

1. Briefly Identify and/or Define (4 pts. each, 2-5 sentences):
 - a. Pure public good
 - b. Pareto superior move
 - c. Neutral tax
 - d. Ramsey tax
 - e. Fiscal illusion
 - f. Leviathan

2. (10 pts.) Construct a two person, three strategy public goods provision game that illustrates the free-rider problem.
 - a. Label all details and briefly describe the nature of the dilemma.
 - b. Now introduce a conditional subsidy that is sufficient to solve the problem. What is the smallest subsidy for provision of the public good that is sufficient to solve the problem?
 - c. In a variety of experiments that test the free rider dilemma and other PD-like games, experimentalists often find substantial cooperation, but not complete cooperation. Given your answer to b, provide a possible explanation for the experimental evidence.

3. (10 pts.) Public goods problems, government provision, finance, and politics.
 - a. Depict a public goods problem with three people. Characterize all relevant details. Explain why a problem exists.
 - b. Now depict government provision of the service funded with Lindahl taxes. Again label and briefly explain all relevant details.
 - c. Does the median voter in your diagram prefer the free rider situation to public provision with a Lindahl tax. Why or why not?
 - d. Given your diagrams and conclusions, briefly discuss the normative relevance of the Pareto efficient level of a pure public good. (1 paragraph)

4. (10 pts.) Al's marginal benefit curve for a pure public good is $MB_a = 300 - 2Q$ and Bob's MB curve is $MB_b = 150 - Q$. Suppose that Al initially provides the public service and that it can be produced at constant costs with $MC = 60$.
 - a. Find the "high demander" output of the pure public good.
 - b. Find the Pareto optimal level of this local public good.
 - c. Determine the Pigovian subsidy rate that can induce Al to produce the Pareto optimal level of the local public good.
 - d. Depict your results in a diagram, and label all details.

◆ (Partial credit will be given for entirely graphical solutions to all the mathematical problems.)

5. (10 pts.) Tax Schedule Properties

- a. Determine marginal and average tax rates for the following tax schedule:

$$T = C + .20Y$$

- b. Under what conditions is this tax progressive, regressive, or proportional?
- c. Explain briefly what you have done and the normative relevance of the progressivity concepts. (1-2 paragraphs).
6. (12 pts.) Some economists (and politicians) have suggested that switching from income taxation to a national sales tax or consumption tax would increase savings rates.
- a. Analyze the merits of this proposal using indifference curves and a two period representation of a consumer's consumption-saving choice. Label all relevant details.
- b. Are permanent and temporary consumption taxes likely to have different effects? Why or why not?
- c. Given your results, what other assumptions are necessary (if any) to reach a conclusion similar to those of the advocates of this tax reform. (1 paragraph).
7. (12 pts.) Suppose that a net tax-revenue maximizing government wishes to tax labor in a setting in which labor demand is $1000E - 10w$, and labor supply is $10w$, where w is the prevailing wage rate and E is the level of public education provided. Suppose that a proportional tax on wages is to be used and that the cost of education is $C=aE^2$.
- a. Find the equilibrium in the labor market that exists without taxation.
- b. Write the net tax revenue of this government.
- c. Characterize the government's tax and education policies.
- d. Does this government provide the national income maximizing level of education? Explain why or why not. (1 paragraph).
8. (12 pts.) Suppose that two adjacent communities adopt environmental regulations for a problem that affects both communities. Suppose that the governments of each attempt to maximize the net benefits for their own citizens, with $N_i = B_i - C_i$, and $i = 1, 2$. Suppose that $B_i = b(S_1 + S_2)$ with $B_{iS} < 0$. Smoke in community i is controlled through regulation R_i , so $S_i = s(R_i)$, with $S_{iR} < 0$. Regulations, however, are costly to implement, $C_i=c(R_i)$, with $c_R > 0$.
- a. Characterize the best reply function for each government's regulations.
- b. Characterize the equilibrium regulations for the two communities, both mathematically and graphically. Explain your result.
- c. Show that the outcome is not Pareto efficient (Hint: show that the combination of regulations fails to maximize total net benefits.)
- d. How, can these unrealized gains from trade be realized? (1-2 paragraphs).