ECON 331: Environmental Economics

Homework 4

- Define any variables you need to answer the problems.
- Use any materials to help you with these questions. That includes others in this course!
- Please write your answers in the space provided.
- Keep your answers short but clear. Your goal is to convince a skeptical grader that you understand the relevant concepts well enough to answer the question you are given.
- The questions on this homework sum to 62 points. But you get a 100 for completing/attempting the majority of the questions.
- Remember to write down the names of anyone you worked with on this homework!
- Bring any and all questions to office hours!

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1. (4 points) What is your name and who did you work with (if anyone)?

1 True/False Questions

Indicate "T"rue or "F"alse for each of the following statements or claims. For each false statement, if you explain why it is false I will give you a bonus point.

2. (2 points) Suppose you read two different articles estimating the damages done to the ocean by an oil rig spill. Both articles use a survey to estimate damages. Article 1 surveys a random sample of people who live/work near the cost. Article 2 surveys fisherman and operators of tourism boats in the same area as article 1. **Claim**: you would expect that both articles would estimate roughly the same monetary amount of the damages because the .

3. (2 points) **Claim**: Using market-valuation to estimate the value of an environmental good does a good job at capturing use value, but often does not really account for the existence value of an environmental good.

4. (2 points) **Claim**: One benefit of surveys is that while there are many ways to ask the same question, people's stated value of an environmental good is roughly equal no matter how you ask the question.

2 Multiple Choice Questions

Circle the best answer to each question. There is only one answer for each question. No explanation necessary.

For the multiple choice questions, let's use the following scenario. Walking along the spine, a volunteer approaches you with a clipboard. "Hello, we are from Save the Whales and going around trying to estimate the benefit to society of a new policy that will prohibit cargo ships from crossing the main migration path of the Beluga whale. How much would you say you would be willing to pay for this policy to be enacted?"

5. (2 points) Suppose the volunteer watches over your shoulder as you write down your answer. Which of the following best describes why the volunteer should expect bias in your answer?

    A. Hypothetical bias.

    B. Sample Selection bias.

    C. Experimenter Demand bias.

    D. Framing bias.

    E. Social desirability bias.

6. (2 points) Suppose instead you are filling out this survey with a bunch of other people around you, who could see your answer if they looked up from their paper. Which of the following best describes why the volunteer should expect bias in your answer?

    A. Hypothetical bias.

    B. Sample Selection bias.

    C. Experimenter Demand bias.

    D. Framing bias.

    E. Social desirability bias.

7. (2 points) Finally, suppose this question adds additional information that this policy is in the early stages, and the team is not sure exactly what the final policy would look like. Which of the following best describes why the volunteer should expect bias in your answer?

    A. Hypothetical bias.

    B. Sample Selection bias.

    C. Experimenter Demand bias.

    D. Framing bias.

    E. Social desirability bias.

3 Short Answer Questions

These questions all require an explanation. Remember you are trying to convince me you understand the why and the how of what you are doing, not simply getting the answer correct. Cite specific concepts from class in your answers for full credit.

8. Suppose Save the Whales comes up with a new survey completely (and miraculously) free from any bias in the valuations people provide about saving the whales. The estimated benefit each year this policy is in place is $10 million per year. Suppose a policymaker is relatively short-sighted and only cares about costs and benefits until the policymaker can no longer hold office. The term is 8 years, and the policymaker just started. We will call this year 0, and the end of the term is 7 years from now. Suppose the discount rate is 3%.

   (a) (8 points) Suppose there are two costs of this route. First, there is an upfront cost. In the year before the policy comes into effect, shipping companies need to research the next-best route for cargo ships that does not cross the beluga whale's migratory path. This next-best route is more costly to shipping companies and the environment through burning extra fuel. **Question**: If the upfront cost is $\$FC$, and the increased costs per year is $\$VC$ in each year the policymaker considers, draw a timeline diagram of the costs and benefits of such a policy. Assume the policy is implemented in year 1.

   (b) (8 points) Suppose that $\$VC$ is equal to $8 million in each year. **Question**: At

a discount rate of 3%, what is the largest possible value of $\$FC$ such that the present value of the benefits of this policy outweigh the present value of the costs of this policy? You must show your work for full credit.

(c) (4 points) Suppose instead of paying the FC you found in part b as one up-front statement, the shipping companies could pay in average equal installment payments each year in period 1 through 7. This installment payment would account for the time value of money. **Question**: How much would each payment be? You must show your work for full credit.

(d) Suppose FC is in fact the value you calculated above. This implies the present net-benefits (present value of benefits minus present value of costs) is exactly 0 for the policy. For each of the following, discuss how each separate change in the problem would change the present-net benefits of the policy. No math required!

(a) (4 points) The discount rate is 5% instead of 3%.

(b) (4 points) The estimated benefit is really $9 million per year instead of $10 million per year.

(c) (4 points) The VC is \$7 million per year instead of \$8 million per year.

(d) (4 points) The policymaker cares about the future, and uses a 20-year time horizon instead of an 8-year time horizon.

9. (10 points) Please provide any feedback you have on the survey project in class regarding adding a new trail in the nature preserve. While not anonymous, I would like to solicit feedback so that I can improve this mini-project for future classes. Any and all feedback is welcome! If not or you would like to give feedback in person, feel free to put NA.