

Problem Set # 1

1) As part of an irrigation project, you need to install several thousand feet of irrigation pipe in ditches dug in land you are improving. You have \$2,000 to spend and you have to both hire labor and rent shovels to do the job (you already have the pipe). You are given the following information.

- A ditch digger is paid a wage of \$60 a day. A ditch digger can dig 300 feet of ditch in a day.
- A shovel rents for \$5.00 per day.
- A pipe layer is paid a wage of \$70 per day. A pipe layer can lay 600 feet of pipe in a day.
- Each ditch digger needs to work with one shovel but pipe layers bring their own tools.

a) Construct an efficient allocation of the \$2,000 - that is, an allocation that allows you to maximize the amount of pipe you can lay with \$2,000. Explain your reasoning.

b) Construct one inefficient allocation of the \$2,000 and explain why it is inefficient.

2) Nicholson and Snyder, 11th edition, pp. 22, Problem 1.1 (for people using the 10th edition, see the end of this problem set)

3) In two separate graphs, illustrate the following changes in the American consumer market for coffee.

- In 2011, excessive rain and cold weather destroy 10 percent of the world's coffee crop. The coffee consumption of the typical American household falls.
- In 2011, the *New England Journal of Medicine* publishes a study showing that drinking more than 1 cup of coffee a day substantially increases the likelihood of men and women of all ages going bald and developing very wrinkled skin. The coffee consumption of the typical American household falls.

There are various dimensions to graphs like these: whether the change in the market equilibrium is caused by a shift in the supply curve or the demand curve, whether the good's price goes up or down, etc. We know that in one dimension – the quantity of the coffee being purchased – the two graphs are similar: The amount coffee purchased falls

in both cases. Briefly explain how and why the graphs differ or are similar in their other dimensions.

4) The readings for this week include a *New York Times* story for August 5, 2010 describing an emergency order barring wheat exports from Russia. Read the article and then use appropriate supply and demand diagrams to illustrate the positions of the Russian and U.S. wheat industries for each of the following dates:

- August 1, **2009** (i.e. roughly one year before the announcement)
- August 1, 2010 (four days before the announcement)

5) In the basic supply-demand graphs we use in class, we describe show the market reaching an equilibrium price in which the quantity supplied equals the quantity demanded.

As the graph below shows, in July 2005 when the economy was fairly strong, there was a roughly constant inventory of about 2.5 million unsold homes throughout the year. Today, there is an inventory of about 4.7 million unsold homes.

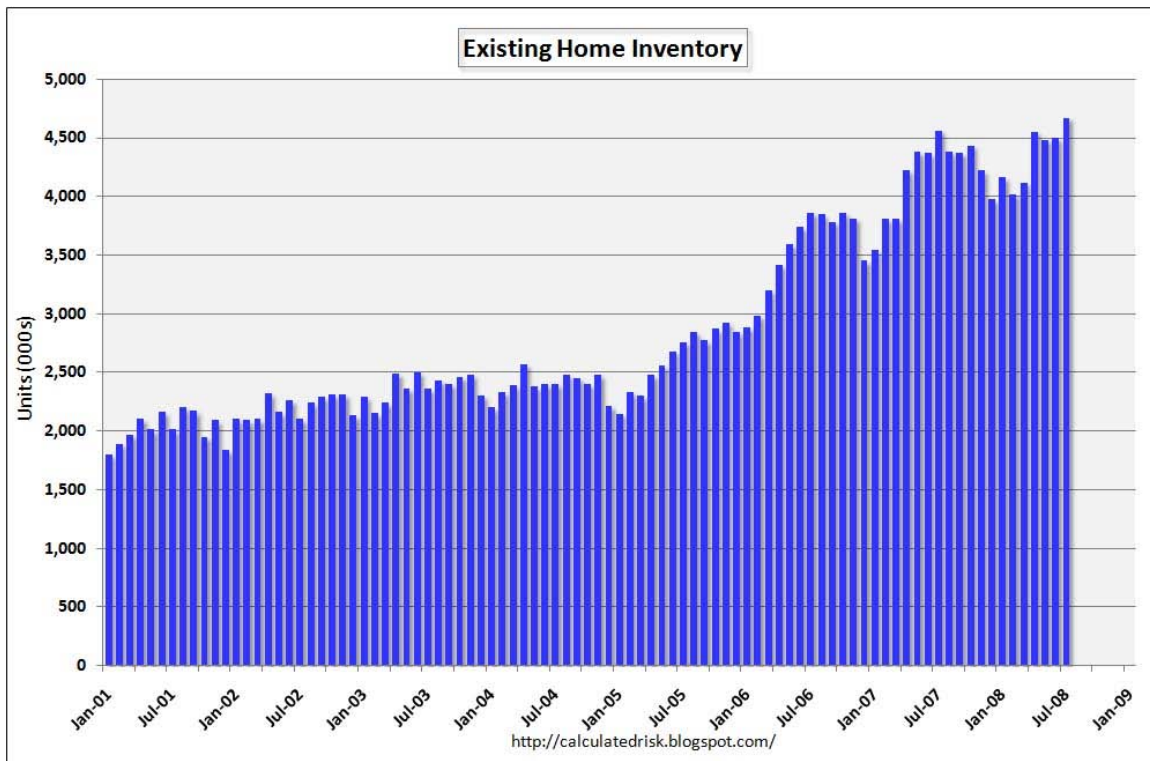


Image courtesy of Bill McBride. Used with permission.

Do these inventories, even in a good year, mean the market for single family homes is always in crisis? Do they mean the single family homes market is in crisis today? Give a brief explanation of what you think was going on in the market in 2005 and what you think is going on today. If it is useful, illustrate your answer with appropriate diagrams.

6) The readings for Tuesday, September 14, include a New York Times story on a proposal by the U.S. postal service to increase the fee for a first class stamp. Read the story and answer the following questions:

a) Below are four possible estimates of the price elasticity of demand for first class mail service. Given the post office's rate proposal, explain which of the estimated elasticities they think must be correct. If the rate proposal is consistent with more than one estimated elasticity, explain why.

$$\varepsilon = +.1$$

$$\varepsilon = +1.3$$

$$\varepsilon = -.2$$

$$\varepsilon = -1.2$$

b) Looking back over the last two decades, how, if at all, would you have expected the growth of email to affect the demand curve for first class mail? In your answer, consider both shifts in the curve and changes in elasticity. Would you expect the development of instant messaging and Twitter to have similar effects on the demand for first class mail? Explain why or why not.

Note for Problem 2: Problem 1.1 in NS 11'th edition begins with the same data as Problem 1.2 in the 10'th edition but substitute the following questions:

a. Graph the points of these supply and demand curves for orange juice. Be sure to put price on the vertical axis and quantity on the horizontal axis.

b. Do these points seem to lie along two straight lines? If so, figure out the precise algebraic equation of these lines. (Hint: If the points do lie on straight lines, you need only consider two points on each of them to calculate the lines.)

c. Use your solutions from part b to calculate the "excess demand" for orange juice if the market price is zero.

d. Use your solutions from part b to calculate the "excess supply" of orange juice if the orange juice price is \$6.00 per gallon.

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

11.203 Microeconomics
Fall 2010

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