?

Acemoglu Laibson List

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Chapter Outline

- 5.1. The Buyer's Problem
- 5.2. Putting It All Together
- 5.3. From the Buyer's Problem to the Demand Curve
- 5.4. Consumer Surplus
- 5.5. Demand Elasticities

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Key Ideas

1. The buyer's problem has three parts:
 1. what you like,
 2. prices, and
 3. your budget.
2. An optimizing buyer makes decisions **at the margin**.
3. An individual's **demand curve** reflects an ability and willingness to pay for a good or service.

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Key Ideas

4. **Consumer surplus** is the difference between what a buyer is willing to pay for a good and what the buyer actually pays.
5. **Elasticity** measures a variable's responsiveness to changes in another variable.

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Evidence-Based Economics Example

▶ Would a smoker quit the habit for \$100 a month?

= incentives



▶ What would motivate you?

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Why does the demand curve have a negative slope?

▶ Why the price has to fall to buy another unit?

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- ▶ Why does a soda machine only dispense one bottle or can at a time, but
- ▶ a newspaper vending machine opens up so that you can take as many as you want?



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The Buyer's Problem

1. What do you like?
2. How much does it cost?
3. How much money do you have?



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The Buyer's Problem:

What You Like: Tastes and Preferences

- ▶ What do you like?
- ▶ Everyone has different likes and dislikes, but we assume everyone has two things in common:
 1. We all want the **biggest bang for our buck**
 2. What we actually buy **reflects** our tastes and preferences

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The Buyer's Problem:

Prices of Goods and Services

- ▶ How much does it cost?
- ▶ We also assume two characteristics of prices:
 1. Prices are **fixed**—no negotiation
 2. We can buy as much as we want of something **without driving the price up** (because of an increase in demand)

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The Buyer's Problem: The Budget Set

How Much Money You Have to Spend

- ▶ How much money do you have?
- ▶ There are lots of things to do with your money, but we assume:
 1. There is no saving or borrowing, only buying
 2. That even though we use a straight line to represent purchase choices, we only purchase whole units

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The Buyer's Problem: The Budget Set

How Much Money You Have to Spend

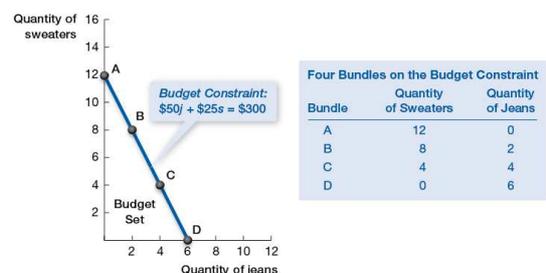


Exhibit 5.1 The Budget Set and the Budget Constraint for Your Shopping Spree

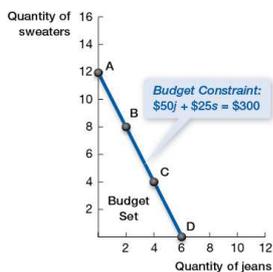
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The Buyer's Problem: The Budget Set

How Much Money You Have to Spend

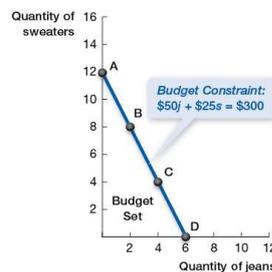


Bundle	Quantity of Sweaters	Quantity of Jeans
A	12	0
B	8	2
C	4	4
D	0	6

Why does the budget line have a negative slope?

The Buyer's Problem: The Budget Set

How Much Money You Have to Spend



Bundle	Quantity of Sweaters	Quantity of Jeans
A	12	0
B	8	2
C	4	4
D	0	6

What does the slope represent?

Putting It All Together

- Suppose Bill Gates offered to buy you a Jaguar—a \$100,000 car.



- Would you accept his offer?

Putting It All Together

- The next day, he calls and says he doesn't have time to buy the car and will just give you a check for \$100,000 instead.
- Will you go buy the car?

