Public Economics

Fall 2020

Practical Session V

Public Goods

1. Think about the rival and excludable properties of public goods. To what degree is radio broadcasting a public good? To what degree is a highway a public good?

2. To determine the right amount of public good to provide, the government of West Essex decides to survey its residents about how much they value the good. It will then finance the public good provision by taxes on residents. Describe a tax system that would lead residents to underreport their valuations. Describe an alternative system that could lead residents to overreport their valuations.

3. The town of Musicville has two residents: Bach and Mozart. The town currently funds its free outdoor concert series solely from the individual contributions of these residents. Each of the two residents has a utility function over private goods (X) and total concerts (C) of the form $U = 3 \log(X) + 2 \log(C)$. The total number of concerts given, C, is the sum of the number paid for by each of the two persons: C = CB + CM. Bach and Mozart both have income of 60, and the price of both the private good and a concert is 1. Thus, they are limited to providing between 0 and 60 concerts.

a) How many concerts are given if the government does not intervene?

b) Suppose the government is not happy with the private equilibrium and decides to provide 8 concerts in addition to what Bach and Mozart may choose to provide on their own. It taxes Bach and Mozart equally to pay for the new concerts. What is the new total number of concerts? How does your answer compare to your answer to a)? Have we achieved the social optimum? Why or why not?

c) Suppose that instead an anonymous benefactor pays for 8 concerts. What is the new total number of concerts? Is this the same level of provision as in b? Why or why not?

5. Consider an economy with three types of individuals, differing only with respect to their preferences for monuments. Individuals of the first type get a fixed benefit of 100 from the mere existence of monuments,

whatever their number. Individuals of the second and third type get benefits according to BII = $200+30M - 1.5M^2$

and BIII =150+90M $-4.5M^2$, where M denotes the number of monuments in the city. Assume that there are 50 people of each type. Monuments cost \$3,600 each to build. How many monuments should be built?

6. Andrew, Beth, and Cathy live in Lindhville. Andrew's demand for bike paths, a public good, is given by Q = 12-2P. Beth's demand is Q = 18-P, and Cathy's is Q = 8-P/3. The marginal cost of building a bike path is MC = 21. The town government decides to use the following procedure for deciding how many paths to build. It asks each resident how many paths they want, and it builds the largest number asked for by any resident. To pay for these paths, it then taxes Andrew, Beth, and Cathy the prices a , b , and c per path, respectively, where a + b + c = MC. (The residents know these tax rates before stating how many paths they want.)

a. If the taxes are set so that each resident shares the cost evenly (a = b = c), how many paths will get built?

b. Show that the government can achieve the social optimum by setting the correct tax prices a, b , and c . What prices should it set?