Resource Economic Preliminary

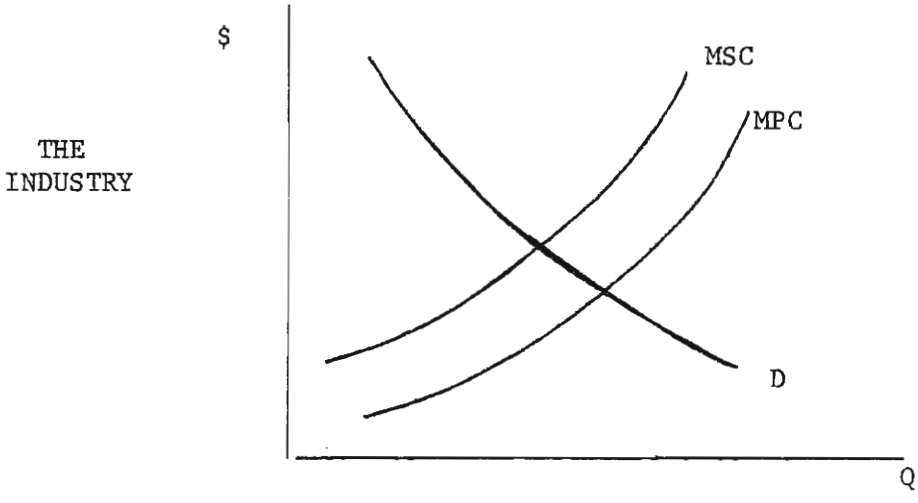
Examination

June 10, 1983

You have four hours to complete this written examination, 8:00 to 12:00. Pace yourself in responding to questions. Exams will be collected after four hours; i.e., do not spend an undue amount of time on any specific question at the expense of the other questions. Sign your name on the sheet of paper passed around the room by the test administrator. The number next to your name on this sheet should be written by you on the top of each of your exam answers. Do not write, under any circumstances, your name anyplace on the materials you turn in for this exam.

A. Answer all three of the following questions.

1. The typical pollution externality is traditionally depicted as follows. Producers of output Q do not bear the full costs of production because of some noxious emissions which are discharged in the course of manufacturing Q. Thus, marginal private costs (MPC) understate marginal social costs (MSC), and the market equilibrium results in too much Q production.



a) Construct and discuss four distinct public policies for the remedy of this horrid externality: (1) market emergence, (2) regulation, (3) tax, and (4) subsidy. Ignoring fully the possible role of transaction costs, how do you compare these alternatives, that is, how do you rank these policies?

b) Extend your considerations to include possible and likely sorts of transaction costs. Does your preference over these policies change? How and why?

c) Outline, using methods of welfare analysis, a procedure for evaluating these alternatives where the final result must be to identify the best policy. Be thoughtful.

d) Suppose now that firms within this industry are large, are located in rural areas, and tend to dominate local markets for unskilled labor. Policies which are effective in reducing Q will cause large layoffs in these areas. Would your analytical procedures change? Why or why not?

2. Individuals 1 and 2 consume goods X and Z. Their preferences are as follows:

$$U^1(X_1,Z) = 2X_1 + Z^2 \qquad U^2(X_2,Z) = 2X_2 + 2Z^2$$

This two-person economy possesses production technologies which yield the following production possibilities frontier:

$$X^2 + Z^2 = 25 \qquad X,Z \geq 0.$$

Suppose initially that $X_1 = 2$, $X_2 = 2$, and $Z = 3$.

i) Can this be Pareto-optimal (Pareto-efficient)? Why or why not?
ii) If your answer to the first question is "yes", then use the following social welfare function to maximize social welfare: $SW = U^1 + U^2$.
iii) If your answer to the first question is "no", then determine a Pareto superior alteration in the initial situation such that production efficiency is maintained.

3. In recent years the attention of many citizens has become more focused upon methods for storage of nuclear wastes. These wastes provide a potential for catastrophe at anytime from the present until thousands of years into the future.

Discuss, from the perspective of an economist, the issues involved with this focal point for citizen concern. What can you, as a practicing resource economist, say about proposals for the storage of nuclear wastes and the methods available for economic analysis of these proposals.

B. Answer one of the following two questions.

4. You have been appointed to head a task force addressing the human resource implications of industrial development in a rural community. Discuss these implications as they relate to employment, community services, migration and commuting. Be careful to distinguish between direct and indirect/induced effects. Then describe a methodology for analyzing and predicting the impacts of a new industry in this rural community. Remember, any good task force report will include a discussion of the strengths and weaknesses of the methodology recommended.

5. Many items affected by public and private sector undertakings are not commonly traded in markets. Yet, from society's viewpoint, adequate evaluation of these undertakings requires that appropriate weight be attached to the impacts of projects upon these nonmarket items. What methods are available for the determination of the weights to be assigned to these impacts and how are they commonly used?