Some Thoughts on Valuation for WAVES

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What is accounting?

- Mulitiply price by quantity and add up the products: $\Sigma p_i q_i$

- Ecosystem services are often *public goods*
  - When they are provided by one person they are enjoyed by many.
  - Public goods are typically not traded in markets

- We typically have to do some sort of *nonmarket valuation*

A preliminary caution:

Peter Kareiva and Susan Ruffo, writing in *Frontiers in Ecology* 2009:

[N]ow more than ever, we need to embrace ecosystem services as a basis for conservation . . .

[but]

. . . getting beyond the platitude of nature's value has proven to be a challenge for both science and policy. Why? . . . Because we do not have enough science to back up our hypotheses of how and when services are delivered . . . In short, because *we have not proven, on the ground, that these ideas work* [emphasis added]
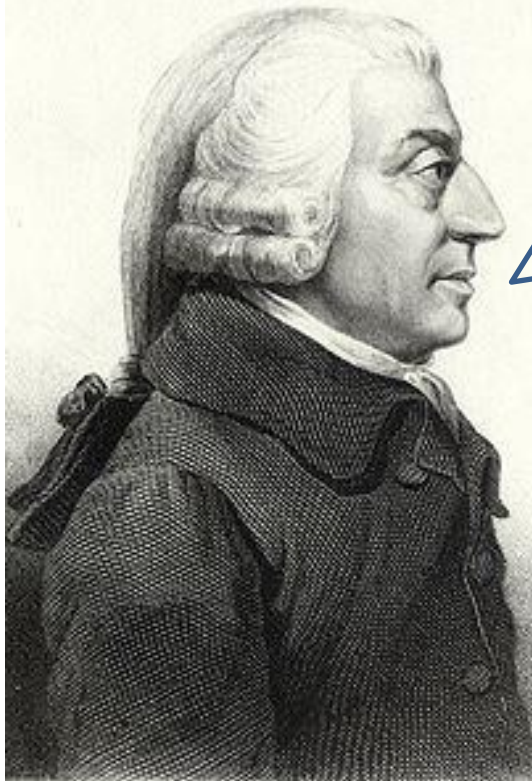
2 implications

1. We have our work cut out for us!

2. Our job is <u>not</u> to prove that these ideas work; it is to see what the evidence tells us.

2 parts to my presentation

1. Principles of valuation

2. Methods of valuation

The single most important thing to remember!

> The things which have the greatest value in use have frequently little or no value in exchange; on the contrary, those which have the greatest value in exchange have frequently little or no value in use. Nothing is more useful than water: but it will purchase scarce anything; scarce anything can be had in exchange for it. A diamond, on the contrary, has scarce any use-value; but a very great quantity of other goods may frequently be had in exchange for it.

Value = scarcity!

Scarcity is always relative

- You'd pay a lot for water after a day without it!
- Time, place, and conditions always matter.
    - In some places and time water *provision* is a valuable ecosystem service
    - At other places and times water *disposal* is a valuable ecosystem service
- Economic value is determined *on the margin*
    - The question is not "what would you pay for water?" but
    - "What would you pay for another liter of water?"

An ecological example: Pollination services

- Without pollination, we wouldn't have many important crops.

- What is the value associated with losing habitat that shelters pollinators?

- The "value of the marginal pollinator" =
  - Price of the product to which it contributes
  - X   Number of seeds it can fertilize
  - *X   The likelihood that those seeds would not be fertilized by any other pollinator (or by wind, or by imported honeybees, or by hand, or . . .)*

(a)

If you already have a lot of bees, adding more would add very little to expected production!

2ⁿᵈ topic: Measuring value

- "Price" = willingness to pay; what would you be willing to give up to acquire more of something?

- To get the demand for a *private* good we add up the *quantities* consumers would buy at a given *price*.

- To get the demand for a *public* good we add up the *prices* consumers would be willing to pay for a given *quantity*.

- The problem is that we can't usually observe directly what people would be willing to pay.

1st Method: Replacement Cost

- The value of an ecosystem service is what it would cost to replace it.

NO!!!

- Why not? Because we have not first established that people would be willing to pay to replace it.

- Difference between replacement cost and avoided cost: latter is what people would really pay.

Some other methods for valuation

- Hedonic pricing: the price of an asset capitalizes the benefits of using it – farmland, homes, etc.
- Travel cost/recreational choice modeling:
  - The "price" of a recreational opportunity is what it costs you to get to where you can experience it
  - Your WTP for improved quality is the additional travel cost you'd be willing to incur to experience it; people will start coming from farther away.
- Production function approach
  - Pollination is an example
  - Others include fishing, farming

A very controversial approach: Stated preference

- Economists typically make inferences from what people <u>do</u>, not what they <u>say</u>; why would we bend that rule?

- Because certain values are intangible: what is it worth to keep Pandas from going extinct?

- Carefully structured surveys may allow us to find out, but

[T]here is a curious dichotomy in the [SP] research . . . Environmental economists actively engaged in nonmarket valuation continue to pursue very technical implementation or estimation issues, while the economics profession as a whole seems to regard the method as seriously flawed when compared with indirect methods. They would no doubt regard this further technical research as foolish in light of what they judge to be serious problems with the method

V. K. Smith 1998 (not much has changed since)

Some concluding thoughts and caveats

- Think diamonds-and-water before you do anything else.

- The goal is to record all values both at least and at most once.

- "There are three kinds of lies:

  lies, damn lies, and statistics."