**Economics 101**

**Fall 2014**

**Answers to Homework #3**

**Due 10/30/14**

**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. Write legibly throughout the whole homework. 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 **for which 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 to insure that your homework is submitted. Good luck!

Your homework reflects you: please make sure that you submit a neat, organized, and legible set of answers!

Remember to show all your work. Also remember that calculators are not permitted on the exam, so you should try to do these questions manually (though you may use a calculator on question 5).

**Part I: Excise Tax**

1. Consider the ice cream market in Madison. In July, the ice cream market demand and supply curves are given by the following equations where Q is the quantity of ice cream units and P is the price in dollars per unit of ice cream:

Demand: Q = 14000 – 10P

Supply: Q = 2000 + 20P

a) Find the equilibrium price and quantity of ice cream in July.

b) Calculate the price elasticity of demand and supply at the equilibrium price in July. Use the point elasticity formula to compute the values of these two elasticities.

In October, ice cream demand in Madison decreases. So, the new demand curve is given by

Demand: Q = 7000 – 30P

Assume the supply curve doesn’t change.

c) Find the equilibrium price and equilibrium quantity in October, and calculate the price elasticity of demand and supply at this new equilibrium price. Use the point elasticity formula in calculating these values.

Let’s return to the July. Suppose that the city of Madison imposes on producers an excise tax of $15 per unit of ice cream.

d) For part (d), answer this set of questions based upon this new tax and the demand and supply curves you have been given in this problem.

1. How does this excise tax affect the supply curve for ice cream producers in Madison? Explain your answers in words as well as in an equation.
2. Then, calculate the new equilibrium price and quantity in July for this ice cream market.
3. Then, calculate the new equilibrium price and quantity in October for this ice cream market.

e) Calculate the consumers’ tax burden ratio in July and in October given your answers in (d) and then analyze the answers you get for these two calculations by filling out the table provided and then writing a verbal explanation of the difference you find with regard to the two consumers’ tax burden ratios. Your explanation should include the impact of demand and supply elasticities on these calculations. The tax burden ratio can be found by using the following equation:

Consumers’ tax burden ratio = (consumers’ tax incidence)/(total tax revenue)

Here is a table that will help you organize your data:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| July | | | October | |
|  | No Tax | Tax | No Tax | Tax |
| Price |  |  |  |  |
| Quantity |  |  |  |  |
| Price Elasticity of Demand |  | --- |  | --- |
| Price Elasticity of Supply |  | --- |  | --- |

**Part II: International Trade**

2. Suppose the domestic demand in the United States for glow-in-the-dark golf balls can be represented by the following domestic demand curve and domestic supply curve equations where P is the price per glow-in-the-dark golf balls and Q is the quantity of glow-in-the-dark golf balls”

Domestic Demand Curve: Q = 40 – 5P for 0 ≤ P ≤ 8 ; Q = 0 for 8 ≤ P

Domestic Supply Curve: Q = 10P – 20 for 2 ≤ P ; Q = 0 for P ≤ 2

a) Calculate the equilibrium price, quantity, consumer surplus and producer surplus for the domestic market for glow-in-the-dark golf balls when the United States is in autarky (i.e. the market is closed to trade). Illustrate your answer graphically.

b) Suppose now that the United States opens the market to international trade and that the world price for glow-in-the-dark golf balls is $2 per golf ball. Further, suppose the United States market for such golf balls is small relative to the global market. Given this information, what will be the new price of glow-in-the-dark golf balls in the US market? How many glow-in-the-dark golf balls will be consumed domestically? How many glow-in-the-dark golf balls will be produced domestically? How many glow-in-the-dark golf balls will be imported/exported? Calculate the new consumer and producer surplus. Illustrate your answers graphically.

c) Suppose the United States government decides to attempt to support domestic producers of glow-in-the-dark golf balls by implementing a tariff of $1 per imported glow-in-the-dark golf balls. What will be the new price of glow-in-the-dark golf balls in the US when this tariff is implemented? How many glow-in-the-dark golf balls will be consumed domestically? How many glow-in-the-dark golf balls will be produced domestically? How many glow-in-the-dark golf balls will be imported/exported given this tariff? Calculate the new consumer and producer surplus, government revenue, and deadweight loss, if any, from the imposition of this tariff. Illustrate your answer graphically.

d) Suppose instead of a tariff, the US government decides to implement an import quota of 15 glow-in-the-dark golf balls. What will be the new price of glow-in-the-dark golf balls? How many glow-in-the-dark golf balls will be consumed domestically? How many glow-in-the-dark golf balls will be produced domestically? How many will be imported/exported? Calculate the new consumer and producer surplus, government revenue, license-holder revenue, and deadweight loss, if any. Illustrate your answer graphically.

e) Suppose the US government decides to sell a single license to an importer granting the right to import and sell all the imported glow-in-dark golf balls up to the import quota of 15 golf balls. At most how much would a seller be willing to pay in order to purchase the license to sell glow-in-dark golf balls? Explain your answer.

3. You are not required to illustrate your answers to this question, but it is never a bad idea. Suppose, circa 4th century BCE, the domestic demand in Macedon, for spears (specifically, *sarisas)* can be expressed by

Domestic Demand: Q = 10000 – 20P for 0 ≤ P ≤ 500; 0 for 500 ≤ P

Domestic Supply: Q = 25P – 1250 for 50 ≤ P; 0 for P ≤ 50

where Q is the number of spears, and P is the price of a spears in dollars (imagine for the moment that 4th century BCE Macedon used dollars as a currency).

a) Calculate the equilibrium price, quantity, consumer surplus and producer surplus for the domestic market for spears when Macedon is a closed economy (an autarky).

b) Suppose Phillip II (the king) decides to open the market for spears in Macedon. Suppose the world price for a spear is $300. What will be the new price of spears? How many spears will be consumed domestically? How many spears will be produced domestically? How many spears will be imported/exported? Calculate the new consumer and producer surplus given this information.

