

Chapter 6

October-29-11
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ISSUE: WILL TAXING CIGARETTES MAKE TEENAGERS STOP SMOKING

- the more effective the tax is in curbing teenage smoking, the less revenues the government will pile up.
- The more the tax benefits the government, the less it will contribute to health.
- The concept of the elasticity of demand will make this point clearer.

ELASTICITY: THE MEASURE OF RESPONSIVENESS

- **Elasticity** - how economists measure responsiveness of quantity demanded to price changes
- A "touchy" curve is called **elastic** or **highly elastic**
- A steep demand curve indicates consumers hardly respond to price change - **inelastic**
- **Elasticity of demand** - ratio of the percentage change in quantity demanded to the percentage change in price that brings about the change in quantity demanded

$$\frac{\% \Delta \text{ quantity}}{\% \Delta \text{ price}}$$

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- If a 10% rise in price reduces quantity demanded by MORE than 10%, demand is elastic (greater than 1)
- If 10% rise in price reduces quantity demanded by LESS than 10%, demand is inelastic (less than 1)
- Elasticity calculates change in quantity demanded as a percentage of the average of two quantities: quantity demanded before and after price change
- Elasticity formula has two basic attributes:
 - Each of the changes with which it deals is measured as a percentage change
 - Each of the percentage changes is calculated in terms of the average values of the before and after quantities and prices

$$\frac{[(Q_1 - Q_0) / (\text{average of } Q_1 \text{ and } Q_0)]}{[(P_1 - P_0) / (\text{average of } P_1 \text{ and } P_0)]}$$

- When price increases, quantity demanded decreases - when price change is a positive number, quantity demanded will be a negative number
- Each percentage change is taken as an "absolute value" - means calculation drops all minus signs

Price Elasticity of Demand and the Shapes of Demand Curves

- **Perfectly Elastic Demand Curves**
 - Horizontal demand curve
 - Typically occurs when many producers sell a product and consumers can switch easily from one seller to another if a producer raises price
 - Given price change leads to a larger percentage change in quantity demanded
- **Perfectly Inelastic Demand Curves**
 - Completely vertical demand curve - elasticity is zero at every point
 - Consumer purchases don't respond at all to any change in price
 - Given price change leads to smaller percentage change in quantity demanded
- **(Seemingly Simple) Straight-Line Demand Curves**
 - Runs neither vertical nor horizontal
 - Slope of demand curve remains constant throughout - elasticity does not
 - Price elasticity of demand grows steadily smaller as you move from left to right - quantity keeps getting larger
- **Unit-Elastic Demand Curves**
 - Bends in the middle toward origin of graph - at either end it moves close and closer to axes but never touches or crosses them
 - Given percentage price change leads to same percentage change in quantity demanded

PRICE ELASTICITY OF DEMAND: ITS EFFECT ON TOTAL REVENUE AND TOTAL EXPENDITURE

- If demand curve is elastic (elasticity > 1) - price increase will decrease total revenue
- If demand curve is unit-elastic (elasticity = 1) - price increase will leave total revenue unaffected
- If demand curve is inelastic (elasticity < 1) - price increase will increase total revenue
- Total revenue = Price (P) x Quantity Demanded (Q)
- If demand curve is elastic, a firm that raises price will end up selling so many fewer units that its total revenue will fall

ISSUE REVISITED: WILL A CIGARETTE TAX DECREASE TEENAGE SMOKING INDEFINITELY?

- Teenagers are more price sensitive (more price elastic) than adults.
- A 10% increase in price will reduce the number of teenage smokers between 3% and 16.5% and adults by about 2%.
- With elastic demand, relatively fewer teen smokers will remain after the tax, and the government will lose tax revenues.
- Recall the goal of the tax is to change behavior, so government would celebrate reduced revenues.
- But cigarette smuggling that complicates things....

WHAT DETERMINES DEMAND ELASTICITY?

1. Nature of the good
 - Necessities - inelastic demand curves
 - Luxuries - elastic demand curves
2. Availability of close substitutes
 - If consumer can obtain acceptable substitutes for product with price increased, they can switch readily - demand is elastic
3. Share of consumer's budget
 - Inexpensive items that absorb little of consumer's budget - inelastic
4. Passage of time
 - Demand of products is more elastic in long run than in short run

Consequences of the Low Price Elasticity of Food

- Food has an inelastic demand. An increase in supply, from S2 to S1 leads to revenues dropping from \$90 (\$10x9) to 80\$ (\$8x10) .

- Farmers produce more, but they get less \$
- Prices adjust to quantity being demanded to the quantity being supplied - because demand is inelastic, while sales in food units needs to be larger, total sales revenues are smaller

ELASTICITY AS A GENERAL CONCEPT

Income Elasticity

- Quantity demanded depends on consumer incomes
- **Income elasticity of demand** - ratio of the percentage change in quantity demanded to the percentage change in income

$$\text{Income elasticity of demand} = \frac{\% \Delta \text{quantity demanded}}{\% \Delta \text{income}}$$
- **Normal goods** - positive income elasticity
- **Inferior goods** - negative income elasticity

Price Elasticity of Supply

Price elasticity of supply = $\frac{\% \Delta \text{quantity of supply}}{\% \Delta \text{price}}$

Cross Elasticity of Demand

- Measures how much the demand for product X is affected by a change in the price of another good, Y
- Some products make other products more desirable, but some products decrease consumer demand for other products
- Some products naturally go together - cream and sugar increases desirability of coffee and vice versa
- In some extreme cases, neither product ordinarily has any use without the other
- **Complements** - two goods are complements if an increase in quantity consumed of one increases quantity demanded of the other - positive cross elasticity
- **Substitutes** - two goods are substitutes if an increase in quantity consumed of one cuts quantity demanded of the other - negative cross elasticity
- Cross elasticity of demand = $\frac{\% \Delta \text{quantity demanded of X}}{\% \Delta \text{price of Y}}$
- If two substitute products (rivals) exhibit high cross elasticity of demand - neither firm can raise price too much without losing customers to other - no one can legitimately claim either firm has a monopoly

CHANGES IN DEMAND CURVE

- Change in price - movement along demand curve
- Change in any other variable - shift of entire demand curve (i.e. people buying goods at any given price - quantity demanded increases without price change)
- Demand curves shift to right if incomes rise, tastes change in favor of product, substitute goods become more expensive or if complementary goods become cheaper - vice versa if curve shifts left

THE TIME PERIOD...

- A demand curve indicates at each possible price the quantity demanded of a good that is demanded during a particular period in time
- **Optimal decision** - one that best serves the objectives of decision maker - selected by explicit or implicit comparison with possible alternative choices

REAL WORLD APPLICATION

- In the late 1980's, two daily Vancouver newspapers owned by Southam Inc. were facing growing competition for advertising revenue from many smaller newspapers in the lower mainland of British Columbia.
 - In response Southam acquired controlling interest in 13 community/specialized papers.
 - This was seen as violation of the *Competition Act*.
- Based on indirect evidence of substitutability through an assessment of the cross-elasticities of demand, it was concluded that Southam's daily newspapers and the acquired newspapers were sufficiently different markets
- Therefore such acquisitions did not contravene Canada's *Competition Act* since they did not significantly lessen competition in the market for retail print