Resources Economics Preliminary
Examination

January 19, 1981

The examination is for a four-hour period, 8:00 to 12:00. Pace yourself in responding to questions considering this four hour restriction; i.e., do not spend an undue amount of time on any specific question at the expense of the other questions.

A. From the following set of four questions, answer any three.

1. Any Pareto-optimum position will always be superior to all non-Pareto-optimum positions for the economy. Carefully evaluate this statement.

2. Explain why it is nonsense to seek the greatest good for the greatest number of people.

3. Compare and evaluate (a) net present value, (b) the benefit-cost ratio and (c) the internal rate of return, as a criteria for choice in public investment theory. Include some of the pitfalls of using the internal rate of return rule. (Be complete in your response providing details).

4. It has long been recognized that, due to the common property nature of some resources, unrestricted entry to the use of these resources will lead to economically inefficient production. Graphically or mathematically illustrate this phenomena.

B. Answer all of the following questions.

5. Benefit-cost analysis is one of the most widely used methods for the evaluation of proposed projects. As a practicing resource economist, how would you respond to each of the following:

   a) Benefit-cost analysis is claimed to be an application of the Potential Pareto-Improvement Criterion. Why?

   b) Identification and measurement of all benefits and costs incurred as a result of a project is a relatively minor problem.

   c) What methods are available for determining the monetary magnitude of benefits and/or costs?

   d) How is the selection of an appropriate discount rate made and what arguments can be made for or against the rate chosen?

6. It has been shown that plant oils (soybean, cotton, sunflower, etc.) are excellent substitutes for diesel fuels. Develop, with appropriate assumptions, an analysis of using plant oils as a diesel fuel substitute. Given your analysis, what are the expected results of a policy promoting the use of plant oils as a diesel fuel substitute?

7. Consider a society of two individuals (Jones and Kay) with two goods (X and Y). Let X_i and Y_i (i=J,K) denote individual i's consumption of X and Y. Consumption preferences of J and K are known to be represented by

$$U_J = X_J Y_J \quad \text{and} \quad U_K = \frac{X_K^2 Y_K}{Y_J} .$$

Initial endowments are:

Jones has 8X and 8Y;
Kay has 10X and 16Y.

(a) Determine the competitive equilibrium (both prices and final consumption bundles) and the resulting utility levels.

(b) As you can see from Kay's utility function, he suffers from a "keep up with the Joneses" complex regarding the consumption of Y. Does this partial externality result in a competitive equilibrium which is not Pareto-optimal? Analytically verify your answer by demonstrating Pareto-optimality (or nonoptimality) or by providing a counterexample.

partials