Valuing Environmental Impacts Using Market Data

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Valuing the environment

➢ "Environmental valuation is an essential component of economics but its results have been greeted with indifference, scepticism, suspicion, or even hostility." (John Horowitz)

➢ Why?

  ➢ Lack of knowledge - theoretical and empirical non-market valuation can be perceived as abstract

  ➢ Rejection of the idea that non-market goods can be valued – priceless

    ➢ E.g. "nature" and "health"

  ➢ Scepticism in estimated values due to sometimes large variation

    ➢ E.g. the empirically established range for the "value to prevent a fatality" is MUSD 1 – 10…

Why then conduct "environmental valuation" studies?

➢ Many goods and serviced do not have easily available "prices"

Why then conduct "environmental valuation" studies?

➢ Necessary for economic evaluation based on welfare analysis like cost-benefit analysis (CBA):

  ➢ $NPV = \sum_{t=0}^{T} \frac{B_t - C_t}{(1+r)^t}$

  ➢ B=benefits, C=costs, r=discount rate, and NPV>0 welfare improving

➢ To inform us about the "social value" of externalities

  ➢ Tax on fossil fuels

  ➢ Damage compensation

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Non-market valuation

➢ When no easily available market prices for the goods/services of interest exist, non-market valuation techniques need to be used to estimate benefit (cost) measures

  ➢ Stated preferences (SP): Hypothetical market is created in which respondents are asked to state their preferences

    ➢ Contingent valuation, Choice experiments, etc.

    ➢ Flexible

    ➢ Framing effects, strategic and hypothetical bias, etc.

  ➢ Revealed preferences (RP): Observed market decisions are used to elicit individual preferences

    ➢ Hedonic pricing (HP), Travel cost method, etc.

    ➢ Actual decisions

    ➢ Assumes that analyst is informed about individuals' decision alternatives

  ➢ ("Experiments": Usually not used to elicit policy relevant values, but to examine behavior and anomalies)

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Survey approach: Example (Andersson et al., JEEM, 2016)

Figure 1 Example of Choice Set in sub-sample A

| What do you prefer in this situation?		
	Policy A	**Policy B**
Source of disease	Water	Food
Number of fewer individuals who die (per year) when the policy is implemented	1	2
Number of fewer individuals who get sick (per year) when the policy is implemented	16 000	8 000
The policy starts to have effect	this year	in 10 years
Your cost (per year)	1 000 SEK	2 000 SEK

I prefer

☐ Policy A

☐ Policy B

☐ None of the suggested policies (today's situation remains and no additional cost for you)

Note: The choice sets in sub-sample B were identical to the ones in sub-sample A with the exception that the levels of the attribute "fewer individuals who die" were multiplied by 100.

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Non-market valuation and market data

- Property prices and attributes that explain them
  - Air pollution
  - Noise
  - …
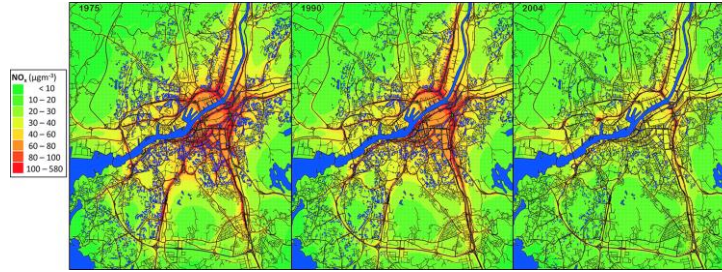
- Recreation values
  - Visits and their costs (financial and non-financial)

- Averting behavior and expenditures
  - Insulation
  - Bicycle helmets
  - …

- "Consumption decisions"
  - Organic
  - …

Challenges with market data

- Getting access to the data needed…

- Well-informed individuals?
  - Do people know the air quality, etc., when they make decisions on where to live?
  - If seeking information, do they get "objective one"?

- Well informed analysts?
  - Why are many prepared to pay a premium for organic products?
    - Health?
    - Environment?
    - Taste?
    - …

- Getting access to GOOD data…

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Encouraging results and new possibilities

➢ Vast amount of evidence that suggest that results from NMV studies for many goods/services and contexts may be both valid and reliable

➢ Historically studies using market data have had to rely on "official statistics" or own collected data

➢ Today's technological developments provide exiting possibilities

  ➢ Apps
  ➢ Loyalty cards
  ➢ Cell phones…
  ➢ …
  ➢ Integrity issues!

➢ Combining market and survey data!