Putting It All Together

Quantity	Sweaters \$25			Jeans \$50		
	Total Benefits (A)	Marginal Benefits (B)	Marginal Benefits per Dollar Spent = (B) / \$25	Total Benefits (C)	Marginal Benefits (D)	Marginal Benefits per Dollar Spent = (D) / \$50
0	0			0		
1	100	100	4	160	160	3.2
2	185	85	3.4	310	150	3
3	260	75	3	410	100	2
4	325	65	2.6	490	80	1.6
5	385	60	2.4	520	30	0.6
6	435	50	2	530	10	0.2
7	480	45	1.8	533	3	0.06
8	520	40	1.6	535	2	0.04
9	555	35	1.4	536	1	0.02
10	589	34	1.36	537	1	0.02
11	622	33	1.32	538	1	0.02
12	654.5	32.5	1.3	539	1	0.02

Exhibit 5.2 Your Buyer's Problem (\$300 available)

Putting It All Together

Quantity	Sweaters \$25			Jeans \$50		
	Total Benefits (A)	Marginal Benefits (B)	Marginal Benefits per Dollar Spent = (B) / \$25	Total Benefits (C)	Marginal Benefits (D)	Marginal Benefits per Dollar Spent = (D) / \$50
0	0			0		
1	100	100	4	160	160	3.2
2	185	85	3.4	310	150	3
3	260	75	3	410	100	2
4	325	65	2.6	490	80	1.6
5	385	60	2.4	520	30	0.6
6	435	50	2	530	10	0.2
7	480	45	1.8	533	3	0.06
8	520	40	1.6	535	2	0.04
9	555	35	1.4	536	1	0.02
10	589	34	1.36	537	1	0.02
11	622	33	1.32	538	1	0.02
12	654.5	32.5	1.3	539	1	0.02

Exhibit 5.2 Your Buyer's Problem (\$300 available)

Putting It All Together

- ▶ Consumer Equilibrium Condition:

$$\frac{MB_s}{P_s} = \frac{MB_j}{P_j}$$

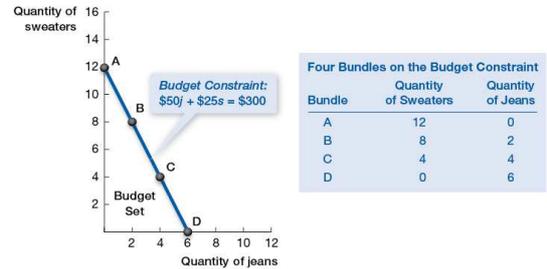
- ▶ What if $MB_s = \$75$ and $MB_j = \$100$?

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Putting It All Together: Price Changes



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Putting It All Together: Price Changes

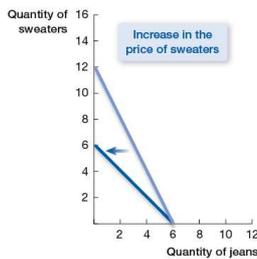


Exhibit 5.3 An Inward Pivot in the Budget Constraint from a Price Increase

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Putting It All Together: Price Changes

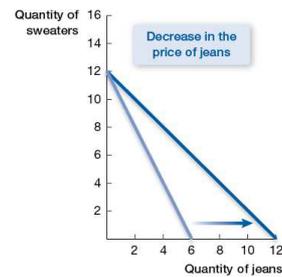


Exhibit 5.4 A Rightward Pivot in the Budget Constraint from a Price Decrease

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Putting It All Together: Price Changes

- ▶ Consumer Equilibrium Condition:

$$\frac{MB_s}{P_s} = \frac{MB_j}{P_j}$$

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Putting It All Together: Income Changes

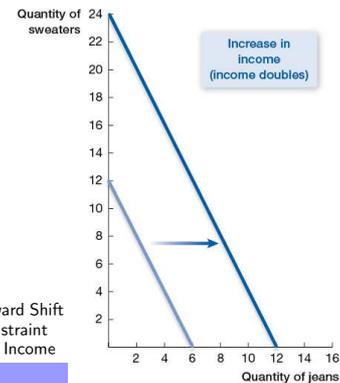


Exhibit 5.5 An Outward Shift in the Budget Constraint from an Increase in Income

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Putting It All Together



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Putting It All Together



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From the Buyer's Problem to the Demand Curve

