

14.01 Fall 2010
Problem Set 1

1. (25 points) For each of the following scenarios, use a supply and demand diagram to illustrate the effect of the given shock on the equilibrium price and quantity in the specified competitive market. Explain whether there is a shift in the demand curve, the supply curve, or neither.
 - (a) (5 points) An unexpected temporary heat wave hits the East Coast. Show the effect in the ice cream market in New England.
 - (b) (5 points) The government introduces a tax on ice cream which is paid by producers. What is the effect in the ice cream market?
 - (c) (5 points) China and Mexico are major producers of textiles. Workers in Mexico decide to go on strike. Show the effect on the market for Mexican textiles.
 - (d) (5 points) Show the effect of the situation described in (c) on the market for Chinese textiles.
 - (e) (5 points) Suppose the government imposes a price cap on bottled water. Show the effect in the bottled water market.

Problem 1 courtesy of William Wheaton. Used with permission.

2. (20 points) For each of the following pairs of goods, identify which one you would expect to have more own-price elastic demand. Please explain your reasoning.
 - (a) (5 points) Computers (generally) vs. Apple MacBook Pro laptops.
 - (b) (5 points) Stereo headphones (generally) vs. hearing aids.

For each of the following goods, identify whether you would expect demand to be more (own-price) elastic in the short run or the long run. As above, please briefly explain your reasoning.

- (c) (5 points) Retail gasoline in the suburbs of Chicago.
- (d) (5 points) Air conditioning units in Miami Beach, Florida.

Problem 2 courtesy of Luke Stein. Used with permission.

3. (30 points) Consider the market for apple juice. In this market, the supply curve is given by $Q_S = 10P_J - 5P_A$ and the demand curve is given by $Q_D = 100 - 15P_J + 10P_T$, where J denotes apple juice, A denotes apples, and T denotes tea.
 - (a) (7 points) Assume that P_A is fixed at \$1 and $P_T = 5$. Calculate the equilibrium price and quantity in the apple juice market.
 - (b) (7 points) Suppose that a poor harvest season raises the price of apples to $P_A = 2$. Find the new equilibrium price and quantity of apple juice. Draw a graph to illustrate your answer.
 - (c) (8 points) Suppose $P_A = 1$ but the price of tea drops to $P_T = 3$. Find the new equilibrium price and quantity of apple juice.
 - (d) (8 points) Suppose $P_A = 1$, $P_T = 5$, and there is a price ceiling on apple juice of $P_J^* = 5$. What is the excess demand for apple juice as a result? Draw a graph to illustrate your answer.

Problem 3 courtesy of William Wheaton. Used with permission.

4. (25 points) You have been asked to analyze the market for steel. From public sources, you are able to find that last year's price for steel was \$20 per ton. At this price, 100 million tons were sold on the world market. From trade association data you are able to obtain estimates for the own price elasticities of demand and supply on the world markets as -0.25 for demand and 0.5 for supply. **Assume that steel has linear demand and supply curves throughout.**
 - (a) (10 points) Solve for the equations of demand and supply in this market and sketch the demand and supply curves.

- (b) (15 points) Suppose that you discover that the current price of steel is \$15 per ton and the current level of worldwide sales of steel is 150 million tons. The most recent elasticity estimates from the trade association this year are -0.125 for demand and 0.25 for supply. Describe the change in the supply and demand curves over the past year using your diagram from part (a). What sort of event(s) might explain the change?

Problem 4 courtesy of Luke Stein. Used with permission.

MIT OpenCourseWare
<http://ocw.mit.edu>

14.01SC Principles of Microeconomics
Fall 2011

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.