

Suppose demand and supply

Economics



1) Problem 6: Suppose demand and supply are given by $Q_d = 60 - P$ and $Q_s = P - 20$.

- a) What are the equilibrium quantity and price in this market?
- b) Determine the quantity demanded, the quantity supplied, and the magnitude of the surplus if a price floor of \$50 is imposed in this market.
- c) Determine the quantity demanded, the quantity supplied, and the magnitude of the shortage if a price ceiling of \$32 is imposed in this market.

Solution:

- a. For the equilibrium
 - i) Price: $Q_d = Q_s$
 $60 - P = P - 20 \Rightarrow P = \40 .
 - ii) Quantity: Equilibrium quantity can be found substituting the value of P found in (i). $Q = 60 - 40 = 20$
- b.
 - i) Quantity Demanded = $Q_d = 60 - 50 = 10$
 - ii) Quantity supplied = $Q_s = 50 - 20 = 30$
 - iii) Magnitude of surplus = $Q_s - Q_d = 30 - 10 = 20$
- c.
 - i) Quantity Demanded = $Q_d = 60 - 32 = 28$
 - ii) Quantity supplied = $Q_s = 32 - 20 = 12$
 - iii) Magnitude of surplus = $Q_d - Q_s = 28 - 12 = 16$

2) Problem 11: You are the manager of a midsized company that assembles personal computers. You purchase most components-such as random access memory (RAM) - in a competitive market. Based on your marketing research,

consumers earning over \$80000 purchase 1.5 times more RAM than consumers with lower incomes. One morning, you pick up a copy of wall street journal and read an article indicating that input components for RAM are expected to rise in price, forcing manufacturers to produce RAM at a higher unit cost. Based on this information, what can you expect to happen to the price you pay for RAM?

Solution:

Based on the information given, a general equation can be derived as below:

Let C_g be the purchase of consumer with income greater than \$80000 and C_l be the consumer with income less than \$80000, and R be the quantity of RAM. $C_g - C_l = 1.5 R$

As per the article, the Ram will be produced at a higher unit price, but the article doesn't state whether the selling price of RAM will increase or not. The RAM producers may continue working with a lower profit margin in order to gain more market share. So, it cannot be concluded about the price change based on this information. Also interesting to read about Demand and Supply Wii console case study answers

Would your answer change if, in addition to this change in RAM input prices, the article indicated that consumer incomes are expected to fall over the next two years as the economy dips into recession? Explain. As the quantity of RAM purchased is dependent on the number of consumers with a certain income, the dip in salary will result in a lesser number of consumers in the bracket with a salary more than \$80000. That means, as per the Law of Demand there will be lesser demand for RAM, which will further result in an

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increase in the selling price of RAM as sellers will look forward to earning profit by raising the price.

CHAPTER 3:

1) Answer the following questions based on the accompanying diagram.

- a) How much would the firm's revenue change if it lowered the price from \$12 to \$10? Is demand elastic or inelastic in this range?
- b) How much would the firm's revenue change if it lowered the price from \$4 to \$2? Is demand elastic or inelastic in this range?
- c) What price maximizes the firm's total revenues? What is the elasticity of demand at this point on the demand curve?

Solution:

- a) Revenue at \$12 = $12 \times 1 = \$12$
 Revenue at \$10 = $10 \times 2 = \$20$
 Change in revenue = $\$20 - \$12 = \$8$. Using the Mid point elasticity method, elasticity for this range is:
 $\frac{\{(Q_2 - Q_1) / (Q_2 + Q_1) / 2\}}{\{(P_2 - P_1) / (P_2 + P_1) / 2\}} = 3.66$. Clearly the curve in this range is relatively elastic as $E > 1$.
- b) b) Revenue at \$4 = $4 \times 5 = \$20$
 Revenue at \$2 = $2 \times 6 = \$12$
 Change in revenue = $\$20 - \$12 = \$8$. Using the Mid point elasticity method, elasticity for this range is:
 $\frac{\{(Q_2 - Q_1) / (Q_2 + Q_1) / 2\}}{\{(P_2 - P_1) / (P_2 + P_1) / 2\}} = 0.274$. Clearly the curve in this range is relatively inelastic as $E < 1$.

- c) The firm's revenue will be maximum when the demand and price are in equilibrium i. e the midpoint of the line with coordinates (0, 14) and (6, 2), which is (3, 8). So a price of \$8 will ensure maximum revenue for the firm. Elasticity of demand at this point is 1.

14) If Starbucks's marketing department estimates the income elasticity of demand for its coffee to be 2.6, how will the prospect of an economic boom (expected to increase consumers' incomes by 6% over the next year) impact the quantity of the coffee Starbucks expects to sell?

Solution:

From the concept of income elasticity, we know that $E_i = \frac{\% \text{ Change in Quantity}}{\% \text{ change in Income}}$. So, $2.6 = \frac{\% \text{ Change in demand}}{6\%} \Rightarrow \% \text{ change in Demand} = 15.6\%$. So with 6% change in consumer income, we expect an increase of 15.6% increase in demand.

15) You are a division manager at Toyota. If your marketing department estimates that the semiannual demand for the Highlander is $Q = 150000 - 1.5P$, what price should you charge in order to maximize revenues from sales of the Highlander?

The graph of this equation can be as below:

When the price is \$0, 150000 units can be sold, whereas at the price of \$100000, we are expected to sell 0 units. Which gives the coordinates as (0, 150000) & (100000, 0)

Toyota can earn maximum revenue at the mid pint of this Curve when the value of elasticity is 1.

Midpoint (Q, P) = (75000, 50000)

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So Toyota can earn maximum revenue from Highlander

If a price of \$50,000 is charged. Solve also the following problem:

Read the gasoline article 'Why the Tepid Response to Higher Gasoline Prices?' uploaded on Blackboard, and answer the following questions:

1. What are the (research-based) estimates of the short-run and long-run price elasticity of demand for gasoline?
2. What are the estimates based on the recent experience?
3. What is the 'puzzle' mentioned in the article?
4. What are the (potential) explanations for the 'puzzle'?
5. What are the policy implications of these explanations?

Solution:

1) The short-run elasticity is estimated to be between 0.1 and 0.2, which can be calculated by $E = \% \text{ change in demand} / \% \text{ change price}$.

Similarly for long-run elasticity is estimated to be between 0.5 and 1.

2) Based on the recent experience elasticity was estimated as $3.5\% / 55\% = .0636$.

3) The 'puzzle' mentioned in the article is a 10% increase in gasoline consumption when gasoline prices surged by 53% from 1998 to 2004. As per

Law of demand, the consumption of gasoline should have decreased with the increase in the price of gasoline.

4) There are three factors cited in the article that leads to an explanation of this puzzle:

- a) Many consumers viewed the recent price increase as temporary and didn't shift to fuel-efficient alternatives. This view was probably based on the experience in the 1980s and 1990s when the price increase didn't last.
- b) As per Pinelopi Goldberg, with the increase in gas prices, the car companies lowered the big car prices.
- c) Also, as the income grew significantly in the late 1990s, income growth meant spending on gasoline had become a smaller share of the cost of driving.

5) The two ways to curb fuel consumption is to either increase the fuel tax or to put miles per gallon standards on vehicle manufacturers. But if the increase in fuel tax fails to curb the consumption, vehicle manufacturers will be forced to manufacture vehicle fleets with specified miles per gallon. The advantage of fuel tax is it generates revenue for the state even when the consumption drops, whereas the new rules can be applied only on new vehicles.