ECO 101A: Tutorial # 3 (Elasticity & Market)

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1. When changes in price and quantities demanded are large, mid-point method of measuring elasticity of demand with average of initial and subsequent prices and qualities should be used as the basis for measuring percentage changes in them. The midpoint (or, arc) elasticity formula for calculating the response of changes in B to changes in A is given as:

$$\text{midpoint elasticity} = \frac{(B_2 - B_1)}{(B_2 + B_1)/2} \div \frac{(A_2 - A_1)}{(A_2 + A_1)/2}$$

   a) If the price of coffee rises from Rs. 45 per 250 grams to Rs. 55 per 250 grams per pack and as a result the consumer's demand for tea increases from 600 to 800 packs then compute the (arc) cross elasticity of demand of tea for coffee.

   b) A seller supplies 200 kilograms of apples when the price per kg of apples is 120 Indian Rupees. Now, when the price per kg increases to 140 Indian Rupees, the supply expands to 240 kilograms. Compute the (arc) price elasticity of supply.

2. In 2010, Americans smoked 315 billion cigarettes, or 15.75 billion packs of cigarettes. The average retail price (including taxes) was about $5.00 per pack. Statistical studies have shown that the price elasticity of demand is –0.4, and the price elasticity of supply is 0.5.

   a) Using this information, derive linear demand and supply curves for the cigarette market.

   b) In 1998, Americans smoked 23.5 billion packs cigarettes, and the retail price was about $2.00 per pack. The decline in cigarette consumption from 1998 to 2010 was due in part to greater public awareness of the health hazards from smoking, but was also due in part to the increase in price. Suppose that the entire decline was due to the increase in price. What could you deduce from that about the price elasticity of demand?

3. Much of the demand for U.S. agricultural output has come from other countries. In 1998, the total demand for wheat was $Q = 3244 - 283P$. Of this, total domestic demand was $Q_D = 1700 - 107P$, and domestic supply was $Q_S = 1944 + 207P$. Suppose the export demand for wheat falls by 40%.

   a) U.S. farmers are concerned about this drop in export demand. What happens to the free market price of wheat in the United States? Do farmers have much reason to worry?

b) Now suppose the U.S. government wants to buy enough wheat to raise the price to $3.50 per bushel. With the drop in export demand, how much wheat would the government have to buy? How much would this cost the government?

4. Over the last two decades, tuition fees at Purdue University (and many other American universities) have increased by 50%. At the same time, the number of students enrolled has increased from 22,000 to over 35,000. Does this example demonstrate that the Law of Demand is false? Explain why or why not.

5. Research shows that the demand for good X is given by: $Q_x = 1200 - 0.5\ P_x + 0.25\ P_y - 8\ P_z + 0.1\ M$. The prices of related goods are given by $P_y = \$6{,}000$ and $P_z = \$90$, while the average income of individuals consuming this product is $M = \$55{,}000$.

   a) Indicate whether goods Y and Z are substitutes or complements for good X.
   b) Is X an inferior or a normal good?
   c) Determine the inverse demand function for good X.