


Consumer Choice and Elasticity

Full Length Text — Part: 5 Chapter: 19
Micro Only Text — Part: 3 Chapter: 7


To Accompany "Economics: Private and Public Choice 12th ed."
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Fundamentals of Consumer Choice

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Fundamentals of Consumer Choice

- Factors affecting choice:
 - Limited income necessitates choice.
 - Consumers make choices purposefully.
 - One good can be substituted for another.
 - Consumers must make decisions without perfect information, but knowledge and past experience will help.
- **Law of diminishing marginal utility:**
As the rate of consumption increases, the marginal utility derived from consuming additional units of a good will decline.

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Marginal Utility, Consumer Choice, and the Demand Curve of an Individual

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The Demand Curve

- The height of an individual's demand curve indicates the maximum price the consumer would be willing to pay for that unit.
- A consumer's willingness to pay for a unit of a good is directly related to the utility derived from consumption of the unit.
- The *law of diminishing marginal utility* implies that a consumer's marginal benefit, and thus the height of their demand curve, falls with the rate of consumption.

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The Demand Curve

- An individual's demand curve, Jones's demand for frozen pizzas in this case, reflects the law of diminishing marginal utility.
- Because marginal utility (*MU*) falls with increased consumption, so does a consumer's maximum willingness to pay -- marginal benefit (*MB*). **Price = \$2.50**
- A consumer will purchase until ***MB = Price*** . . . so at \$2.50 Jones would purchase 3 frozen pizzas and receive a consumer surplus shown by the shaded area (above the *price* line and below the demand curve).

$MB_4 < MB_3 < MB_2 < MB_1$
 because
 $MU_4 < MU_3 < MU_2 < MU_1$

Price

Jones's demand curve for frozen pizza

3.50
3.00
2.50
2.00

1 2 3 4

Frozen pizzas per week

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Consumer Equilibrium With Many Goods

- Each consumer will maximize his/her satisfaction by ensuring that the last dollar spent on each commodity yields an equal degree of marginal utility.

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \dots = \frac{MU_n}{P_n}$$

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Price Changes and Consumer Choice

- The demand curve shows the amount of a product consumers would be willing to buy at different prices for a specific period.
- The *law of demand* states that there is an inverse relationship between the quantity of a product purchased and its price.
- Reasons the demand curve slopes downward:
 - Substitution effect:** as a product's price falls, the consumer will buy more of it and less of other, now more expensive, products.
 - Income effect:** as a product's price falls, a consumer's real income rises and so induces the individual to buy more of both it and other goods.

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Time Cost and Consumer Choice

- The monetary price of a good is not always a complete measure of its cost to the consumer.
- Consumption of most goods requires time as well as money. Like money, time is scarce to the consumer.
 - So, a lower time cost, like a lower money price, will make a product more attractive.
- Time costs, unlike money prices, differ among individuals.

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Questions for Thought:

1. Chuck is currently purchasing 3 pairs of jeans and 5 t-shirts per year. The price of jeans is \$30, and t-shirts cost \$10. At his current rate of consumption, his marginal utility of jeans is 60 and his marginal utility of t-shirts is 30. Is Chuck maximizing his utility? Would you suggest he buy more jeans and fewer t-shirts, or more t-shirts and fewer jeans?
2. "If the price of gasoline goes up and Fran now buys fewer candy bars because she has to spend more on gas, this would best be explained by the substitution effect."
-- Is this statement true or false?

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Market Demand Reflects the Demand of Individual Consumers

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Individual and Market Demand Curves

- Consider *Jones's* demand for frozen pizza. At \$3.50 *Jones demands* 1 pizza ... at \$2.50 3 pizzas ... and so on ...
- Consider *Smith's* demand for frozen pizza. At \$3.50 *Smith demands* 2 pizzas ... at \$2.50 3 pizzas ... and so on ...
- The *market demand curve* is merely the horizontal sum of the individual demand curves (here *Jones* and *Smith*).
- The *market demand curve* will slope downward to the right, just as the individual demand curves do.

Price

Jones *Smith* *2-Person market*


\$3.50 \$3.50 \$3.50
\$2.50 \$2.50 \$2.50

1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8

Weekly frozen pizza consumption

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Elasticity of Demand

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Price Elasticity of Demand

- Price elasticity reveals the responsiveness of the amount purchased to a change in price.

$$\text{Price Elasticity of demand} = \frac{\% \text{ Change in quantity demanded}}{\% \text{ Change in Price}} = \frac{\% \Delta Q}{\% \Delta P}$$


$$= \frac{(Q_0 - Q_1) / (Q_0 + Q_1)/2}{(P_0 - P_1) / (P_0 + P_1)/2}$$

- or put more simply -

$$= \frac{(Q_0 - Q_1) / (Q_0 + Q_1)}{(P_0 - P_1) / (P_0 + P_1)}$$

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Price Elasticity Numerical Application

- Suppose Trina bakes specialty cakes. She can sell 50 specialty cakes per week at \$7 a cake, or 70 specialty cakes per week at \$6 a cake.
- What is the demand elasticity for Trina's cakes?

