Economics 101

Summer 2013

Homework #5

Due Wednesday, June 19, 2013

**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. **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. Suppose there are two companies, Quality Products and Perfection Performed, in a market that compete with one another. Both firms are trying to decide independently of one another whether they should engage in an advertising campaign or not. If Quality Products advertises while Perfection Performed does not advertise, Quality Products will earn profits of $1000 while Perfection Performed will earn profits of $0. If Quality Products advertises and Perfection Performed also advertises, each firm will earn $500 in profits. The payoffs for advertising or not advertising for Perfection Performed are symmetric to those facing Quality Products. . Finally you know that when both firms decide not to advertise they each earn $700 in profits. Use this information to complete the payoff matrix below.

 Perfection Performed

|  |  |  |
| --- | --- | --- |
|  Quality Products | Advertise | Not Advertise |
| Advertise |  |  |
| Not Advertise |  |  |

a. Complete the above matrix given the information provided in this question.

b. If Perfection Performed and Quality Products cooperate with one another, which choice of strategy for each firm will result in the greatest joint profits?

c. What is the dominant strategy for Quality Products?

d. What is the dominant strategy for Perfection Performed?

e. What do you predict will be the outcome of this “game” given the above information? What will the value of joint profits be given this predicted outcome?

2. Consider the market for gasoline in the country of Good Will. The market for gasoline in this country is currently described by the following demand and supply equations:

Demand: Q = 50,000 – 5000P

Supply: Q = 20,000P

where P is the price per gallon of gasoline and Q is gallons of gasoline. Although the good citizens of Good Will are aware that consuming gasoline creates externality costs on their society the current gasoline market does not incorporate any of these externalities.

a. Describe at least four possible externality costs associated with the consumption of gasoline.

b. Given the externality costs you delineated in (a), where do you think the marginal social cost of gasoline curve is relative to the given supply curve? That is, are the two curves the same, is the marginal social cost of gasoline curve to the right of the market supply curve, or is the marginal social cost of gasoline curve to the left of the market supply curve?

c. Given the above information, what is the current market equilibrium quantity and price?

d. Suppose that the government analyzes the externality costs in this market and concludes that the market should ideally result in 20,000 gallons of gasoline being consumed if all the externalities associated with gasoline consumption were internalized in the market. Assuming the externality costs are per unit of usage of gasoline and are constant, what is the externality cost per gallon of gasoline consumed?

e. Suppose the government elects to impose a tax to internalize the externality. How big an excise tax would the government need to impose in order to address the externality that you measured in (d)?

3. Marty and Palmer are the only residents in their community. They are currently trying to decide how many streetlights should be installed in their community. Marty and Palmer both recognize that streetlights once they are installed are non-rival: that is, once the streetlight is installed and lit, everyone can enjoy consuming the benefits of the streetlight without affecting the level of consumption benefits available to other individuals in the community. They also recognize that streetlights are non-exclusive: that is, streetlights are apt to be under demanded as each individual in the community realizes that even if they do not pay for the streetlight they will still be able to enjoy consuming the benefits from the streetlight once it is installed and lit. Marty and Palmer have both decided to not free ride and take advantage of the non-exclusivity of the streetlight: they each are willing to fully reveal their willingness to pay for streetlights. Marty and Palmer’s demands for streetlights are given in the equations below where Q is the quantity of streetlights and P is the amount per streetlight they are willing to pay.

Marty’s Demand for Streetlights: P = 10 – (1/2)Q

Palmer’s Demand for Streetlights: P = 10 – Q

You also know that the MC of providing an additional streetlight is $4 per streetlight. Assume that this MC curve reflects the marginal social cost of providing streetlights.

a. In a diagram with the graphs vertically “stacked” on top of one another draw three graphs: in the top graph draw Marty’s demand curve, in the middle graph draw Palmer’s demand curve, and in the bottom graph draw the market demand curve for streetlights. Remember that these streetlights are public goods: this implies that you will need to vertically sum the individual demand curves to get the market demand curve. That is, select a quantity and ask how much Marty and Palmer will each pay to install this amount of streetlights-remember that the streetlights are non-rival so the critical thing here is that each of these individuals will contribute together for the purchase of this quantity of streetlights since they can both consume the benefits from this level of streetlights simultaneously.

b. In your graph draw in the MC curve for streetlights.

c. Mark the socially optimum amount of streetlights on your graph. Then determine how much Marty will pay per streetlight and how much Palmer will pay per streetlight.

Now, suppose that the MC of providing a streetlight increases and is now $8 per streetlight.

d. Given this new MC of providing a streetlight, what is the socially optimum amount of streetlights? How much will Marty pay per streetlight and how much will Palmer pay per streetlight?