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Estimating the Probability of Visiting a Protected Natural Space and Its Conditioning Factors: The Case of the Monfragüe Biosphere Reserve (Spain)

Marcelino Sánchez-Rivero , Juan de la Cruz Sánchez-Domínguez  and M^a Cristina Rodríguez-Rangel * 

Department of Economics, Faculty of Economic Sciences and Management, University of Extremadura, Avenida de Elvas s/n, 06006 Badajoz, Spain; sanriver@unex.es (M.S.-R.); jsanchezdom@unex.es (J.d.l.C.S.-D.)

* Correspondence: mcrisrod@unex.es

Abstract: Spain is the European country with the highest percentage of protected areas (27.4% of its total surface area) and the country with the highest number of Biosphere Reserves, with 53. Extremadura, the region that we analyze in our study, has a total of 89 Special Conservation Areas and 71 Special Protection Areas, Monfragüe being one of them. In this context, the aim of this paper is to determine which factors have an influence on the decision to visit Monfragüe. We perform a regression analysis using a logit model, which shows that the only four factors that influence the decision to visit Monfragüe are gender, travelling with one's partner or family, the type of accommodation, and the importance given to nature conservation. We also analyze the structural change using the Chow test, which shows that there are no structural changes, i.e., that the probability of visiting Monfragüe in the high or low season is not significantly different. In the case of Monfragüe, ecotourism is not currently practiced en masse; only 3 out of 10 tourists practice ecotourism in Monfragüe, which is important for the sustainable management of the park because the number of tourists it receives each year is within its carrying capacity.

Keywords: natural parks; regression analysis; ecotourism; Extremadura



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1. Introduction

The surface area protected in the form of Biosphere Reserves continues to increase and has now reached the figure of 53 territories, which have been awarded this distinction by the UNESCO in the year 2021 in Spain.

This rise can be explained by the opportunities for conservation of the development of the sustainable use of these natural resources [1]; as part of this use, the important role played by tourism should be emphasized.

Although it is true that tourist activities carried out in an uncontrolled manner can become a threat to the conservation of these spaces, the sustainable development of these activities is desirable both to develop the local communities and to generate income for the conservation of the protected space [2]. In effect, as the authors of [3] point out, socioeconomic development around protected spaces may help to avoid adverse effects such as checking depopulation and reducing the economic disparities suffered by rural areas.

For this reason, the sustainable management of natural spaces becomes an opportunity to create wealth and wellbeing in regions with little industrial development that see in the management of their natural legacy an opportunity to generate wealth and employment by the development of the service sector.

However, to achieve satisfactory tourist management of the natural space, it is essential to use suitable segmentation strategies. The segmentation of markets has habitually been used by marketing managers to get to know and understand differences between the potential tourists of a destination [4]. Their importance to management lies in the fact that

the suitable segmentation of a market allows destinations to anticipate development trends and offer highly diversified products to meet the needs of tourists [5].

Despite the considerable benefits deriving from suitable segmentation, in destinations that develop their products around resources with a high sensitivity to unsustainable development models, few studies concentrate on providing information on the differentiated profile of the tourists visiting nature reserves [6]. Thus, the main research question we propose an answer for in our paper is which are the factors that have an impact on the intention to visit a protected natural area, taking as a case study the Monfragüe Biosphere Reserve.

To make up for this lack of research, this study has the initial objective of characterizing the demand for tourism in nature reserves; to do so, it uses the National Park and Biosphere Reserve of Monfragüe located in the province of Cáceres in Extremadura, Spain, as a case study

The chosen space provides an interesting case study owing to the intrinsic characteristics of this destination. The province of Cáceres can be described as an inland destination, which due to its low level of industrial development finds in its rich natural and cultural legacy a great opportunity for achieving economic progress. As this destination is in a growth stage, it is essential for its managers to count on information to be able to plan suitable management policies.

In addition to the clear practical implications for the management of the destination, the results obtained in this applied research aim to contribute towards the profiling of the characteristics of the tourist of nature reserves in inland territories in a growth stage. They thus help to increase the information available on the differentiated profile of this type of traveler.

To do so, in the first place, this study analyses the factors that determine the probability of practicing tourism in natural spaces at the destination under study. To achieve this objective, a logit model is used based on a survey of 4683 people carried out by the Tourist Observatory of Extremadura during a calendar year. Secondly, the above analysis is complemented with Chow's test, which allows for the confirmation of the existence or otherwise of structural change because of two factors of segmentation, whether the visit is made in the high season or low season, and whether the tourist analyzed is from the Spanish or foreign market.

To achieve these objectives, this study has the following structure: After this initial introductory section, a bibliographical revision is carried out to analyze the necessary symbiosis between tourism and protected spaces. Subsequently, we analyze the demand for ecotourism, a tourist type which can include nature reserve tourism. Section 4 allows the reader to get to know the main characteristics of the natural space used as a case study. Section 5 then describes the methodology used and subsequently the major results obtained are described. Finally, the article concludes with the discussions and conclusions generated by this research.