Quantity	Sweaters \$25			Jeans \$50			
	Total Benefits (A)	Marginal Benefits (B)	Marginal Benefits per Dollar Spent = (B) / \$25	Total Benefits (C)	Marginal Benefits (D)	Marginal Benefits per Dollar Spent = (D) / \$50	Marginal Benefits per Dollar Spent = (E) / \$75
0	0			0			
1	100	100	4	160	160	3.2	2.13
2	185	85	3.4	310	150	3	2
3	260	75	3	410	100	2	1.33
4	325	65	2.6	490	80	1.6	1.07
5	385	60	2.4	520	30	0.6	0.4
6	435	50	2	530	10	0.2	0.13
7	480	45	1.8	533	3	0.06	0.04
8	520	40	1.6	535	2	0.04	0.03
9	555	35	1.4	536	1	0.02	0.01
10	589	34	1.36	537	1	0.02	0.01
11	622	33	1.32	538	1	0.02	-0.02
12	654.5	32.5	1.3	539	1	0.02	-0.07

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From the Buyer's Problem to the Demand Curve



Exhibit 5.6 Your Demand Curve for Jeans

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From the Buyer's Problem to the Demand Curve

Why does the demand curve have a negative slope?

- Why are you only willing to buy another unit if the price falls?

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From the Buyer's Problem to the Demand Curve

- ▶ Why does a soda machine only dispense one bottle or can at a time, but
- ▶ a newspaper vending machine opens up so that you can take as many as you want?



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Consumer Surplus

- ▶ How much would you be willing to pay for an "A+" in this course?
- ▶ 在本課程中，你願意付出多少代價(金錢或時間)來拿A+?



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Consumer Surplus

The difference between what you are **willing to pay** and what you **have to pay** (the market price)

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Consumer Surplus

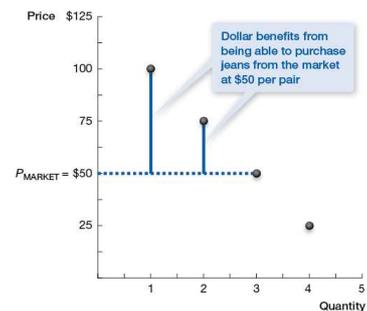


Exhibit 5.7 Computing Consumer Surplus

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Consumer Surplus

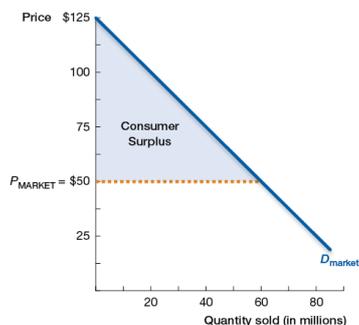


Exhibit 5.8 Market-Wide Consumer Surplus

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Consumer Surplus: An Empty Feeling: Loss in Consumer Surplus When Price Increases

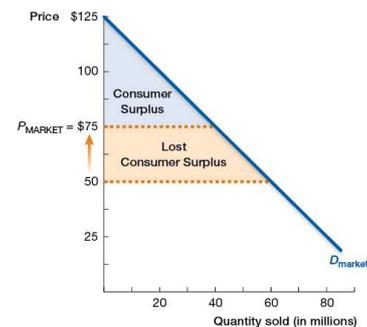


Exhibit 5.9 Market-Wide Consumer Surplus When Prices Change

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Evidence-Based Economics Example

- ▶ Would a smoker quit the habit for \$100 a month?

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- ▶ What would motivate you?

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Evidence-Based Economics Example

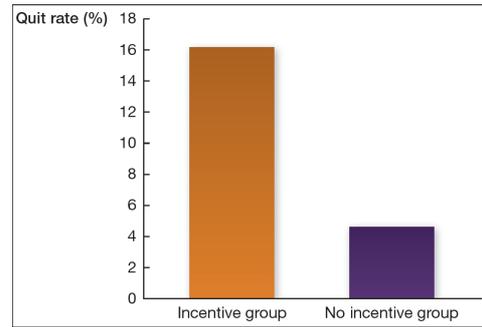


Exhibit 5.10 Experimental Results from Smoking Study

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Your Buyer's Problem with an Extra \$100

