

Resource & Environmental Economics Field Examination
January 2012

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 and number each page. Do not use your name or social security number. Write on only one side of the page leaving at least one inch margins. When you submit the exam, make sure the pages are in order.
- You have four questions to answer.

Answer four of following five questions.

1. The Deepwater Horizon oil spill has resulted in a natural resource damage claim against British Petroleum (BP). You are assigned to work for the trustees of the damaged natural resources in the Gulf of Mexico, focusing on the loss of wildlife. Explain how you will conduct the economic assessment(s) of this case, keeping in mind that the work is done in the context of litigation and that your adversaries will likely include the top econometricians and micro theorists that can be hired by BP. Defend your methods in terms of their ability to account for all the important damages, and for being able to withstand attack from the BP economists.
2. Society is increasingly discussing things like the sustainability of items. Evidence on fisheries indicates that average individual fish size is decreasing, as are stock populations. Using economic arguments and tools:
 - a. Why might fisheries be exhibiting such characteristics?
 - b. Increasingly fish production for consumption is moving to farmed fish or aquaculture. Why does it make sense for society to use this more expensive form of production.
 - c. What effects would expansions in farmed fish or aquaculture have on the stock of fish in the wild.
3. Many developing countries have stocks of natural resources that can be extracted and exported. Some believe that such trade in natural resource products will lead to growth in income for the country. However, concern has arisen that with rising income, such countries will in fact pollute more than they do at present.
 - a. Is it assured that the country that exports natural resources will in fact be better off in terms of growing income? Why or why not?
 - b. Suppose that increased trade does in fact lead to higher country income. Is it assured that the country will then pollute more? Why or why not?
 - c. Several researchers have considered the role of government corruption in the above analysis. How would a corrupt government impact the outcome regarding pollution, if at all?

4. One issue being widely discussed today is the idea of a climate change adaptation fund. Suppose one existed.
 - a. Are there issues of leakage, additionality, and uncertainty that one could consider in allocating such funds to projects? Define each term and develop a conceptual economic argument why it might exist and what might be done about it in evaluating projects.
 - b. One possibility is to fund projects to subsidize irrigation efficiency. Would such projects always reduce water use in total? Develop a conceptual framework to identify why this may or may not be true.
 - c. Another possibility is to fund projects to install sea walls to protect against sea level rise. Would such projects have an effect on use of land behind the walls? Suppose rapid sea level rise held out the possibility that the walls could be rendered ineffective. Would sea walls then be desirable economically? Develop a conceptual framework to identify why this may or may not be true.

5. Consider a coal-fired power plant that produces electricity. The total private benefits (TPB) to consumers from electricity are given by $TPB = 72q - 3q^2$, where q is the quantity of electricity used, and the total private costs (TPC) for the power plant are given by $TPC = 10 + 2q^2$.

However, the power plant also emits air pollution, such as sulfur dioxide and particulate matter, which causes damages to surrounding residents and ecosystems. The total external costs (TEC) are given by $TEC = 2 + q^2$. Answer the following questions given this information. Also, include accurate graphs in your answer for each question.

- a. What is the competitive price and quantity produced if the power plant is allowed to ignore the damages to society caused by the air pollution?
- b. What is the socially efficient quantity of electricity production?
- c. What is the net loss to society when electricity is produced at the competitive level (i.e., ignores damages from air pollution)?
- d. The government is considering entitling electricity producers to their current, competitive production behaviors and then paying them to trim electricity production to the socially efficient quantity. What is the efficient level of this payment per unit of q ?
- e. After this policy has been adopted, how are the total net benefits being distributed within society?