Valuing Changes in Forest Biodiversity

The application of a CE approach to Białowieża Forest in Poland

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Valuing Biodiversity – the challenge

- Biodiversity – recognition
- Convention on Biological Diversity, 1992
- Measures for implementing the Convention on Biological Diversity, 1998
- OECD, Valuation of Biodiversity Benefits: selected studies 2001
- World Summit on Sustainable Development 2002
- Biodiversity – decreasing levels
- The need for measuring and economic valuation

Valuing Biodiversity – the challenge

- The definition
- Species level diversity
  - vs. full picture
  - vs. general public
- The challenge

Previous studies

Value of biological resource

- Genetic – production function
- Species – stated preference
- Natural areas – travel cost & stated preference
- Ecosystem functions and services - adverting behaviour, replacement cost, production function

Value of it's biological diversity

- Policies aiming to or resulting in particular biodiversity increase
- Sets of components or indicators, that describe biological diversity of an area

Previous studies

- Meyerhoff (forthcoming)
- Christie et al. (2004)
- Greensense (2003)
- Holmes and Boyle (2003)
- Nunes et al. (2003)
- Nunes and van den Bergh (2001)

Site selection

- Forests = 65% of biodiversity resources in Poland
- Białowieża Forest – most recognised and ecologically valuable
- Considered the last natural lowland forest in temperate climate Europe

Białowieża Forest

- 62000 ha
- 16% national park
- Richness of species
- 11000 known species
- > 20000 total
- Natural dynamics
- Ecological structures and functions

Study design

- Attributes considered:
  - Familiar species of wildlife: rare, common
  - Unfamiliar species of wildlife: rare, common
  - Quality of species habitat
  - Ecosystem processes
  - Habitat for endangered and protected plant and animal species (red list)
  - Forest stand structure
  - Landscape diversity
  - Amount of dead wood

Study design – the attributes

- Natural ecological processes
  - *status quo* – 16%
  - *partial improvement* – 30%
  - *substantial improvement* – 60% of the area
- Rare species of fauna and flora
  - *status quo* – decline threatening total extinction
  - *partial improvement* – nurturing and tending allowing for maintaining current standings and improvement of their quality
  - *substantial improvement* – nurturing and tending allowing for maintaining current standings as well as their expansion

Study design – the attributes cont.

- Ecosystem components
  - *status quo* – lack of some components and decrease in quality of the existing ones
  - *minor improvement* – regeneration of deteriorated components on 10%
  - *partial improvement* – on 30%
  - *substantial improvement* – on 60% of the area
- Cost
  - additional compulsory tax
  - 10 years
  - 5 levels

Experimental design

- Alternatives:
  - Status quo (no variation)
  - Extension of the national park
  - Another form of protection
  - Opt out: '*I don't want to pay anything at all*'
- Orthogonal fractional factorial design:
  - 32 choice sets
  - Blocked into 8 questionnaire versions

The questionnaire

- June 2007
- In-person surveys
- Professional polling agency
- Random sample of 400 adult Poles
- 1600 choice observations

The questionnaire cont.

- The questionnaire structure:
  - General information
  - General questions
  - Detailed information about Białowieża Forest
  - Detailed description of attributes and attribute levels
  - Stated choice
  - Protest identification
  - Attitude questions
  - Socio-demographics

Results – the model

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
NEP1	.50910425	.09843863	5.172	.0000
NEP2	.64785554	.12395707	5.226	.0000
SPE	.34974804	.09233964	3.788	.0002
EC1	.50654162	.10930251	4.634	.0000
EC2	.51241183	.11226704	4.564	.0000
EC3	.62703028	.12306152	5.095	.0000
PARK	.24498339	.07048146	3.476	.0005
OPTOUT	-2.65484917	.23613687	-11.243	.0000
FEE	-.02953301	.00296950	-9.945	.0000

Log likelihood function	-1323.376
Pseudo-R^2(adj)	.22326
Protest responses removed	368

Results – welfare measures

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
WTP(NEP1)	17.2384822	3.46823975	4.970	.0000
WTP(NEP2)	21.9366590	3.90929410	5.611	.0000
WTP(SPE)	11.8426147	3.14892809	3.761	.0002
WTP(EC1)	17.1517106	3.90374413	4.394	.0000
WTP(EC2)	17.3504785	3.84502099	4.512	.0000
WTP(EC3)	21.2315069	3.99355099	5.316	.0000
WTP(PARK)	8.29523985	2.25591174	3.677	.0002

1 PLN ≈ 0.28 EUR ≈ 7.29 CZK

Conclusions

- First biodiversity economic valuation study in Poland
- Values difficult to compare but plausible
- Set of attributes describing biological diversity
  - several layers, not only species level
  - structural, species and functional diversity
- Natural processes most important
- Species – good proxy for biodiversity?
- Way of protection matters – ‘label effect’