Quantity	Sweaters \$25			Jeans \$50		
	Total Benefits (A)	Marginal Benefits (B)	Marginal Benefits per Dollar Spent = (B) / \$25	Total Benefits (C)	Marginal Benefits (D)	Marginal Benefits per Dollar Spent = (D) / \$50
0	0		0			
1	100	100	4	160	160	3.2
2	185	85	3.4	310	150	3
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6	435	50	2	530	10	0.2
7	480	45	1.8	533	3	0.06
8	520	40	1.6	535	2	0.04
9	555	35	1.4	536	1	0.02
10	589	34	1.36	536.5	0.5	0.01
11	622	33	1.32	535	-1.5	-0.03
12	654.5	32.5	1.3	530	-5	-0.1

Exhibit 5.2b Your Buyer's Problem (\$300 → \$400 available)

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Evidence-Based Economics Example



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Demand Elasticities

- ▶ Why are last-minute airplane tickets so expensive?



- ▶ Why are last-minute Broadway show tickets so cheap?

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Demand Elasticities

- ▶ Suppose you play in a band.
 - ▶ Your band has a steady gig with a bar that gives you the cover charge without taking a cut.
 - ▶ You and your band are interested in increasing the money you make from this gig and are talking about changing the cover charge.
 - ▶ Should you increase it or decrease it?

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Demand Elasticities

- ▶ Elasticity
- ▶ A measure of how **sensitive** one variable is to changes in another

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Demand Elasticities

- ▶ Three measures of elasticity:
 1. **Price** elasticity of demand
 2. **Cross-price** elasticity of demand
 3. **Income** elasticity of demand

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Demand Elasticities: Price Elasticity of Demand

1. Price elasticity of demand answers the question:
 - ▶ How much does quantity demanded change when the good's price changes?
 - ▶ Mathematically:
 - ▶ Percentage change in quantity demanded due to a percentage change in price:

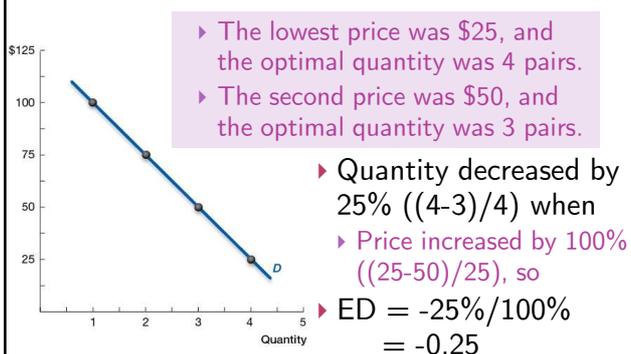
$$\text{Price elasticity of demand} = \frac{\text{Percentage change in } Q^d}{\text{Percentage change in } P}$$

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Demand Elasticities: Price Elasticity of Demand



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Demand Elasticities: Elasticity Measures

- ▶ $ED = \infty$ = Perfectly Elastic
- ▶ $ED > 1$ = Elastic
- ▶ $ED = 1$ = Unit Elastic
- ▶ $ED < 1$ = Inelastic
- ▶ $ED = 0$ = Perfectly Inelastic

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Demand Elasticities: Elasticity Measures

Good Category	Price Elasticity ³
Olive Oil	1.92
Peanut Butter	1.73
Ketchup	1.36
Wine	1.00
Laundry Detergent	0.81
Shampoo	0.79
Potato chips	0.45
Cigarettes	0.40

Exhibit 5.13 Examples of Various Price Elasticities

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Demand Elasticities:

Price Elasticity of Demand

- ▶ Let's look at another point on the demand curve for jeans:
 - ▶ Original price = \$25; original quantity = 4 pair
- ▶ What if
- ▶ Price increased to \$30 (20% increase)
 - ▶ and as a result, the optimal quantity fell to 3 (25% decrease)
- ▶ $ED = -25\%/20\% = -1.25$

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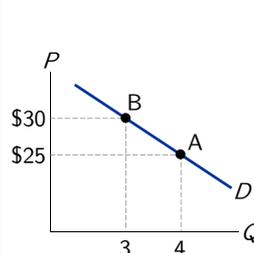
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Demand Elasticities:

Midpoint Method for Calculation

- ▶ Problem: The above method gives different answers depending on where you start.



