

## Resource and Environmental Economics

### Comprehensive Examination (Part A):

January 26, 2007

(Please answer all three questions. You have 2 hours)

1. Sulfur dioxide emission from coal burning in power plants is the main culprit for acid rain. In 1990s, the US EPA launched sulfur emission trading program among electric utilities. A decade long practice has shown that the program is a huge success. If you were asked to participate in designing such a program, how would you approach the issue? Please outline your economic rationales and basic procedures for implementing the program. How would you compare your approaches to the alternatives?
2. Recent surges in crude oil price have caused huge troubles in the US economy (you probably felt the “pain” personally). How would such price increases prompt you to rethink the appropriateness of the Adelman paradigm and/or the Hotelling paradigm in characterizing the world crude oil market?
3. Please set up a firm’s model of exhaustible resource extraction with costs and offer economic interpretation of its transversality condition.

# Environmental Economics Comprehensive Examination

January 26, 2007

## **Part B: Take home questions.**

**Please email completed answers to Professor Neha Khanna ([nkhanna@binghamton.edu](mailto:nkhanna@binghamton.edu)) before 9:00 a.m. on Monday, January, 29, 2007**

Please answer ***any one*** of the following questions. Both questions relate to the Environmental Kuznets Curve (EKC) hypothesis.

In both questions, you may focus on an interior solution only.

### Question I

- a) Copeland and Taylor (QJE, 1994) explain the EKC hypothesis in terms of the scale, composition, and technique effects. Carefully explain each of these three concepts. How do they combine to explain the inverted U-shaped relationship between income and pollution? Provide an intuitive answer – please do not use any math.
- b) Plassmann and Khanna (AJAE, 2006) establish the necessary and sufficient conditions for the EKC using a very simple model in terms of environmental effort and consumption. Develop the concepts of scale, composition, and technique under the Plassmann-Khanna (P-K) model and show how P-K's main result contained in Theorem 1 can be explained in terms of these three concepts. If you think it is not possible to develop these concepts within the P-K model, explain why this is so.

### Question II

- a) Lieb (EDE, 2002) shows that pollution will decline with income at an interior solution if the slope of the indifference curve (marginal rate of substitution between pollution and consumption) falls faster than the slope of the consumption possibilities curve (marginal rate of transformation between pollution and consumption). Why does this result make intuitive sense? Provide an explanation without using any math.
- b) Plassmann and Khanna (AJAE, 2006) establish the necessary and sufficient conditions for the EKC in terms of environmental effort and consumption using a very simple model with minimal assumptions regarding functional forms. Is it possible to derive Lieb's result mentioned in (a) as a special case of the Plassmann-Khanna (P-K) model? If yes, then show how (that is, derive Lieb's result using the P-K model). If not, then explain why.