Percent change in quantity demanded: $\frac{(50 - 70)}{(50 + 70)/2} = \frac{-20}{60} = -33.33\%$

Percent change in price: $\frac{(7 - 6)}{(7 + 6)/2} = \frac{1}{6.5} = 15.38\%$

The price elasticity of demand equals: $\frac{\% \Delta Q}{\% \Delta P} = \frac{-33.33}{15.38} = -2.17$

- Recall -

$$\text{Price Elasticity of demand} = \frac{(Q_0 - Q_1) / (Q_0 + Q_1)}{(P_0 - P_1) / (P_0 + P_1)}$$

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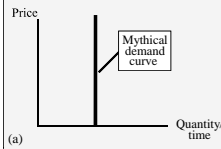
Price Elasticity of Demand

- After calculating the price elasticity of demand, you can determine whether it is elastic, inelastic, or unitary elastic with the following:
 - If the absolute value of the elasticity term < 1 , then the demand is **inelastic**.
 - If the absolute value of the elasticity term > 1 , then the demand is **elastic**.
 - If the absolute value of the elasticity term $= 1$, then the demand is **unitary elastic**.
- Because price elasticity of demand is *always* negative, the sign on the coefficient is often omitted in discussions of elasticity.

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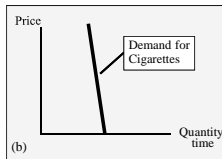
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Elasticity of Demand



(a)

- **Perfectly inelastic:**
An increase in price results in no change in consumers purchases. The vertical demand curve is mythical as the substitution and income effects prevent this from happening in the real world.



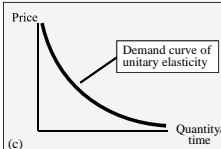
(b)

- **Relatively inelastic:**
A percent increase in price results in a smaller % reduction in sales. The demand for cigarettes has been estimated to be highly inelastic.

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Elasticity of Demand



(c)

- **Unitary elasticity:**
The percent change in quantity demanded due to an increase in price is equal to the % change in price. A decreasing slope results. Sales revenue (price times quantity) is constant.

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Elasticity of Demand

• Relatively elastic:
A % increase in price leads to a larger % reduction in purchases. When there are good substitutes for a product (as with Granny Smith apples), the quantity purchased will be highly sensitive to changes in price.

• Perfectly elastic:
Consumers will buy all of Farmer Hollings's wheat at the market price, but none will be sold above the market price.

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Elasticity of Demand

Recall - $\frac{(Q_0 - Q_1)/(Q_0 + Q_1)}{(P_0 - P_1)/(P_0 + P_1)}$

$\frac{(110 - 100)/(110 + 100)}{(\$1 - \$2)/(\$1 + \$2)}$
 $= (-) 0.14$
Elasticity = (-) 0.14

- With this straight-line (constant-slope) demand curve, demand varies across a range of prices.
- Using the equation for elasticity, the formula shows that, when price rises from \$1 to \$2 ... while quantity demanded falls from 110 to 100 ... the elasticity for that region of the demand curve is (- 0.14) – inelastic.

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Elasticity of Demand

Recall - $\frac{(Q_0 - Q_1)/(Q_0 + Q_1)}{(P_0 - P_1)/(P_0 + P_1)}$

$\frac{(20 - 10)/(20 + 10)}{(\$10 - \$11)/(\$10 + \$11)}$
 $= (-) 7.0$
Elasticity = (-) 7.0

- A price increase of the same amount, from \$10 to \$11, ... leads to a decline in quantity demanded from 20 to 10.
- Note that this change in price was smaller (as a %) than in the previous slide but resulted in the same change in quantity demanded.
- Applying the elasticity formula, the calculated elasticity is (- 7.0) – greater than (- 0.14) from before.
- The price-elasticity of a straight-line demand curve increases as price rises.

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Determinants of Price Elasticity of Demand

- Availability of *substitutes*
 - When good substitutes for a product are available, a rise in price induces many consumers to switch to another product.
 - The greater the availability of substitutes, the more elastic demand will be.
- *Share of total budget* expended on product
 - As the share of the total budget spent on the product increases, demand is more elastic.

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Elastic and Inelastic Demand

(a) 1/2 lb. hamburgers per week (in thousands) (b) Cigarette packs per week (in millions)

- As the price of 1/2 lb. hamburgers (a) rises from \$4.00 to \$6.00 . . . the quantity demanded plunges from 100,000 to 25,000 per week.
- The % reduction in quantity demanded is larger than the % increase in price, hence the **demand** for 1/2 lb hamburgers is relatively **elastic**.
- As the price of cigarettes (b) rises from \$4.00 to \$6.00 . . . quantity demanded declines from 100 million to 90 million packs per week.
- The % reduction in quantity demanded is smaller than the % increase in price, hence the **demand** for cigarettes is relatively **inelastic**.

