

# Mixed integration of individual background, attitudes and tastes for landscape management



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## ARTICLE INFO

### Article history:

Received 21 February 2013

Received in revised form

18 December 2013

Accepted 18 December 2013

### Keywords:

Discrete choice experiment

Heterogeneity

Multilevel mixed models

Ski

Spa

## ABSTRACT

This paper discusses the design and analysis of a choice experiment regarding preferences for possible transformations of a mountain landscape traditionally used for grazing. Visual impacts related to changing a mountain landscape associated with a new ski resort development are evaluated versus an option with less environmental impact, such as a health spa or “no development”. A multi-level latent class framework is applied to simultaneously obtain those groups of people who choose similarly and are grouped locally, but are also defined by their location, assuming that their choices are representative of what they like and would choose. Groups from the mountains are classified into one specific grand class. Some individuals who live in urban areas have attitudes and beliefs similar to those who live in the mountains, and they also are classified into that same grand class. The model also identifies seven lower-level groups of individuals, each with their own structure of preferences.

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## Introduction

Throughout the 20th century, the rural landscape in Europe has undergone major changes due to social and economic transformations that have occurred. For example, European mountains have experienced many changes with respect to systems used to manage their resources. Specifically, profound landscape changes occurred in the Spanish Pyrenees Mountains, which in turn generally led to abandonment of traditional practices of using the land in a search for increased agricultural profitability.

The second half of the 20th century witnessed the emergence of a demand for services from the rural environment that went beyond the supply of cheap food (Calatrava, 1996; Lima-Santos, 1998; Arnalte, 2002). With increased income and leisure time for a majority of Europeans, as well as widespread ownership and/or use of automobiles, concentration of people in urban areas, demand for outdoor recreation services increased that involved consuming a greater or lesser degree of nature. In turn, this led to new functions for rural areas and growing ecological awareness. At the same time, natural spaces are growing scarce, which had led to increased demand for attributes like beauty, culture, history and wildlife.

These attributes are elements of European landscapes that have sustained the heaviest losses due to intensification and mechanization of agriculture and abandonment of marginal agricultural areas that cannot compete with more fertile areas (Gourlay and Slee, 1998; Latacz-Lohmann, 1998; Lima-Santos, 1998; Arnalte, 2002; Sayadi et al., 2009).

At the same time, development and distribution or specialization of leisure activities has been uneven in terms of offerings and geographic areas. As a result, certain high mountain areas are making claims for a share of the highly lucrative skiing business, which in most cases involves higher environmental costs.

With the preceding as background, the purpose of this paper is to describe and discuss a valuation exercise that focused on visual impacts associated with the development of a ski resort in the Sobrarbe district (Huesca) of Northern Spain, that involves building and developing more than 30 ski runs (currently under discussion). We compare this project to an alternative that has much less environmental impact.

The first effort on valuing environmental changes involved in developing mountain environments is due to Krutilla and Fisher (1985). There is also a large literature dealing with the study of landscapes, although mostly from ecological, spatial and/or psychological perspectives rather than from an economic perspective (García del Barrio et al., 2003; Arriaza et al., 2004; Dearden, 1980; among others). There also are numerous studies that focus on

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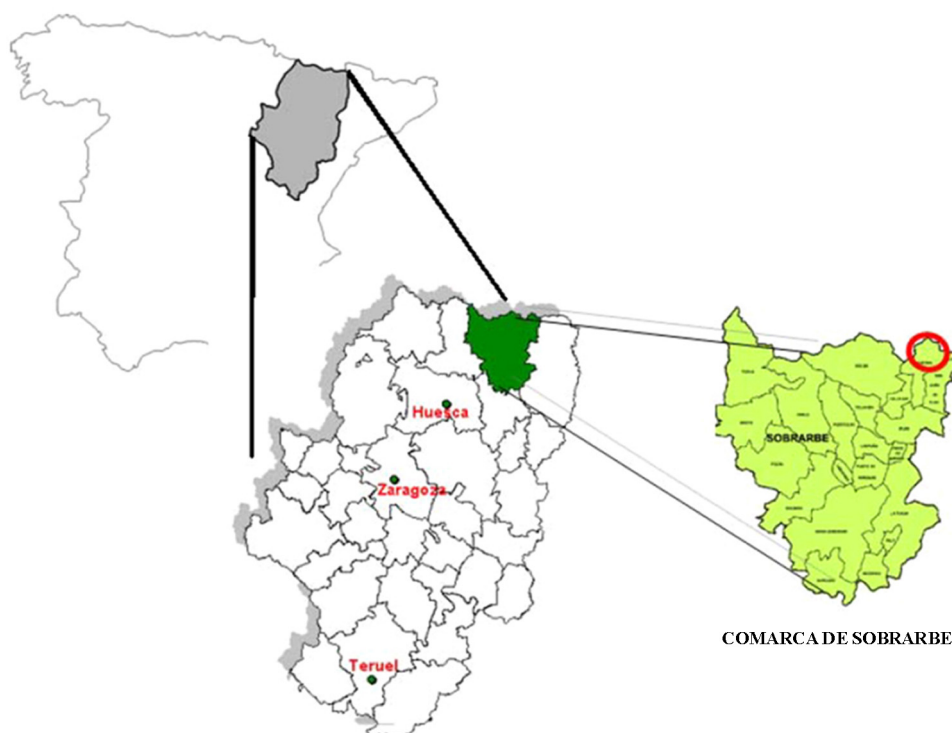


