Valuing forest recreation on the national level in a transition economy: The case of Poland[☆]

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ABSTRACT

Recreation benefits constitute a substantial part of the total economic value of forests, and are important for the choice of multi-functional forest policies. The application of methods valuing such benefits is in its infancy in transition economies in Central and Eastern Europe (CEE), so value estimates for policy use are sometimes transferred from Western Europe proportionally scaled down by GDP. However, little is known about how recreation values vary with income, and one risks underestimating benefits in CEE. This paper reports the findings of the first comprehensive, national-level study in any CEE country estimating annual and per trip forest recreation values in Poland using the Travel Cost (TC) and Contingent Valuation (CV) methods. Two in-person interview surveys of forest recreation behaviour were carried out. The first was administered on-site in ten representative forest areas, and the other in the homes of a national sample of adult Poles. Results show that forest recreation is highly valued in Poland, at Euros 0.64–6.93 per trip per person, depending on the valuation method. Both trip frequency and per trip values are higher than the average in Western Europe, despite a lower income level. Thus, a simple GDP-adjusted transfer from Western Europe would substantially undervalue forest recreation in Poland. Further, a comparison of TC consumer surplus estimates and GDP/capita in Europe shows no clear relationship, indicating that a range of cultural, institutional and other factors may be important.

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1. Introduction

Recreation benefits constitute a substantial part of the total economic value of forests in modern societies, and are an increasingly important determinant in multi-functional forest management (Cubbage et al., 2007). While applications of the travel cost (TC) and contingent valuation (CV) methods to value recreation benefits are quite common in Western Europe and USA (see for example Croitoru (2007); Lindhjem (2007); Brainard et. al. (2001); Scarpa et al. (2000); Carson et al. (1996)), their use in transition economies in Central and Eastern Europe (CEE) is in its infancy.[1] TC measures people's revealed preference for forest recreation through the expenditures they incur to visit a site while CV measures people's stated preference, i.e. their Willingness-to-Pay (WTP) for a hypothetical trip. To evaluate recrea-

tion benefits in CEE the only means to date is to transfer unit values per trip from Western Europe. A simple transfer often assumes that recreation benefits vary proportionally with income, so transferred values are scaled down by the relative difference between purchasing power parity (PPP) adjusted GDP/capita. Based on an assumption like this, UNECE/FAO (2005) puts the value of a forest trip at Euro 1 in Western Europe, and Euro 0.25 in CEE. However, this approach risks underestimating recreation benefits in CEE countries.[2] There is some evidence that environmental values increase with measures of income at a less than proportionate rate at least for some goods (notably water quality, wetlands and air pollutants) and income levels (Kriström and Riera, 1996; Hökby and Söderqvist, 2003).[3] Forest recreation may also display Kuznets curve characteristics, i.e. an U-shaped relationship between recreation value and GDP-levels (Grossman and Kruger, 1995).[4] If so, recreation values in CEE may also be higher in *absolute*

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[1] Forestry-related TC and CV have been used separately in a few, limited cases: in the Czech Republic, Hungary and Poland, none of which are published in English (see Bartczak and Giergiczny (2006) for details).

[2] Krupnick et al. (1996) acknowledge that this is likely to be the case in their early transfer of value estimates of air quality improvements from USA to CEE.
[3] Goods displaying this demand characteristic are often called normal, non-luxury goods.
[4] A standard Kuznets Curve would have a measure of environmental pollution on the *Y*-axes and GDP/capita on the *X*-axis, thus displaying an inverted U-shaped curve.

terms than in Western Europe. Further, a number of other factors than income is likely to play a large role in explaining differences in recreation values between countries (Ready and Navrud, 2006). More advanced international benefit transfer techniques based on benefit functions or meta-analysis are also too unreliable at the current state of knowledge to capture such factors (Lindhjem and Navrud, in press). Hence, primary studies valuing forest recreation (and other forest goods) in CEE are clearly needed to understand recreation patterns and values and to guide forest policy development. The primary purpose of this paper is to report the findings of the first comprehensive national-level study, in any CEE country, valuing forest recreation by applying standard TC and CV methods. We couple a survey of national recreation patterns with on-site surveys of per trip values per person from ten representative forest sites to estimate the average per trip and total annual recreation value of forests in Poland. Further, we compare and contrast Polish recreation behaviour patterns and per trip values with Western European studies to date. We find that forest recreation is considered highly valuable in Poland, more so than would be indicated by its income level.

