

Economics 101
Fall 2017
Homework #2
Due Tuesday, October 10, 2017

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.
- Late homework will **not** be accepted so make plans ahead of time.
- **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, and 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 submit any work for someone else.

Part I: PPF, Opportunity Cost, Trading prices, Comparative and Absolute Advantage

1) In the land of Ruritania there are two tribes growing wheat and corn. Tribe A has 100 workers and Tribe B has 200 workers. Assume that both tribes have linear production possibility frontiers. The workers in Tribe A can grow 1,000 tons of wheat or 600 tons of corn annually. The workers in Tribe B can grow 800 tons of wheat or 400 tons of corn annually.

a. Plot the production possibility frontier (PPF) of each tribe in separate graphs, with wheat on the horizontal axis and corn on the vertical axis (restrict your attention to the first quadrant: that is, consider only values equal to or greater than zero for wheat and corn). Write each tribe's PPF as an equation.

b. Which tribe has the absolute advantage in the production of corn and in the production of wheat? Which tribe has the comparative advantage in the production of corn and in the production of wheat? State each tribe's opportunity costs for the production of one ton of wheat and for the production of one ton of corn.

c. Plot the joint PPF of both tribes in a graph with wheat on the horizontal axis and corn on the vertical axis (restrict your attention to the first quadrant: that is, consider only values equal to or greater than zero for wheat and corn). Write the joint PPF as an equation.

d. What is the range of acceptable trading prices for one unit of wheat and one unit of corn between the two tribes? Explain your answer.

e. Suppose Tribe B makes a major breakthrough in agricultural technology and develops a faster growing type of corn. All other attributes of the corn are exactly the same. Tribe B can now grow with the same number of workers 800 tons of wheat or 800 tons of corn annually or any combination of corn and wheat that are on the straight line including these two production points. Describe the changes to the opportunity cost of producing one ton of each good, absolute advantage, and comparative advantage that arise from this technological breakthrough.

f. Plot the new joint PPF after the change to corn production in tribe B. Write the new equation for the joint PPF.

g. A new Tribe, C, is discovered in a distant part of Ruritania. Tribe C has 150 workers and it can grow 900 tons of wheat or 450 tons of corn annually or any combination of corn and wheat that lie on the line including these two provided points. What are Tribe C's opportunity costs for the production of one ton of wheat and one ton of corn? Plot the new joint PPF of all the tribes in Ruritania (assuming tribe B can grow more corn as in (d)-(f)).

Part II: Demand and Supply Shifts

2) Suppose there are two types of smartphones in the economy: the iPhone and the Galaxy. The quantity demanded for each type of smartphone decreases as price increases and the quantity supplied for each type of smartphone increases as price increases. The two smartphones are substitutes for one another. Initially the markets for both types of smartphones are in equilibrium.

In each of the following questions describe the change to the demand and the supply (this could be a demand shift, a supply shift, a change in the quantity demanded, and/or a change in the quantity supplied) for both types of smartphones and explain how the equilibrium prices and quantities changed compared to the initial equilibrium prices and quantities for these two types of smartphones.

Before each scenario assume the market for these two smartphones has returned to the initial, original equilibrium.

a. Suppose there have been reports of several incidents of Galaxy phones igniting while being charged. These reports have caused a panic and badly hurt the reputation of Galaxy smartphones and consumers' willingness to buy this smartphone. Consumers are now more inclined to buy iPhones.

b. A critical component of the iPhone is a chip produced by Apple. Suppose that Apple recently closed a major factory due to financial difficulties, causing a halt in the production of this chip. This event negatively affects the number of iPhones in the market. Furthermore, many consumers were employed in the Apple factory and are now facing a lower income due to their loss of employment.

c. Suppose a new federal regulation regarding ionizing radiation in smartphones is implemented and this implementation increase consumers' confidence in this product and they are now more inclined to buy a smartphone. However, this regulation also resulted in additional compliance costs for the producers, raising their production costs.

d. Suppose a new technology becomes available, reducing the production costs for both types of smartphones. At the same time the new technology reduces the price of tablets. Tablets are produced by Apple and they are substitutes to the Galaxy smartphone, but complements to the iPhone.

e. Not yet recovered from the effect of the igniting Galaxy phones, consumers decide to replace their Galaxy phones with a different model if their income will allow it. Fortunately, Apple just opened a new factory producing the necessary iPhone chip, so many consumers also got rehired at this factory. Furthermore, the number of iPhones in the market has risen thanks to the increase in the production of the chips.

