Econ 950 | Public Finance | Spring 2009
GMU | **Midterm Exam** | R. Congleton

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 lavle 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 maket 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 $Ni = Bi - Ci$, and $i = 1, 2$. Suppose that $Bi = b(S_1 + S_2)$ with $Bi_S < 0$. Smoke in community i is controlled through regulation Ri, so $Si = s(Ri)$, with $Si_R < 0$. Regulations, however, are costly to implement, $Ci=c(Ri)$, 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).