

A synthesis of recreation values of European forested areas and implications for national benefit transfers

*Kateřina Kaprová, Charles University Environment Center, Czech Republic,
katerina.kaprova@czp.cuni.cz*

Jan Melichar, Charles University Environment Center, Czech Republic

Markéta Braun Kohlová, Charles University Environment Center, Czech Republic

Introduction

Recreation represents an important ecosystems service provided by the natural areas that contributes to the human well-being. The knowledge on the recreational value of natural areas and its determinants may support the discussion on the allocation of financial resources for nature conservation. Our study focuses on European recreation values attributed specifically to forests. Since the last similar study published 9 years ago (Zandersen and Tol, 2009), the scientific evidence on new natural sites has emerged and may help to enhance the knowledge on the factors that affect the recreation value. Focusing solely on forest recreation values yielded by travel cost studies (as opposed to a very recent study by Schägner et al., 2018), we hope to elucidate the effect of the travel cost methodology and specific forest characteristics on the resulting estimate of value associated with the recreational experience.

Our particular aim is to assess the validity of the value transfer from Europe to natural sites in the Czech Republic and in other countries in the Central and Eastern Europe, where the evidence on recreation values is still scarce and which are not covered by most of the previous meta-analytic studies that incorporate forest recreation values.

Methodology

We first synthesize and discuss the central tendency and evolution of the values. Since the primary estimates are substantially heterogeneous across the studies, we disentangle the factors of variability in the reported recreation values using a meta-analytic model. Out of value transfer methods, meta-analysis represents the most complex technique (Navrud and Ready, 2007). The technique allows for synthesis of previous research results and for testing hypotheses with respect to the effects of particular determinants of recreation use values of natural areas. This technique also facilitates validity testing - we measure the accuracy of benefit transfer using benefit transfer error. We develop a value transfer function that uses the recreational value (consumer surplus) per person per visit as the dependent variable.

Data

Our analysis builds on a body of the primary valuation literature on forest recreation values published in Europe over the past 35 years. The meta-analysis includes primary environmental valuation studies that applied travel cost method (Parsons, 2003) and are employed to model forest recreation values across European countries. Relevant papers and studies were searched through databases such as EVRI, DEFRA UK and EPA US, further using the online research databases like ScienceDirect, JSTOR, EBSCO and peer review journals in environmental and resource economics. We have also reviewed EU funded projects that assessed impacts upon non-market goods relevant for climate change (e.g. ClimateCost) and their monetary valuations (e.g. NEEDS, PASHMINA). These data sources were complemented by grey literature (dissertation theses, working papers etc.). Our sample

is unique in the respect that it encompasses a significant portion of natural recreation sites in the post-transition area of Central and Eastern Europe.

Results and Discussion

One of the key results from our meta-analysis of European forest recreation values is that higher recreation values are associated with remote forests in scarcely populated mountainous areas which are preferably protected and constitute of denser broadleaved forests, with not much open space within the forested area. The results suggest that even within one environmental valuation technique (travel cost method), the particular methodology applied plays a significant role for the magnitude of estimated consumer surplus. We further discuss how the results fit into the context of primary estimates in the Czech Republic (single site models by Kaprová, 2015; Melichar, 2012, and a random utility model by Kaprová and Melichar, 2016).

Using a split sample analysis, we confirm that meta-analytic benefit transfer from Northern, Western and Southern recreation sites to those located in Central and Eastern Europe systematically overpredicts the recreation values in all quartiles of recreation value per trip.

Conclusion

Our results demonstrate that the outcomes of primary studies focusing on estimation of recreation demand and values associated with non-urban forests vary significantly across Europe. We successfully disentangle the effects of methodological and study site variables on the recreation value. However, in accordance with the previous works, the direct measurement of the effect of proxies for recreationists' preferences or cultural differences across studies and countries is not straightforward, because the data available are very limited.

The findings suggest that value transfer across Europe, including Czech recreational areas, could be beneficial for cost-benefit analyses of minor prospective projects aimed at natural recreational areas, but a sensitivity analysis in CBA is recommended. The errors may differ (and may be substantially larger if the evaluated recreation site differs from those in the sample). This issue would deserve a more in-depth discussion and will be addressed subsequently.

Acknowledgement

This contribution was supported by the 7th FP EC grant Global-IQ: Impacts Quantification of global changes (No. 266992; 2011-2014). The support is gratefully acknowledged.

Kaprová, K. (2015). Recreation values and the value of recreation demand modelling: The case of the Šumava NP. *Journal of Landscape Management* 6/2, p. 38-48.

Kaprová, K., and J. Melichar (2016). Recreation demand for large natural areas in the Czech Republic. Proceedings of conference "Public recreation and landscape protection - with nature hand in hand..." (RaOP 2016), May 1-3, 2016, Křtiny.

Kaprová, K., J. Melichar (2012). Truncation, overdispersion and endogenous stratification in recreation demand models. Paper presented at Mathematical methods in economics conference, September 11-13 2012, Karviná.

Melichar, J. (2014). Measuring recreation benefits of forest quality change with contingent behavior model. *Journal of Landscape Management* 5/2, p. 10-15.

Navrud, S. and R. Ready, eds. (2007). Environmental value transfer: issues and methods. Springer, 290 p.

Zandersen, M., and R. S. J. Tol (2009). A Meta-analysis of Forest Recreation Values in Europe. *Journal of Forest Economics* 15, p. 109-130.

Schägner, J. P., L. Brander, M. L. Paracchini, J. Maes, F. Gollnow, B. Bertzky (2018, in press - corrected proof). Spatial dimensions of recreational ecosystem service values: A review of meta-analyses and a combination of meta-analytic value-transfer and GIS. *Ecosystem Services*.