2. Background, study design and forest sites

Poland has about 9.2 million hectares of evenly distributed forests covering 28.4% of its territory (average in Europe is 31%). While some other transition countries have chosen to privatise forests (e.g. Hungary), Poland still has more than 80% state owned (mostly administered by the State Forest Enterprise — SFE). The vast majority of forests are accessible to the public free of charge. However, according to a law from 2004 an entrance fee can be introduced in national parks, a practice which has only been taken up in few parks to date. In 2005, the SFE commissioned a study aiming *to estimate the recreational value of forests in Poland both in terms of value per trip (or visit) and total annual value*, to inform the balancing of multiple use and timber harvesting objectives within current forest policy and management. Two independent surveys were conducted face-to-face by a professional polling agency. The first, conducted in October 2005, was an on-site survey with integrated TC and CV components aiming to estimate the recreational value per trip for day-trips to a selection of ten forest sites. The sample consisted of around 1000 interviews with users intercepted along main paths inside the forests at random times and days of the week. The second main survey, a national household survey, was conducted in November 2005, sufficiently close in time to ensure preference stability and consistency with the on-site survey. This was an add-on to a routine in-person opinion poll administered in respondents' homes to a quota sample of 1000 people representative of the entire adult population with respect to sex, age, education, income level and geography.[5] Since the site surveys can only capture current users, the national sample supplements this data with recreation patterns of all users and non-users. The forest sites were selected to cover various ecosystems, conservation regimes, ownership structures and geographical locations (see Table 1).

Five areas represented forests with no particular conservation regime, two were national parks, two so-called "promotional areas"[6] and one was a municipal forest in a large city. Of the ten sites listed in Table 1, three can be considered "urban forests" serving mainly adjacent urban areas (Forest Barbarka, Kampinoski National Park and Forest Piatkowski). In contrast, Puszcza Bialowieska, The Bialowieza

Table 1
Selected forest sites for on-site surveys

No.	Name of the site	Conservation regime	Ownership	Location	Sample size
1	Puszcza Bialowieska	National Park	Treasury	NE	101
2	Forest Barbarka (Torun)	None	State Forest	NW	100
3	Kampinoski National Park	National Park	Treasury	C	100
4	Swierklaniec	None	State Forest	SW	101
5	Zielona Gora	None	State Forest	SW	100
6	Forest Piatkowski (Poznan)	None	Municipal	NW	100
7	Krzeszowice	None	State Forest	SE	100
8	Kudypy	None	State Forest	NE	100
9	Kozienice	Promotional	State Forest	SE	100
10	Bory Tucholskie	Promotional	State Forest	NW	100

Key: NW, NE, C, SE, and SE refer to Northwest, Northeast, Central, Southeast, and Southwest locations, respectively.

Primeval Forest, is the best-preserved example of a European lowland ecosystem, and it is further away from any urban centre.

3. Valuation methods

The TC and CV methods were used to obtain a robust range of per trip values. The on-site survey questionnaire was evaluated by peers in the fields of forestry, economics, and survey methodology. It generally followed valuation survey procedures well-tested in Poland in earlier studies (Żylicz, 2000).

3.1. The travel cost component

The value of a single, one-day trip to a forest was calculated according to standard single-site TC methodology (see for example Ward and Beal (2003)). In addition to questions about the frequency of trips to the particular forest over the last 12 months, the TC part collected detailed information about the current trip:

Purpose of the trip (one-destination trips and multi-destination trips[7]) and main activity (walking, picking berries, sport activities, non-recreational activities, other),
Round trip distance in km, time required to complete the trip, mode of transport, number of people travelling together (including the number of children), time spent on-site, and information concerning relevant substitute sites.

To calculate the average visitor demand for forest recreation in Poland and thus also the consumer surplus (CS) per trip we used calculated TC, rather than perceived and stated TC (Moons et al., 2001). Cost for use of public transport and private cars per individual or household was estimated based on information about the mode used by respondents in round trip (in this case the average cost of fuel, cost of tickets in public transport from 2005 were taken), distance, number of people travelling together, and number of household members visiting a site. Many studies assume opportunity cost of time equal to a fraction of the wage rate, usually one-third (Cesario, 1973). However, the value of travel time for individuals can vary depending on many factors such as the length and route of the trip, transport mode or weather conditions. Further, travel may in some cases increase the wellbeing of visitors. Since there is no generally agreed approach to dealing with the value of time in TC models, we chose to

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[5] The polling company did not report detailed response rates for the surveys, but informed us that their average refusal rate for routine polls in Poland in 2005 was around 9%, which is low by any standards. Further, for site surveys of user groups it is often easier to get higher response rates than for more general populations.

[6] A unique Polish conservation regime voluntary declared by the SFE that combines forestry with protection of ecosystems. One of the main aims is education (educational paths, centres, museums).

[7] For multi-destination trips respondents were asked to attach percentage weights to the forest trip, and the travel costs were weighted for those whose weights were equal to at least 50%. If the weight was less than 50%, the observation was dropped as it can reasonably be assumed that many people would make the trip in any case. More advanced approaches to deal with multiple-destination trips suggested for example by Parsons and Wilson (1997) were for simplicity not pursued here.