**Part III: Elasticity**

4. This set of questions focuses on percentages and elasticity.

a) Suppose your hourly wage decreases from $25 to $20. What is the regular percentage decrease in your wage given this information?

b) Suppose your hourly wage increases from $20 to $25. What is the regular percentage increase in your wage given this information?

c) Suppose Mr R’s demand for pizza decreases from 10 pizzas to 7 pizzas when the price increases from $5 per pizza to $6 per pizza. What is his price elasticity of demand for pizza? Use the arc elasticity of demand formula to calculate this price elasticity of demand.

d) Mr R’s demand for sandwiches increases from 15 sandwiches to 18 sandwiches when the **price of pizza** increases from $5 to $6. What is his cross price elasticity of sandwiches for pizza? Are these two goods complements or substitutes? Use the standard formula for percentage change to calculate this cross price elasticity value.

e) In 2001 France uses the franc as national currency. The demand for cheese in France is 100 units of cheese when the price is 20 francs per unit of cheese and the demand for cheese is 130 units of cheese when the price of cheese decreases to 15 francs. What is the price elasticity of demand for cheese given this information? Use the arc elasticity formula to calculate this value.

f) In 2002, France starts using the euro as its currency. The exchange rate for francs to euro is 5 francs = 1 euro. So, in terms of euro, the demand for cheese is 100 when the price is 4 euros, and the demand becomes 130 when the price decreases to 3 euros. What is the price elasticity of demand for cheese given these new prices? Compare your results to part (e). Use the arc elasticity formula to calculate the price elasticity of demand.

g) Suppose you are a producer who knows with certainty that the demand for your product is given by the following linear demand curve equation where P is the price per unit and Q is the number of units demanded:

Demand: Q = 1000 – 10P

If maximizing revenue is your sole goal, what is the best price to charge demanders for this good? What quantity will be demanded at this price? And, what will be your total revenue?

**Part IV: Real vs. Nominal Quantities**

5. Consider the following table of *nominal* prices in a fictional version of Madison over time:

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Shirts** | **Bread** | **Diamonds** |
| 2009 | $25.00 | $5.00 | $100.00 |
| 2010 | $22.00 | $5.50 | $90.00 |
| 2011 | $22.50 | $6.00 | $92.00 |
| 2012 | $24.00 | $6.00 | $120.00 |
| 2013 | $23.00 | $6.50 | $115.00 |

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uppose a typical consumer basket throughout the year consists of 5 shirts, 55 loaves of bread, and 1 diamond.

a) Using the above information, calculate the cost of the market basket for each of the given years and enter your calculations in the table below:

|  |  |
| --- | --- |
| Year | Cost of Market Basket |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

b) Using 2009 as the base year, calculate the CPI for each year using a 100 point scale.

c) Using the CPI calculated in part (b), calculate the annual rate of inflation starting with the annual rate from 2009 to 2010.

d) Using the CPI calculated in part (b), calculate the *real* price of diamonds in 2012 (out to two places past the decimal) using 2009 dollars (that is, you are converting the 2012 price of diamonds measured in 2012 dollars into the 2012 price of diamonds measured in 2009 dollars).

e) Suppose we do not know the nominal price of shirts in 2008, but we do know that a loaf of bread cost $4.00 and a diamond cost $60.00. Additionally, we know that the rate of inflation from 2008 to 2009 was 25%. What was the cost of a shirt in 2008? To answer this question you should assume that the defined market basket has not changed and that you have access to all the data provided or calculated in the problem thus far.

f) Describe a procedure to compare the cost of living in Madison to the cost of living in Chicago for a given year.

**V. Surfing the Web, Data Sets, and Occupational Choice:**

## 6. Professor Kelly and her husband are working on a new blog for people interested in economics but who are not career economists. So, for this question we have you going to the web and doing a bit of reading and then some research. Here are the directions:

## Go on the web and google “Life’s Curiosities: An Economist’s Perspective”.

## Once you are on this page click on “Careers” and read “Is There Data Available to Help You Evaluate Occupational Choices?”

## Once you have read this entry in its entirety go to the websites that are mentioned and research a potential career of interest to you. Then, answer the following questions.

## a) What career did you pick? Why did you pick it?

## b) What was the “outlook” for the career you picked? What does this “outlook” mean? Were you aware of this “outlook” for the career you selected?

## c) Determine the level of income earned in this occupation in a particular state (tell us what state you are choosing) by the bottom 10% of the people working in this occupation, the median income, and the income earned by the 90 percentile. Put this information into a nice organized table.

## d) Write a paragraph about what you learned by doing this reading and this research.

## e) Was this a helpful exercise for you-that is, did you find it interesting, revealing, and helpful? Explain your answer beyond a simple “Yes”, “No”, or “Whatever”.

## Note: it would be really surprising if everyone in the class research an occupation starting with the letter “A”; it would be really strange if the same occupation kept coming up on every student’s paper…so, you can work with a friend, but you better pick a separate, and different, occupation to research!

## Note: if you found this interesting and fun, let Prof. Kelly know: she would like to use all 800 of you as a kind of “focus group” in what she hopes is a good experience for people who are thinking about their career paths!