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Time and Demand Elasticity

- If the price of a product increases, consumers will reduce their consumption by a larger amount in the long run than in the short run.
 - Thus, demand for most products will be more elastic in the long run than in the short run.
 - This relationship is sometimes referred to as the **second law of demand**.

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Elasticity of Demand

Inelastic		Approximately Unitary Elasticity	
Salt	- 0.1	Movies	- 0.9
Matches	- 0.1	Homes, owner occupied (long run)	- 1.2
Toothpicks	- 0.1	Shellfish (consumed at home)	- 0.9
Airline travel (short run)	- 0.1	Oysters (consumed at home)	- 1.1
Gasoline (short run)	- 0.2	Private education	- 1.1
Gasoline (long run)	- 0.7	Tires (short run)	- 0.9
Natural gas, home (short run)	- 0.1	Tires (long run)	- 1.2
Natural gas, home (long run)	- 0.5	Radio and television receivers	- 1.2
Coffee	- 0.3		
Fish (cod), at home	- 0.5	Elastic	
Tobacco products (short run)	- 0.5	Restaurant meals	- 2.3
Legal services (short run)	- 0.4	Foreign travel (long run)	- 4.0
Physician services	- 0.6	Airline travel (long run)	- 2.4
Taxi (short run)	- 0.6	Fresh green peas	- 2.8
Automobiles (long run)	- 0.2	Automobiles (short run)	- 1.2 to -1.5
		Chevrolet automobiles	- 4.0
		Fresh tomatoes	- 4.6

• Can you explain why the demand for some goods is highly inelastic while that for others is elastic.

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How Demand Elasticity and Price Changes Affect Total Expenditures (or Revenues) on a Product

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Total Expenditures and Demand Elasticity

Price elasticity of demand	Elasticity coefficient (in absolute value)	Impact of <i>higher price</i> on total consumer expenditures or a firm's total revenue	Impact of <i>lower price</i> on total consumer expenditures or a firm's total revenue
<i>Elastic</i>	1 to ∞	decrease ↓	increase ↑
Unitary Elastic	1	-- unchanged--	-- unchanged--
<i>Inelastic</i>	0 to 1	increase ↑	decrease ↓

• The table above summarizes the relationship between changes in price and total expenditures for demand curves of varying elasticity.


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Income Elasticity

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Income Elasticity


- **Income elasticity** indicates the responsiveness of a product’s demand to a change in income.

$$\text{Income Elasticity of demand} = \frac{\% \text{ Change in quantity demanded}}{\% \text{ Change in Income}}$$

- A **normal good** is a good with a positive income elasticity of demand.
 - As income expands, the demand for normal goods will rise.
- Goods with a negative income elasticity are called **inferior goods**.
 - As income expands, the demand for inferior goods will decline.

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Income Elasticity of Demand

Low Income Elasticity		High Income Elasticity	
Margarine	- 0.20	Private education	2.46
Fuel	0.38	New Cars	2.45
Electricity	0.20	Recreation and amusements	1.57
Fish (haddock)	0.46	Alcohol	1.54
Food	0.51		
Tobacco	0.64		
Hospital care	0.69		

- Why is the income elasticity of demand for some goods greater than for others?
- What does it mean that the income elasticity of demand for margarine is negative? Can you think of any other goods which you would expect to have a negative income elasticity of demand coefficient?

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Price Elasticity of Supply

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Price Elasticity of Supply

- The **price elasticity of supply** is the percent change in quantity supplied divided by the percent change of the price causing the supply response.
 - analogous to the **price elasticity of demand**
 - If the % change in quantity is small relative to the % change in price, supply is **inelastic**.
 - If the % change in quantity is large relative to the % change in price, supply is **elastic**.
 - However, price elasticity of supply is positive because the quantity producers are willing to supply is directly related to price.

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Questions for Thought:

1. (a) Studies indicate that the demand for Florida oranges, Bayer aspirin, watermelons, and airfares to Europe are elastic. Why?
(b) Why is the demand for salt, matches, and gasoline (*short-run*) inelastic?
2. Are the following statements *true or false*? Explain your answers.
 - (a) A 10% reduction in price that leads to a 15% increase in amount purchased indicates a price elasticity of more than 1.
 - (b) A 10% reduction in price that leads to a 2% increase in total expenditures indicates a price elasticity of more than 1.

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Questions for Thought:

3. Suppose Bobby, the owner-manager of Bobby's Red Hot BBQ restaurant, projects the following demand for his baby-back rib platter:

Price	Quantity purchased
\$9	110 per night
\$11	100 per night
\$13	80 per night

(a) Calculate the price elasticity of demand between \$9 and \$11. Was demand in this price range elastic, inelastic, or unitary?

(b) Calculate the price elasticity between \$11 and \$13. Is it elastic, inelastic, or unitary?

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**End
Chapter 19**

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