Warsaw University
Warsaw Ecological Economics Center

FOREST NON-MARKET VALUATION STUDIES IN THE CZECH REPUBLIC, HUNGARY AND POLAND: A REVIEW

Anna Bartczak

bartczak@wne.uw.edu.pl

Presentation structure

- History of non-market valuation studies in the CE countries & some general information concerning forest and forestry in those countries
- An investigation of forest non-market valuation studies based on the report „An instrument for assessing quality of environmental valuation studies", Swedish Environmental Protection Agency
  - TCM studies
  - CVM studies
- Conclusions

Non-market valuation studies in the Central European Countries

- History – beginning of non-market valuation studies in the mid 1990s
- Research centres carrying out non-market valuation studies – one or a few depending on a country
- Number of non-market valuation studies – up to 18 in any particular country
- CE countries with the highest number of non-market valuation studies: the Czech Republic, Poland & Hungary

Non-market valuation studies in the Czech, Hungary & Poland*

Country	Studies		
	Research areas	Methods	No.
The Czech Repub.	air quality (2), **forest (2),** flood protection (1), landscape (3), national park (1), waste management (1), drinking water quality (2), surface water quality (1); human health (2); VOSL (3)	BT(1); CE(1), ABM(1);CVM(13) TCM(2)	18
Hungary	air quality (1), **forest (1),** national park (1), nature conservation-caves (1), nature conservation-Danube (1), waste management (2), water quality (4); VOSL (1)	BT(3); CVM(9); HPM(1);TCM(2)	12
Poland	air quality (2), cultural heritage (1); **forest (3),** national parks (2), drinking water quality (2), sea water quality (1), surface water quality (2), wetland (1), VOSL (2)	BT(1); CE(1) CVM(9); HPM(2) TCM (5)	16

* without VOT studies

General information on forests and forestry in: the Czech Repub., Hungary & Poland

Characteristics	Country		
	The Czech Repub.	Hungary	Poland
Share of forests area	33%	20%	29%
Predominant forest type	mixed	coniferous	broadleaved
Average age	around 60 years		
Share of public forests	84%	60%	83%
Access to forests	unlimited and free of charge independently of the ownership structure		

Non-market forest valuation studies in the Czech Repub., Hungary & Poland – background information (1)

- Number of surveys carried out : 6
  - Czech (2),
  - Hungarian (1),
  - Polish (3).

- Source of financing:
  - various ministries (Czech),
  - State Forest Enterprise (Poland),
  - WWF (Poland),
  - no funds (Hungary, Poland).

Non-market forest valuation studies in the Czech Repub., Hungary & Poland – background information (2)

- Objects:
  - single-site (4):
    - Forest in the Jizerske hory Mountains (CR) – (1)
    - Gemenc floodplain forest (Hungary) – (1)
    - Białowieża primeval forest (Poland) – (2)
  - multiple-site (2):
    - 10 selected forests covering various ecosystems and have different conservation regimes, ownership structures and geographical locations (Poland) – (1)
    - national sample asked about unspecified forest (CR) – (1)
- Methods:
  - TCM (4),
  - CVM (3).

TCM studies: background information

Country	THE CZECH REPUB.	POLAND		
Author	Melichar, J.	Zięzio, J.	Giergiczny,M.	Bartczak, A.
Timing of data collection	September – October 2005	April – September 2003	April – June 2003	1. October 2. November 2005
Estimated value	1. recreational 2. Δ in a site quality (3 scenarios)	recreational	recreational	recreational
Number of sites	1	1	1	10
Target population	?	Poles and foreigners	all adult Poles	all adult Poles
Frame population	forest visitors	forest visitors	forest visitors	1. forests visitors 2. representative sample of adult Poles

TCM studies: sampling & data collection

Country	THE CZECH REPUBL.	POLAND		
Author	Melichar, J.	Zięzio, J.	Giergiczny M	Bartczak, A.
Data	primary	primary	secondary	primary
Data collection	on-site one-topic survey	on-site one-topic survey		1. on-site one-topic survey 2. respondents homes routine survey of the polling agency
Sampling	random sample of visitors	random sample of visitors		1. random sample of visitors 2. quota sample representative for a country
Sample size	1. 312 2. 1248	1012	583	1.N=1002 2.N=1005
Method of interviews	face-to-face	face-to-face		face-to-face
Interviewers	trained students	trained students		professional polling agency