From A to B,
 P rises 20%, Q falls 25%,
 $ED = -25/20 = -1.25$

From B to A,
 P falls 16.7%, Q rises 33.3%,
 $ED = -33.3/16.7 = -2$

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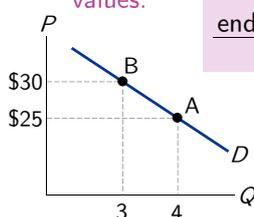
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Demand Elasticities:

Midpoint Method for Calculation

- ▶ So, we instead use the midpoint method:
 - ▶ The midpoint is the number halfway between the start and end values, the average of those values.



$$\frac{\text{end value} - \text{start value}}{\text{midpoint}} \times 100\%$$

It doesn't matter which value you use as the start and which as the end—you get the same answer either way!

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Demand Elasticities:

Midpoint Method for Calculation

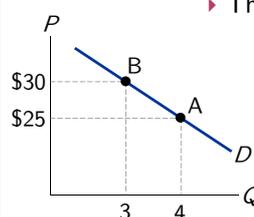
- ▶ The % change in P equals

$$\frac{\$30 - \$25}{\$27.5} \times 100\% = 18.2\%$$

- ▶ The % change in Q equals

$$\frac{3 - 4}{3.5} \times 100\% = -28.6\%$$

$$ED = -28.6/18.2 = -1.57$$



$$\frac{\text{end value} - \text{start value}}{\text{midpoint}} \times 100\%$$

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Demand Elasticities and Total Revenue

- ▶ Suppose you play in a band.
 - ▶ Your band has a steady gig with a bar that gives you the cover charge without taking a cut.
- ▶ You and your band are interested in increasing the money you make from this gig and are talking about changing the cover charge.
 - ▶ Should you increase it or decrease it?

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Demand Elasticities and Total Revenue

$$TR = P \times Q$$

- ▶ If demand is **inelastic**, when price increases, quantity decreases—a little:

$$TR = \uparrow P \times \downarrow Q = \uparrow TR$$

- ▶ The price increase pushes total revenue up,
 - ▶ the quantity decrease pushes total revenue down,
 - ▶ but the price increase is more than the quantity decrease,
 - ▶ so the final result is that total revenue increases.

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Demand Elasticities and Total Revenue

$$TR = \downarrow P \times \uparrow Q = \downarrow TR$$

- ▶ If price decreases, total revenue also decreases.
- ▶ As a result of lower price, quantity increases,
- ▶ but because demand is inelastic, quantity increases only slightly.
- ▶ Net result is that total revenue decreases.

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Demand Elasticities and Total Revenue

$$TR = P \times Q$$

- ▶ If demand is **elastic**, when price increases, quantity decreases—a **lot**:

$$TR = \uparrow P \times \downarrow Q = \downarrow TR$$

- ▶ The price increase pushes total revenue up,
- ▶ the quantity decrease pushes total revenue down,
- ▶ but the quantity decrease is more than the price increase,
- ▶ so the final result is that total revenue decreases.

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Selected Price Elasticity (from Wiki)

- | | |
|------------------------|---|
| ▶ Rice ^[48] | ▶ Eggs |
| ▶ -0.47 (Austria) | ▶ -0.1 (US: Household only), ^[54] |
| ▶ -0.80 (Bangladesh) | ▶ -0.35 (Canada), ^[55] |
| ▶ -0.80 (China) | ▶ -0.55 (South Africa) ^[56] |
| ▶ -0.25 (Japan) | |
| ▶ -0.55 (US) | ▶ Livestock |
| | ▶ -0.5 to -0.6 (Broiler Chickens) ^[44] |

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Selected Price Elasticity (from Wiki)

- | | |
|--|--|
| ▶ Soft drinks | ▶ Alcoholic beverages (US) ^[42] |
| ▶ -0.8 to -1.0 (general) ^[51] | ▶ -0.3 or -0.7 to -0.9 as of 1972 (Beer) |
| ▶ -3.8 (Coca-Cola) ^[52] | ▶ -1.0 (Wine) |
| ▶ -4.4 (Mountain Dew) ^[52] | ▶ -1.5 (Spirits) |
| | ▶ Cigarettes (US) ^[41] |
| | ▶ -0.3 to -0.6 (General) |
| | ▶ -0.6 to -0.7 (Youth) |

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Selected Price Elasticity (from Wiki)