Fig. 1. Study area.

individual preferences, although few have a specific economic valuation objective (Arriaza et al., 2004; Buhyoff and Riesenmann, 1979; Calatrava and Sayadi, 2001; Dunn, 1976; Givon and Shapira, 1984; Pérez, 2002; Ulrich, 1981); and some effort to integrate landscape ecology and economics (Tagliaferro et al., 2013).

Examples of research focused on economic valuation of landscape are, among others, Lima-Santos (1998) who conducted an economic valuation of landscape focusing on willingness to pay for conservation that considered the complexities of valuing changes to landscape. Lima-Santos used the contingent valuation method, and attempted to take into account the multi-attribute nature of landscape and interactions among the attributes. Dabbert et al. (1998) reviewed several contingent valuation studies applied to landscape characteristics. Hanley et al. (1998) undertook a valuation exercise for maintaining certain characteristics in Environmentally Sensitive Areas in the UK to calculate compensation to farmers who voluntarily maintained a certain landscape in its humanized and integrated aspect. More recently, Hanley et al. (2007) incorporated other cultural aspects of rural landscapes based on the discrete choice experiment approach (Louviere et al., 2000).

Campos (1993) and Campos and Riera (1996) (among others) worked on spaces converted to pasture land in Spain, and the economic value of various aspects of these spaces, including landscape and reforestation. González and León (2003) conducted a landscape valuation study in Spain that highlighted the fact that values can differ depending on an individual's personal situation. They used a contingent ranking exercise to overcome some of the traditional difficulties of the contingent valuation method. Using both contingent valuation and choice experiments, Prada et al. (2005) highlighted the economic benefits associated with conserving mountain landscapes in natural spaces in Spain; Colombo et al. (2006) analyzed the improvements derived from preventing erosion and their effects on landscape and Howley et al. (2012) explored WTP for conservation of traditional farm landscapes.

Thus, the majority of publications in the field of environmental economics focused on valuation of various aspects (recreational, functional, etc.) of landscapes. Researchers have tried to take cultural and (sometimes) esthetic aspects into account in valuations, although the latter rarely was the objective of study in most cases. Evaluating visual impacts due to landscape changes associated with a new ski resort development provides an opportunity for a more comprehensive valuation of the economic aspects of landscape changes that are usually not considered in planning, design and management of natural and rural spaces. Moreover, a more comprehensive valuation that takes visual landscape impacts into account along with other economic considerations has been conspicuously absent in environmental impact studies of major landscape-related development projects like the particular project that is the focus of our research.

This remainder of the paper proceeds as follows: first, we describe and discuss the case study. Then we describe and discuss the methodology and the design of the associated survey questions. We then discuss the results, finally present relevant conclusions.

### Study area

The study was conducted in Zaragoza, Huesca and in the Gistaín Valley, which is in the Pyrenees Mountains within the region of Aragón (Fig. 1). The study area is located in a high mountain area, with an approximate surface area of 2203 km<sup>2</sup>, a population of 7293 inhabitants, and a population density of 3.3 inhabitants/km<sup>2</sup>.

Gistaín is one of the most hidden and isolated valleys in the Pyrenees, which has kept it relatively free from much speculation until recently. However, the inhabitants of the valley are requesting development policies that can stimulate the local economy and help keep young people from leaving the land. We held a number of meetings with various mayors and local private initiative groups during the winter of 2005. Inhabitants of the valley have demanded a ski resort for years, and currently there are two possible projects being considered: one for the valley of Bielsa, next to the Ordesa

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