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Economic Analysis of Recreation by Tourists on Protected Coastal Zones: A French Case

Jeoffrey Dehez & Mbolatiana Rambonilaza

Cemagref-Bordeaux, France

jeoffrey.dehez@bordeaux.cemagref.fr
mbolatiana.rambonilaza@bordeaux.cemagref.fr

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Introduction

Recreation is a major use of protected coastal zones and demand derives both from local and tourist populations. Economic impacts of such policies are hard to handle for many reasons. First, recreation is a non-market service and the lack of price is often associated with a lack of benefits. This situation is well known by economists who have elaborated various techniques for giving an economic value to many environmental functions. The Travel Costs Method (TCM) is one of the most used techniques for recreation but unfortunately tourists are generally dropped out the sample on the basis that they do not fit the standard economic hypothesis well. Secondly, supply side is frequently neglected. This is partly because information on inputs, costs and outputs is scattered between public agencies or managers. Thus, complete analysis of recreation is also relatively rare.

We offer here an integrated economic analysis of recreation activities in the Gironde area, a portion of coastal zone located in the South West of France. It's famous for its natural character and tourist attractiveness. Natural spaces are composed by sandy beaches, dunes and three large pine forests.

Methods

In many occasions, recreation activities fit the theory of Lancaster (1966) well, whereby individuals get satisfaction from certain characteristics (scenery, trails density, water quality) in addition to the total number of trips and prices (McConnel 1977). For this reason, we develop an analytical framework based on this kind of approach, as it seems to offer better opportunities for connecting supply and demand (compared to global valuation).

Regarding the lack of literature, we propose a simple analytical framework for describing the production costs of recreational attributes. It's based on standard microeconomics of production and designed to include both direct and restoration costs. For the demand, we show how to adapt the standard Travel Cost Method by using a 3 stage decision process and a random utility model. This comes from an early work made by Bell and Leeworthy (1990), recently adapted by Riera Font (2000) in the Balearic islands. Under the new hypothesis, this type of model allows for the application of the TCM with tourists. Here, we focused on the third step and the relevant "on-site costs". The definition of the latter is discussed in the paper.

Results

Based on the previous models, we empirically estimate cost functions for various attributes. We make separated estimations for the three spaces (beach, dune and forest) and specific management actions. Total number of visits F, as well as beach lengths LN, Ld, and Lf, recreation area size (in forests) SZA and cycling paths' length LPC appear to be the dominant factors. Each functional form is linear. This allows a matrix of marginal (or average) costs (table 1).

Table 1: Marginal costs of producing recreational attributes (Euros 2002).

Management actions	*Constant*	*L_N (km)*	*Ld (km)*	*Lf (km)*	*S_{ZA} (Ha)*	*Config (dum)*	*F_{est} (visits)*	*F (visits)*	*Lpc (Km)*
Life guarding							0,049		
Beach cleaning		13.992							
Dune management			3.100						
Cycling paths (investment)									2.682,98
Cycling paths (operating)									626,19
Recreation areas (investment)	7.603				917	20.972			
Recreation areas (operating)				8.138,42	1.197,81			0,016	
Forest management					589,75				589,75
Total		13.992	3.100	8.138,42	2.713,56	20.972	0,049	0,016	3.898,92

Table 2: Marginal benefits for recreational attributes (Euros 2002).

Attributes	*Unit*	*Marginal benefit (day/household/€)*	*Marginal benefit (day/individual/€)*
Cycling paths (L_{PC})	1km	22,60	5,65
Recreation areas (S_{ZA})	1ha	1,26	0,32
Beach Length (L)	100m	8,67	2,17

Functional forms are estimated using OLS and panel data techniques (depending on the database). Turning to the tourists demand, a conditional logit is estimated where on-site costs, squared on-site costs, beach length, recreation areas and cycling paths are all significant. By doing so, we find some of the variables used in the supply analysis again. We derive measures of consumer surplus for households and individuals related to each of the three previous attributes (table 2).

In the last part of the paper, we balance costs and benefits. Each attribute appears to have a significant economic value as a relatively small number of visits (between 690 and 8451 depending on the attribute) offer a positive net value. These figures are quite low compared to the total number of tourists' day-visits (around 5 million) given by regional statistics. This tends to suggest the actual management conforms to economic optimality and invites us to think of related policies such as funding. On that particular point, our work also offers indications. For instance, peak pricing is relevant for at last three reasons: seasonality of demand and costs, and capacity costs (through variable SZA).

Conclusion

To conclude, we discuss the overall contribution of the attribute based approach for economic valuation of recreation management. The presented one is very appealing for the identification of key variables (recreational characteristics) but still suffers from limitations in the evaluation of global costs and benefits. For these reason, it must be completed with techniques rather than focusing on the total number of visits such as count data models.

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