TCM studies: pre-testing & methodology

Country	THE CZECH REPUB.	POLAND		
Author	Melichar, J.	Zięzio, J.	Giergiczny,M.	Bartczak, A.
Pre-testing	focus groups in-depth interviews pilot studies	-		-
Cost components	transport, accommodation	transport, accommodation, travel time	transport, travel time*	transport, travel time*, time on site*
Multidesti-nation trips	assumption: all trips are a one destination trips	assumption: all trips are a one destination trip	assumption: all trips are a one destination trip	stated weights to a visit in a forest
Substitutes	travel costs to substitutes counted but not included in the v.f.	-		existence of substitutes included in the v.f (dummy variable)

*VOT estimated in CE or CV survay

TCM studies: models & estimations (1)

Country	THE CZECH REPUBL.	POLAND		
Author	Melichar, J.	Zięzio, J.	Giergiczny,M.	Bartczak, A.
Wealfare's measure	NCS	travel expenses	NCS	NCS
Model	Single site count model. 1-truncated Poisson regression.	-	ZTCM Countinous model	Multiple Site count model. 1-truncated Poisson regression
Valuation function (v.f.)	$\lambda_{ij} = \exp(\beta_0 + \beta_1 x_{ij} + \beta_2 p_{ij} + \beta_3 q_j)$ $\Pr(y_n \mid y_n > 0) = \frac{e^{-\lambda_n} \lambda^{y_n - 1}}{(y_n - 1)!}$	$V = N \cdot AC$	$\lambda_{ij} = \exp(\beta_0 + \beta_1 x_{ij} + \beta_2 p_{ij})$	$\lambda_{ij} = \exp(\beta_0 + \beta_1 x_{ij} + \beta_2 p_{ij})$ $\Pr(y_n \mid y_n > 0) = \frac{e^{-\lambda_n} \lambda^{y_n - 1}}{(y_n - 1)!}$
Explanatory power of v.f.	1.log-likelihood 17 763 2. log-likelihood 64 386	-	adjusted R^2=0.81	log-likelihood 39 584
% of excluded observation	0	0	9% (foreign visitors)	6% (visitors with no recreational purpose of a trip and visits longer than 1 day)

TCM studies: models & estimations (2)

Country	THE CZECH REPUB.	POLAND		
Author	Melichar, J.	Zięzio, J.	Giergiczny,M.	Bartczak, A.
Non-visitors	-	-	Taken into account	Taken into account
Results	**1)11.58** Euro per visit per visitor 2)Δ in quality **=35.25** Euro per visitor per year	Total annual recreational value = **4.1 mln** Euro	Total annual recreational value = **2.9 mln** Euro Total recreational value = **73.6 mln** Euro (r=2%)	Visitors: **22.84** Euro per vist per person All: **2118** Euro/ha per year
Confidence interval (c.i.) for the coefficient of the travel cost variable	1) β_2=-0.0029 95% C.I.= [-0.0031; -0.0028] 2) β_2=-0.0028 95% C.I.= [-0.0029; -0.0027]	-	β_2=-0.00896 95% C.I.= [-0.0115; -0.0065]	β_2=-0.01102 95% C.I.= [-0.0115; -0.0105]

TCM studies: veryfication

Country	THE CZECH REPUB.	POLAND		
Author	Melichar, J.	Zięzio, J.	Giergiczny,M.	Bartczak, A.
Sensitivity analysis	NB vs. Poisson model	-	-	NB vs. Poisson model
Validity tests	debriefing questions for respondents and interviewees	-	-	comparison with CVM results
Non-responses	-	-	-	-

CVM studies: backgroung information

Country	THE CZECH REPUB.			HUNGARY	POLAND
Author	Šišak L., Pulkráb K., Kalivoda V.			Nagypál N., Szlávik J.	Bartczak, A.
Timing of data collection	1994	1995	1996	January-April 2002	1.October 2.November 2005
Estimated value	recreational			the total economic value	recreational
Number of sites	national level			1	10
Target population	all adult Czechs			?	all adult Poles
Frame population	representative sample of adult Czechs			representative sample of local population	1.forest visitors 2.representative sample of adult Poles