- | | |
|---|---------------------------------------|
| ▶ Transport | ▶ Airline travel (US) ^[43] |
| ▶ -0.20 (Bus travel US) ^[46] | ▶ -0.3 (First Class) |
| ▶ -2.80 (Ford compact automobile) ^[50] | ▶ -0.9 (Discount) |
| | ▶ -1.5 (for Leisure Travelers) |
| | ▶ Car fuel ^[45] |
| | ▶ -0.25 (Short run) |
| | ▶ -0.64 (Long run) |

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Selected Price Elasticity (from Wiki)

- | | |
|---|--|
| ▶ Medicine (US) | ▶ Cinema visits (US) |
| ▶ -0.31 (Medical insurance) ^[46] | ▶ -0.87 (General) ^[46] |
| ▶ -.03 to -.06 (Pediatric Visits) ^[47] | ▶ Live Performing Arts (Theater, etc.) |
| | ▶ -0.4 to -0.9 ^[49] |
| ▶ Oil (World) | |
| ▶ -0.4 | ▶ Steel |
| | ▶ -0.2 to -0.3 ^[53] |

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Demand Elasticities: Determinants

▶ Determinants of Price Elasticity of Demand

1. Number and closeness of substitutes
2. Budget share spent on the good
3. Time horizon available to adjust to price changes

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Demand Elasticities: Determinants

▶ Why are last-minute airplane tickets so expensive?



▶ Why are last-minute Broadway show tickets so cheap?

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Demand Elasticities:

Cross-Price Elasticity of Demand

2. Cross-price elasticity of demand answers:
 - ▶ How much does the quantity demanded of one good change when the price of another changes?
 - ▶ Mathematically:
 - ▶ the percentage change in demand of good 1 due to a percentage change in the price of good 2:

$$\text{Cross-price elasticity of demand} = \frac{\% \text{ change in } Q^d \text{ for good 1}}{\% \text{ change in price of good 2}}$$

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Demand Elasticities:

Cross-Price Elasticity of Demand

Goods	Cross-Price Elasticity ⁴
Meat and Fish	1.6
Clothing and Entertainment	0.6
Whole Milk and Low-Fat Milk	0.5
Meat and Potatoes	-0.2
Food and Entertainment	-0.7

Exhibit 5.14 Examples of Various Cross-Price Elasticities

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Demand Elasticities:

Income Elasticity of Demand

3. Income elasticity of demand answers:
 - ▶ How much does quantity demanded change when income changes?
 - ▶ Mathematically:
 - ▶ the percentage change in demand of a good due to a percentage change in income

$$\text{Income elasticity of demand} = \frac{\text{Percentage change in } Q^d}{\text{Percentage change in Income}}$$

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Demand Elasticities:

Income Elasticity of Demand

Goods	Income Elasticity ⁵
Foreign Vacation	2.10
Domestic Vacation	1.70
Vacation Home	1.20
Healthcare	1.18
Meats	1.15
Housing	1.00
Fruits and Vegetables	0.61
Gasoline	0.48
Cereal	0.32
Environment	0.25
Electricity	0.23
Rice	-0.44
Public Transit	-0.75

Exhibit 5.15 Examples of Various Income Elasticities

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Conclusion

- ▶ Demand is derived from Buyer's Problem
- ▶ Consumer Surplus is the Gain from Trade
- ▶ Elasticity (= Sensitivity) of Demand
 - ▶ Price Elasticity of Demand
 - ▶ Cross-Price Elasticity of Demand
 - ▶ Income Elasticity of Demand

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Homework For ALL Chapter 5

- ▶ ALL Chap.5, Problem 1, 4, 7, 10, 11, 13
- ▶ Challenge Questions (from Past Midterms)
 - ▶ 2007 - Essay Q2
 - ▶ 2008 - Essay Part D (Multi-Choice Q4-6)
 - ▶ 2009 - Essay C2-C7, D7-D8
 - ▶ 2010 - Essay B2-B4, B7, B10-B11(True/False Q4)
 - ▶ 2012 - Essay B3, C (True/False Q5)
 - ▶ 2013 - Essay A, D13-D14 (True/False Q4)
 - ▶ 2014 - Essay A6-A10, C1-C5
 - ▶ 2015 - Essay B1-B13 (True/False A6)

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