

Economics 101
Fall 2011
Homework #3
Due 10/11/11

Directions: The homework will be collected in a box **before** the lecture. Please place your name, TA name and section number on top of the homework (legibly). Make sure you write your name as it appears on your ID so that you can receive the correct grade. Please remember the section number for the section **you are registered**, because you will need that number when you submit exams and homework. Late homework will not be accepted so make plans ahead of time. **Please show your work.** Good luck!

Please realize that you are essentially creating “your brand” when you submit this homework. Do you want your homework to convey that you are competent, careful, professional? Or, do you want to convey the image that you are careless, sloppy, and less than professional. For the rest of your life you will be creating your brand: please think about what you are saying about yourself when you do any work for someone else!

1. Shifting Supply and Demand

Each of the following questions describes a change in one or more markets and asks how these changes affect other markets. Your response should include which curves (supply, demand, or both) shift, in what direction, and what the result is for equilibrium price and quantity. Please include at least one graph for each part.

- (a) We want to study the interactions in the market for Paper, Pens, and Pencils. Pens and Pencils are substitutes for each other, and Paper is a complementary good for both Pens and Pencils. Assume all three goods have upward sloping supply curves and downward sloping demand curves. Assume that each of the described changes is the only change that occurs (e.g., the change described in (i) is not continued into (ii)).
 - i. The price of Paper rises. What happens in the markets for Pens and Pencils?
 - ii. The price of Pens falls. What happens in the markets for Paper and Pencils?
 - iii. The price of Pens falls, while the price of Pencils rises. What happens to the market for Paper?
- (b) If multiple curves are shifting, you may not be able to always determine what's happening to equilibrium price or quantity. In addition to the information requested above, draw at least two graphs for each of the following cases to demonstrate why one part of the equilibrium is undetermined.
 - i. A recent report claimed that apple juice contains high levels of arsenic (a chemical dangerous to human health). News agencies also recently reported that fire blight (a bacterial disease only harmful to apple trees) has struck apples trees in Australia. What can you predict about the market for apples in Australia?

- ii. Amazon.com recently announced that it's selling the Kindle Fire, a device designed to lure customers away from buying the Apple iPad. Rumors are also circulating that Apple has found a way to produce the iPad with less materials (and therefore more cheaply). What do you expect will happen to the market for iPads?

2. Market Supply

Consider the (simplified) market for peanut butter. There are only two producers: Jif and Skippy. They each make identical peanut butter and have unique supply schedules:

- Jif's Supply Schedule: $Q_s = 2P$
- Skippy's Supply Schedule: $Q_s = 4P - 40$

- (a) Graph each brand's individual supply curve.
- (b) Graph the market supply curve for peanut butter.
- (c) What is the equation for the market supply curve for peanut butter?

3. Quota and Deadweight Loss

Consider the market for haircuts in the small town of Harrison, Wisconsin, during a typical day. In this market, hair stylists are producers and any resident of Harrison with hair is a consumer. There is only one type of haircut in Harrison. The demand curve and supply curves for the market for haircuts are given by

Demand: $Q_d = 25 - \frac{1}{2}P$

Supply: $Q_s = 2P$

- (a) Find the equilibrium price and quantity in this market for haircuts.
- (b) Calculate the consumer's surplus and producer's surplus in the market for haircuts. Sum consumer and producer surplus to get the total surplus in the market for haircuts.

Assume now that the government of Harrison imposes a quota of 10 haircuts per day. That is, the government of Harrison is going to limit the number of haircuts per day to a total of 10 haircuts irrespective of the demand for haircuts. To implement this quota, the government requires that hair stylists purchase an operating license that allows them to cut hair.

- (c) For parts (c), (d) and (e) of this question you will find it helpful to draw a graph and then use that graph as a roadmap for the calculations you will be making. At what price will consumers demand exactly 10 haircuts?
- (d) What price must producers receive in order to be willing to sell exactly 10 haircuts?

- (e) The hair stylists will be forced to pass on the cost of the operating license to their customers in order to stay in business. Based on (c) and (d), how much should the government charge hair stylists (per haircut) for the operating license in order to impose the quota of 10 haircuts per day?
- (f) Calculate the consumer surplus, producer surplus, and the total amount of money collected by the town from selling licenses. Add these three numbers to find the total surplus with the quota. You will find it helpful in making these calculations to draw a graph where you label these areas.
- (g) Subtract the new total surplus from the total surplus of the market you obtained in (b) to find the deadweight loss.
- (h) Based on your calculations, do think the quota policy is a good idea? Why or why not?

4. Agricultural Intervention

Use the following information to answer parts (a) through (d).

Consider the market for coconuts in a small island nation. The domestic demand curve (in Dollars) is $P = 140 - 4Q_D$ and the domestic supply curve is $P = 20 + 2Q_S$.

- (a) What is the market equilibrium price and quantity?

PRICE CEILINGS AND FLOORS

- (b) If the government, hoping to help poor consumers, imposes a price ceiling of \$40, what will be the shortage of coconuts in the market? Graph your response.
- (c) What price floor would yield a surplus of 9 coconuts?

PRICE SUPPORT PROGRAMS

- (d) Suppose the government price target is \$80, which they plan to accomplish by use of a price support program. How many coconuts will the government have to buy with this program, and how much will the program cost the government? Graph your results, and shade the region corresponding to total government cost.

5. International Trade

Let's say the U.S. has the following supply and demand curves for oil where quantity is measured in millions of barrels of oil and price is measured as price per barrel of oil:

Supply: $Q_s = (1/5)P$

Demand: $Q_d = 30 - (1/10)P$

In your answers please make sure you provide accurate units of measurement!!

- (a) Assuming the U.S. does not export or import any oil, find the equilibrium price and quantity for U.S. oil.
- (b) Calculate consumer surplus, producer surplus, and total surplus.
- (c) Now suppose the U.S. allows oil to be imported and exported. If the world price is \$200 per barrel of oil, what are the new consumer surplus, producer surplus, and total surplus when this market opens to trade? Is the U.S. importing or exporting oil?
- (d) Recalculate the consumer surplus, producer surplus, and total surplus if the world price is \$50 per barrel of oil. Is the U.S. importing or exporting oil?
- (e) With the world price at \$50, the U.S. decides it wants to reduce its dependence on foreign oil so it places a tariff on imported oil of \$10 per barrel of oil. Find consumer surplus, producer surplus, government revenue (from the tariff), and deadweight loss.
- (f) If the world price is still \$50 per barrel of oil and the U.S. instead institutes a quota (a limit on the quantity imported) of barrels of 9 million barrels, what are the new consumer surplus, producer surplus, license holder revenue and deadweight loss?