CVM studies: sampling & data collection

Country	THE CZECH REPUB.			HUNGARY	POLAND	
Author	Šišak L, Pulkráb K., Kalivoda V			Nagypál N., Szlávik J.	Bartczak, A.	
Data	primary			primary	primary	
Data collection	routine survey of the polling agency Multi-topic survey			respondents homes, public places one-topic survey	1. on-site one-topic survey 2. respondents homes routine survey of the polling agency	
Sampling	quota sample representative for a country			quota sample representative for a local population	1. random sample of visitors 2. quota sample representative for a country	
Sample size	856	991	1461	300	1.N=501 2. 1005	1.N=501 2. 1005
Method of interviews	face-to-face			face-to-face	face-to-face	
Interviewers	professional polling agency			one of the authors and her friends and relatives	professional polling agency	

CVM studies: pre-testing & scenario

Country	THE CZECH REPUB.		HUNGARY	POLAND	
Author	Šišak L, Pulkráb K., Kalivoda V		Nagypál N., Szlávik J.	Bartczak, A.	
Pre-testing	-		-	consultation with a forestry expert	
Scenario	-		description of current quality of the forest	presenting costs connected with keeping forests as a recreational place	
Payment vehicle	entrance fee to a private forest	entrance fee	annual payment not specified a form nor a recipient	entrance fee paid to a local forest management body	
% of non-responses for valuation quest.	19%	0%	no information	0%	0%
% of protesters	not defined		9%	50%	38%

CVM studies: WTP

Country	THE CZECH REPUB.			HUNGARY	POLAND	
Author	Šišak L, Pulkráb K., Kalivoda V			Nagypál N., Szlávik J.	Bartczak, A.	
WTP/WTA	WTP			WTP	WTP	
Question format	open-ended			open-ended	payment card	single bounded DC
Protesters	-			excluded from an estimation	excluded from an estimation	
% zero WTP	68%	68%	65%	44%	20%	8%

CVM studies: models

Country	THE CZECH REPUB.	HUNGARY	POLAND
Author	Šišak L, Pulkráb K., Kalivoda V	Nagypál N., Szlávik J.	Bartczak, A.
Method	non-parametric	non-parametric	parametric
Model	-	-	a Spike model

CVM studies: results

Country	THE CZECH REPB.			HUNGARY	POLAND	
Author	Šišak L, Pulkráb K., Kalivoda V			Nagypál N., Szlávik J.	Bartczak, A.	
Results	**0.09** Euro per person per visit	**0.23** Euro per person per visit	**0.95** Euro per person per visit	**12** Euro per person per year	Visitors: **0.72** Euro per person per visit (st.error 0.05) All: **64** Euro/ha per year	Visitors: **4.68** Euro per person per visit (st. error 0.32) All: **334** Euro/ha per year
% of WTP in net income	-	-	-	-	Visitors: 0.1%	Visitors: 0.7%

CVM studies: veryfication

Country	CZECH	HUNGARY	POLAND	
Author	Šišak L, Pulkráb K., Kalivoda V	Nagypál N., Szlávik J.	Bartczak, A.	
Sensitivity analysis	-	-	minimum legal WTP: **0.64** Euro per visitor per visit	- non-parametric estimation (Kaplan-Meier estimator): **3.56** Euro per visit -an anchoring effect: acceptance of lowest bid **98%** acceptance of highest bid **33%**
Validity tests	-	-	comparison with results achieved by TCM	
Non-responses	-	-	-	

Conclusions (1)

- Short history of non-market valuation studies in transition economies, a small number of such studies, decision makers are not aware or not interested in carrying them out
- Most of forest non-market valuation studies did not involve the stage of testing the scenarios and questionnaires, payment vehicle or bids in CV surveys (mostly due to financial constrains).
- In some surveys a target sample has not been defined
- In the majority of TCM studies non homogeneous visits were taken into account (mixing one day visits with multi-day visits).
- Only in one case the value of time spent on the recreation site was included in the cost component.
- In the majority of TCM studies it was assumed that the trips have a single goal
- In some surveys some elementary methodological mistakes appeared such as assuming that the value of recreation equals travel expenses

Conclusions (2)

- The scenarios in CVM studies (if any) were not convincing or realistic. In most of those studies a payment vehicle was not precisely defined. Both of these factors caused a high number of protest answers. In one out of 3 CVM studies the share of protesters was not investigated.
- The size of the sample in two CVM studies after excluding protesters was below 500, which could influence the reliability of their findings
- In almost all studies authors avoided estimation of the total value and the problem of discounting connected with it
- All surveys suffer from lack of sufficient sensitivity and validity analysis.