Problem Set 1
Public Economics
Professor Hungerman

1. Suppose that an individual consumes two goods, *x* and *y*, and the individual's utility function can be written as

$$U(x, y) = \alpha \ln x + (1-\alpha) \ln y,$$

where $0 < \alpha < 1$. This individual maximizes utility subject to the constraint:

$$p_x x + p_y y = m$$

A. Verify that the marginal utility of *x* is positive, but falls as *x* increases. Does this make sense? What is the case for *y*?

B. Write down the individual's maximization problem—that is, write down the Lagrangian.

C. Take the derivative of your answer in A with respect to *x*, *y*, and the Lagrange multiplier λ, to get three first order conditions.

D. Using these first order conditions find the *demand equations*: that is, solve for *x* and *y* as functions of α, p_x, p_y, and *m*.

E. What fraction of income will this individual spend on *x*? Does this fraction depend upon p_x or *m*?

F. What is the price elasticity of demand for good *x*?

2. Many studies in the social sciences have shown that religious individuals look different from other individuals. For example, people who go to church are less likely to smoke, be heavy drinkers, and commit crimes than are other people. Some individuals have argued that this evidence indicates a positive benefit from attending church, and policy makers should consider this when making laws which could affect religion. How could the above studies be biased?

3. What is the poverty line for a family of 5 in the United States right now?

4. Suppose the poverty line for a family of size *x* is made by taking the poverty line of a family size *x*-1 and adding in the marginal cost of one more family member. If that was the case, do the real poverty guidelines indicate that the marginal cost of one more child is rising or falling for poor families?

5. Turn in the abstracts of the three papers you are interested in learning about, as discussed in class and on the syllabus.