

Resource & Environmental Economics Field Examination

May 29, 2014

Instructions:

- You have 4 hours to complete the exam. This time commences at the end of the 15-minute reading period during which no writing is allowed.
- Please use your assigned "alpha letter" on every page to identify your exam. Do not use your name or social security number. Write on only one side of the page leaving at least one inch margins. Number each page, and make sure the pages are in order.
- You have four questions to answer.

Answer four of the five questions.

1. Many economists and environmentalists have studied the relationship between a country's growth and its output of various pollutants. Answer the following two questions related to this issue.
 - a. What are the shortcomings of conducting cross sectional analysis of pollution levels as a function of a country's gross domestic product in order to discern whether growth causes more or less pollution?
 - b. How would you better model the relationship? Provide at least two economic or econometric approaches that would alleviate some of the shortcomings you have identified. Explain their advantages.

2. Can it ever be optimal to drive a species stock level so low that it leads to extinction?
 - a. Explain your response using a formal renewable resource (economic) framework and model.
 - b. What environmentalist-appeasing modification of your model might make it less likely that it would be optimal for a species to be driven to extinction?
 - c. Provide an example of a particular species that might be in trouble (threatened or endangered) and suggest ways that you might try to value preservation of this species. Comment on how this valuation might influence the economic model of part a.

3. Suppose you are leading a project to (i) identify an optimal path for the Texas energy sector to achieve a 50% carbon emission reduction by 2050 and (ii) propose policy options to achieve this goal. Provide an outline for the report, and for each main section discuss its goals and the primary research questions that you would want to address. What are the key empirical and conceptual challenges for your analysis? Be specific about the economic sectors that would need to be in your analysis and what you might mean by "optimal."

4. Hydraulic fracturing (fracking) has been one of the most prominent environmental issues of the last several years. Though debated, some scientists have suggested that there may be air pollution issues stemming from releases of gas as well as ground and surface water pollution from leakages of the toxic fluids used in the process. How could you use the travel cost method, the hedonic price method, and stated choice methods to evaluate fracking consequences? For each method
 - a. describe an aspect of the environmental consequences of fracking for which you could employ this approach;
 - b. describe the kind of data that would be required, and the econometric analysis that would be conducted; and
 - c. observe the major pitfalls to be considered when carrying out the analysis.

5. The energy-water-food nexus is receiving considerable attention in the literature and popular press. According to an environmental agency report, “Nexus policy making is not complex in itself. It requires the strategies of a government or a business to be designated in ways that take account of the connections between water, food and energy systems.”
 - a. Critically evaluate the above statement. As you proceed, further explain the energy-water-food nexus and develop arguments for whether this concept contributes to natural resource economics in the sense of better understanding policy needs or policy design. Are these new insights or relabeled ones?
 - b. Design a program of study to examine the energy-water-food nexus and its implications for the State Water Agency.