07 - Valuing the Environment

Econ 331: Environmental Economics

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Learning Outcomes/Goals

1. Compare and contrast use value, non-use value, and existence value of an environmental good.

2. Compare and contrast market valuation and non-market valuation.

3. Identify potential issues in both market and non-market valuation.

Where We Are

- We have done cost-benefit analysis in which we know the costs and the benefits.
- But often, we do not actually know how much the benefit of an environmental policy or project is going to be.
- We need to estimate it.
- **Big Question**: How do we estimate the value of an environmental good?

Valuing an Environmental Good: Types of Value

- An environmental good (e.g. the BU Nature Preserve) derives value from multiple parts.
  1. **Use value**: Value from human use (e.g. hiking, fishing, classes that use the preserve, etc).
  2. **Non-use value**: Value people derive from how the environment helps human welfare. (e.g. the cleaner air and water provided by the preserve ("environmental services")).
  3. **Existence value**': Value people derive from knowing the preserve exists and other people have the ability to enjoy it.

Valuing an Environmental Good: Difficulty

Why is it harder to place a value on a trail at the nature preserver than it is to place a value on a cup of coffee at Dunkin?

- Coffee is traded in a market. The price is known.
- It is easy to think about the utility increase due to having one extra cup of coffee.
- A trail at a nature preserve is not traded in the market.
- There is no price we can look at for other trains at other parks in terms of the benefits.
- It is difficult to think about the utility increase of one specific trail in a preserve that has more than one trail.

Valuing an Environmental Good: Importance

Why do we even need to put a value on the environment

- In policy discussions, there are always trade offs.
- A cost benefit analysis is often required to implement any policy, even policies aimed at improving the environment.
- In a setting with limited funds, a governing body may choose to spend money where costs and benefits can be directly calculated rather than in areas where it cannot be calculated.
- Even if it feels weird to place a value on the environment, it is necessary for economists to be able to have input into these policy conversations.

Valuing an Environmental Good: 2 Ways

1. **Market Valuation**
   - Use goods or services that are traded in the market to figure out the price of an environmental good.
   - E.g., Sales prices of homes closer or further to a lake, average hotel rate for the ocean-facing rooms versus the highway-facing rooms.
   - Requires economics stats, regression analysis, econometrics.
   - This is beyond the scope of this class.
2. **Non-market Valuation**
   - Survey people to figure out the value of an environmental good.
   - This is the method we will focus on in this class.

Non-market Valuation: Example

- Suppose we want to estimate the value of adding just one trail to the nature preserve for the average person.
- We know about how many people use the nature preserve each year.
- We will assume that same amount of people will use this trail.
- We can take the average value, multiplied by the number of people who go into the preserve, to calculate the annual benefit of adding an additional trail.
- We can compare this to the cost of building the new trail and then conduct our cost-benefit analysis of the trail.

Non-market Valuation: Surveys

- The most straightforward approach is simply to ask people "how much (in dollar terms) do you a new trail would increase the value of the nature preserve?"
- Or, "How much would you personally be willing to be to ensure one new trail is built in the nature preserve'?"
- However, a simple-looking survey question could lead to lots of different valuations based on how we ask the question.
- We will now explore potential issues with surveys.

Issues with Surveys: Sample Selection

- Suppose for a moment we asked a survey question that we knew resulted in the average person giving us their true valuation of one additional trail in the preserve.
- Now imagine, using the same question, two different classes asked two different groups of people.
  1. Class 1 asks a random set of Binghamton students by walking around campus and seeing if random students will answer a question.
  2. Class 2 stations members near the entrances to the preserve, and asks people leaving or entering to answer a question.
- Class 1 gets a much lower valuation than Class 2!
- Why? Because Class 2 asked people who already go into the nature preserve, whereas Class 1 asked people who do and don't go into the preserve.
- This is called sample selection bias.

Sample Selection or Sample Selection Bias

- **Goal**: Our survey should be representative (as good as random) who **respond** to the survey.
  - Even if you send out the survey to a random sample, if only certain people actually fill out the survey you still have sample selection!
- One way around this is to ask people addition questions about their background, so you can try to see what sort of people were more likely to fill out the survey.
- In our example, we could add a question of something like "How many times did you visit the preserve in the last year" to measure how much they already use the preserve!
- This would not fix the sample selection issue, but it would give us a sense of if we expect our average value to be higher or lower than a random sample.

Issues with Surveys: Biases

- Now suppose we do not have any sample selection.
- What could go wrong by asking people “How much do you value adding a new trail to the nature preserve?”
- In short, **a lot**!
- We will call these “survey biases”.
- No survey is perfect, the idea is to try and mitigate these biases.

Issues with Surveys: Biases Summarized

1. **Framework Bias**: How we ask the question matters.
2. Hypothetical Bias: People have a hard time answering about hypothetical situations.
3. Experimenter Demand Bias: People give the answer they think the researcher wants to hear.
4. Social Desirability Bias: People give the answer they think will make others like them more.
5. **Bundling Bias**: People have a hard time separating the value of aspect from other related aspects.

- I include additional slides for the biases in bold.

Issues with Surveys: Framework Bias

- We can frame this policy proposal (adding a new trail to the preserve) as either a gain or a loss.
- We can also either ask people how much they are willing to pay (WTP) for the change, or how much we have to pay them for them to accept not having the change (WTA).
- People give very different answers to each of these 4 possible ways to ask about the same thing!

1. **Gain, WTP)**: "How much would you be willing to pay for BU to build a new trail in the preserve?"
2. **Gain, WTA)**: "How much would I need to pay you in order for BU not to build a new trail in the preserve?"
3. **Loss, WTP)**: "How much would you be willing to pay for BU to remove a new trail in the preserve?"
4. **Loss, WTA)**: "How much would I need to pay you in order for BU not to remove a new trail in the preserve"

Issues with Surveys: Bundling Bias

- There are some environmental goods where it is tough for a respondent to a survey to separate the value of what you are asking about from other related environmental goods.
- For the preserve trail example, most respondents who have an opinion on how much a trail is worth are likely thinking about the other trails in the preserve they use.
- Or, depending on the trail's planned route, the respondent may include in their valuation how much they value the views or nearby trails they could also take when they answer about a general new trail.

Key Takeaways

1. While difficult, valuing environmental goods is an important aspect of environmental policy.
2. Being able to value environmental goods is key for cost-benefit analyses required for regulations.
3. An environmental good often has use value, non-use value, and existence value.
4. Two ways to value an environmental good are (i) market valuation and (ii) non-market valuation.
5. We will focus on non-market valuation in class, mainly using surveys to estimate the value of a particular environmental good or service.
6. There are several issues that can arise with surveys, such as sample selection and biases in the responses generated by a survey.
7. These biases will be important when we design our own survey in class!