

Take Home Quiz #3
DUE AT THE BEGINNING OF CLASS ON WEDNESDAY, APRIL 10

This quiz is intended as an individual take-home quiz. Each student is expected to hand in their own work. While you are free to consult with me for any questions you may have, you may not discuss the quiz with other students. E-mail questions about the quiz should be sent to my personal e-mail address (dcpopp@syr.edu), rather than the class listserv. This is an open-book quiz. You are free to consult your notes and the readings from the class to complete the quiz.

Take the time to think before you write. Well-thought out, well-written answers will be rewarded. A direct, concise explanation is better than a five-page treatise. I am not just looking for how much you know, but how well you are able to communicate what you do know, which includes filtering through information to highlight the most relevant points. In addition, pay attention to the target audience. For this assignment, your memo should be accessible to someone with some economics expertise. Your memo should be written in a professional manner. The assignments page of the class web site links to an article with suggestions for effective professional writing.

The quiz is due AT THE BEGINNING OF CLASS on WEDNESDAY, APRIL 10. Late exams give you an unfair advantage over other students in the class. As a result, late exams will be marked down one grade for each day late, starting AT THE BEGINNING OF CLASS on WEDNESDAY, APRIL 10. If you will not be in class on Wednesday, it is your responsibility to get the exam to me BEFORE CLASS either via e-mail or submitting it at the front desk of the Center for Policy Research. Do not just leave the quiz in my mailbox, as I need to know when you hand the quiz in. There is a sign-in sheet at the front desk of CPR for this purpose.

I. The Value of a Clean Air at a State Park (25%)

Suppose that, after graduation, you take a job with the NY State Department of Environmental Conservation. They are concerned about air quality at one of their state parks. Because of air pollution from a local power plant, visibility at the park is reduced for approximately one-half of the time. The agency is considering increasing regulations on the local power plant. These regulations would eliminate the poor quality air days, so that reduced visibility would never be a problem. You have been asked to do a travel-cost analysis to estimate the benefits of the proposed regulation.

To estimate the value of cleaner air, survey data has been gathered from 2,000 hikers who visit the forest. Surveys were administered on both days with poor air quality and good air quality. Using regression analysis, your staff has controlled for differences in income, employment status, age, and other important factors that might affect the number of hiking trips taken. Taking these factors into account, your staff has estimated two demand curves for park visits: one on poor air quality days and one on good air quality days. These demand curves are given below, where Q represents the number of visitors to the park each day.

Demand on good air quality days: $P = 90 - 0.4Q$

Demand on poor air quality days: $P = 70 - 0.4Q$

Your data also show that the average travel cost of visitors to the park is \$20. Using this information, answer the questions below to calculate the value of reducing air pollution at the park.

- 1) Based on a typical travel cost of \$20, how many visitors currently visit the park on poor-air quality days?
- 2) What is the total willingness to pay of these visitors?
- 3) Based on a typical travel cost of \$20, how many visitors currently visit the park on good air quality days?
- 4) What is the total willingness to pay of these visitors?
- 5) What is the total willingness to pay for cleaner air at the park on any one day?
- 6) The park experiences 150 poor air quality days per year. What is the total benefit of eliminating these poor air quality days, so that the air quality at the park is always good?

Please show all of your work.

II. Valuing Clean Water (75%)

In the city of Riverside, a three-mile park along the Green River is a popular recreation area. However, city officials are struggling to deal with pollution problems that affect water quality of the Green River near the park. Existing water treatment plants are inadequate for peak usage days, such as those with heavy rain. On such days, raw sewage overflowing from the city sewer system flows into the river. To address this problem, city leaders propose building three new neighborhood water treatment plants. These plants would capture overflow sewage and treat the waste so it can be disposed properly. While these plants would provide a cleaner river, local residents in the neighborhoods where these treatment plants would be built are concerned about the impacts such a plant would have on their neighborhood.

To contribute to the discussion concerning this plant, the city plans to do a cost-benefit analysis of the proposed treatment plants. They have solicited bids from various consultants, who have each proposed methods to estimate these costs and benefits. As someone trained in environmental economics, your job is to evaluate these proposals for city leaders. They have requested that you prepare a 3-4 page memo discussing the strengths and weaknesses of each proposal, along with a recommendation as to which proposal (or proposals) they should choose.¹ You may assume that the officials evaluating the proposal have some economics background, so using basic economic terms is acceptable. However, none of the officials is an environmental economist. Thus, as you analyze the methods proposed, you will need to carefully explain each technique, as well as its strengths and weaknesses. The three proposals received are summarized below:

Proposal A: This firm proposes looking at market values to estimate costs and benefits. To calculate the benefit of increased recreational opportunities along Green River, this firm proposes to do a travel cost study of visitors to the park along the river. Visitors will be surveyed on various days, to allow for variation in water quality. In addition, to assess the impact on neighborhoods where the treatment plants will be built, they propose to do a hedonic price study of homes in other cities that have similar neighborhood wastewater treatment facilities.

Proposal B: This firm proposes using surveys to do a more general assessment of the value Riverside residents place on water quality in the Green River. They will use contingent valuation methods in which they ask residents to consider a monthly surcharge to their water bills that would finance the proposed treatment facilities. Each respondent will be asked whether or not they support a surcharge of X dollars to their monthly water bill, with the value of X varying across respondents. They will use the results of this survey to estimate the demand for higher water quality in the Green River.

Proposal C: This firm is concerned about the reactions of residents in the neighborhoods where the treatment facilities will be built. They propose a survey of these residents to find out how much compensation they would be willing to accept to allow the treatment plant in their neighborhood. To measure the benefits of a cleaner river on the rest of the city's residents, they also plan a travel cost study. However, their study would survey residents as to the number of trips they make to other nearby parks that have cleaner water quality. By doing this, they hope to learn how much residents are willing to give up to go to locations with higher water quality than the Green River.

¹ Please note that the request is for a 3-4 page memo to cover all three proposals. You are not to write 3-4 pages on each proposal.