Part III: Price Ceiling and Price Floor

3) In 2011 the government of Israel decided to abandon price supervision of cottage cheese. As a result, the price of cottage cheese jumped, causing public protests and widespread riots against the government. After public pressure, the government reinstated a price ceiling on cottage cheese.

a) Assume the demand for cottage cheese is a downward sloping line (that is, as price increases the quantity demanded of cottage cheese decreases holding everything else constant), and the supply of cottage cheese is an upward sloping line (that is, as price increases the quantity supplied of cottage cheese increases holding everything else constant). Plot the demand and supply curves for cottage cheese in a graph measuring the quantity of cottage cheese on the horizontal axis and the price of cottage cheese on the vertical axis. Mark the equilibrium price in this market (assume it is a competitive market) as P_1 and the equilibrium quantity in this market as Q_1 . On the same graph, indicate how a price ceiling would change the quantities demanded and supplied and the prices consumers and producers face. Mark the price ceiling price as P_2 and the price ceiling quantity as Q_2 .

b) What are the changes in consumer surplus, producer surplus and total welfare (in this example, total welfare = consumer surplus + producer surplus)?

c) Assume that the demand for cottage cheese is given by the equation:

$$P = 10 - \frac{1}{2}Q$$

where P is the price of cottage cheese measured in dollars and Q is the quantity demanded of cartons of cottage cheese. The supply is given by the equation:

$$P = \frac{3}{10}Q + 2$$

The government's price ceiling is set at $P = \$3.50$ per carton of cottage cheese.

Plot the demand and supply for cottage cheese. Indicate clearly the point of competitive equilibrium and the points of consumption and production with the price ceiling. What are the price and quantity in the competitive equilibrium? What are the prices and quantities with a price ceiling?

d) Calculate the consumer surplus, producer surplus, and deadweight loss. Who is better off due to the price ceiling and who is worst off, and why? What is the change in social welfare (consumers and producers) after the price ceiling is established and why? Here is a table where you can organize your answers to these questions.

	Before price ceiling	After price ceiling	Change
Consumer Surplus			
Producer Surplus			
Deadweight Loss			
Social Welfare			

e) In an attempt to increase competition in the dairy market, the government lifts restrictions on the import of dairy goods. However, this hurts local farmers, who have a strong lobby. In order to help farmers, the government decides to set a price floor at $P = \$7$ per carton of cottage cheese. Disregarding any changes described in the previous questions, repeat parts (c) and (d) with the price floor instead of price ceiling. Assume the demand and supply curves are given by the above equations. Here is a table where you can put some of the required answers for this question. Note that there are more questions to answer than are summarized in this table!

	Before price floor	After price floor	Change
Consumer Surplus			
Producer Surplus			
Deadweight Loss			
Social Welfare			

Part IV: Agricultural Markets: Price Support and Price Guarantee Systems

4) The government conducts a large-scale research study and concludes that there are health benefits to eating kale. Officials in the Department of Agriculture propose a plan to support farmers who grow kale. Under this program, the government will buy any excess quantity of kale at a price that will be determined. The demand for kale is given by $P = 10 - 2Q$ and the supply

for kale is given by $P = 2Q$, where P is the price of kale per pound measured in dollars and Q is the quantity of kale in millions of lbs.

- a. What are the price and quantity of kale in a competitive equilibrium, before any government intervention? Plot the supply and demand curves and the point of equilibrium in a graph.
- b. The government decides to buy any excess supply from farmers at a price of \$6 per pound of kale. Given the implementation of this program, what quantity would be purchased by consumers? What quantity would be purchased by the government? Given this program, how much do consumers spend on kale? What is the cost to the government of this program? What is the total revenue to the farmers from this program?
- c. In light of the costs of the price support program, the government decides to cancel the program and instead initiate a price guarantee program. Under this program the government will ensure that consumers can purchase the total quantity of kale in the economy that farmers are willing to produce at a price of \$6 per pound of kale by subsidizing the producers of kale so that they receive \$6 per pound of kale after receipt of the subsidy. This is the amount that you computed in part (b). In order to develop this plan, the government hires a strategic consulting firm that was paid for this project 25% of the total subsidy the government paid to the farmers. Given this program, what quantity of kale would be purchased by consumers? What is the price per pound of kale to consumers with this price subsidy program? What is the price per pound of kale for farmers given this price subsidy program? Given this program, what is the consumer expenditure on kale? What is the cost to the government of this subsidy program? What is the total revenue to the farmers given this subsidy program?
- d. Compare the two programs. Which program would consumers prefer? Which program would producers prefer? Which program would the government prefer?
- e. Besides the cost of the programs to the government, what other considerations could impact the government's choice between the price support and the price guarantee program? Explain your answer fully and completely.