2. Protected Natural Spaces and Tourism: A Necessary Symbiosis

Following the definition of the International Union for Conservation of Nature (IUCN), a protected area is a "clearly defined geographically space which is clearly defined, recognized and managed by legal means or other efficient means so as to achieve long-term nature conservation, the ecosystem services, and the associated cultural values" [7]. As for nature reserves, ref. [8] (p. 1) define them as "spaces in which human activities have not altered the typical environment drastically and in which as a consequence both the biotic and abiotic elements have been preserved in good condition". Protected areas are essentially governance systems [9] with spatially defined areas with natural as well as cultural attributes and services managed by a group of players with different roles and institutional frameworks [10]. These areas are organized in accordance with a variety of natural and spatial attributes that determine the conservation objectives, the protection categories, and the human activities permitted [11].

The protection of natural areas has a century-and-a-half-long history and is of a universal nature [12]. It is worth highlighting the difference between the United States creating the first Nature Reserve in 1872 (that of Yellowstone) and after, insofar as the protection objectives of the territory established [13]. For example, the Middle Ages saw the appearance of the first spaces protected for reasons related to hunting [14] and with time spaces arose in which only the royalty and nobility could hunt [13]. However, when President Grant created the first nature reserve in the USA, a new type of protected area was created, which is characterized by it being public and having recreation goals. From that year onwards, the number of protected spaces in the world has increased constantly [13], which according to [15] can be divided into three stages: (1) Between 1872 and 1975, the growth was helped by the beginning of the development of laws and regulations for the protection of the spaces, as well as by the creation of the first institutions that were specialized in the protection of the environment, both in a national and international sphere. There was also an event that contributed greatly to the declaration of new protected spaces, the first World Congress of Natural Reserves held in Seattle in 1962, since after it being held, around 80% of the protected areas of the world were created [16]. (2) Between 1974 and 1992, both the policies for environmental conservation and the laws on the subject intensified and increased in number. In this second phase, the number of protected areas and their surface became more numerous all over the world, even if there existed some differences between countries. (3) The final stage began with the Rio de Janeiro summit in 1992, which marked the introduction of a new ideology regarding conservation, which links it with sustainability and its three pillars: society, environment, and ecology.

Regarding the current situation, in 2018, the protected territories attained 14.87% of the total surface area of the world [17] and in some areas reached a much higher percentage, such as the EU with 18%. In the case of Spain, the most recent data available show that the country has protected 36.2% of the total of its land surface area and 12.3% of its marine surface area. It is also the European country that contributes the largest surface area to the Natura 2000 Network, 27.4% of the total surface area of the country, and that with the most Biosphere Reserves with 53 [18]. In the case of Extremadura, the target area of this study, the region has a total of 89 Special Conservation Areas (Zonas Especiales de Conservación, ZEC), which occupy a total of 933,772 hectares, and 71 Special Protection Areas (Zonas de Especial Protección de Aves, ZEPA) with a total surface area of 1,102,409 hectares. The protected areas are not only strategic enclaves for the protection of biodiversity and other heritage values; they also contribute towards people's wellbeing [18]. These data are the consequence of the important Spanish protectionist culture, which is based on the approval of the Law on Nature Reserves of the year 1916. Both the protected surface area and the various forms of protection have increased considerably, and the regulatory framework has been built up because of the regulations approved in the respective Autonomous Regions in accordance with the sharing of powers between them and the central government [19].

An important factor which should be taken in account is the support of local communities for the establishing of the protected areas. In this sense, the economic and social circumstances influence the decisions of people as to whether to support the establishing of the protected areas [20]; great efforts have been made to make society aware of the ecological and sociocultural values of the protected areas and to increase the involvement in the conservation process [21]. The interaction of the tourists with the protected areas through observation or activities such as the practice of sports or education, when this is permitted, provides cultural and social benefits, in addition to increasing wellbeing and raising environmental awareness [22].

However, the increase in tourism implies a series of negative impacts at both a national and international level [23]. The literature fully describes the two-faced role of tourism in the sustenance of delicate environments, communities, and cultures [24–26]. Concern for the environment and the negative effects mass tourism can have if uncontrolled have meant that sustainable tourism is attracting a great deal of attention [27]; moreover, this new mode of tourism allows people to travel independently, safely and in comfort [28].

Protected zones are a powerful way of managing land use, for sustainable development, and for nature conservation [29], although seeking to comply with conservation objectives and the resulting arbitration of land use may cause conflict [29]. For example, this occurs when the various parties have different visions of conservation objectives and one or several parties attempt to impose their interests at the cost of the interests of the remainder [30,31]. In the next section, we analyze the literature published on the demand for ecotourism in protected spaces.

3. The Demand for Ecotourism in Protected Spaces: A Revision of the Literature

Market segmentation is a relatively new concept [32]. In 1956, Wendell Smith [33] suggested that big and differentiated markets consist of many smaller and similar segments, and that targeting them allows the businesses (or in our case, the destinations) to (1) position themselves uniquely, offering a better product to their chosen target and (2) to create a long-term competitive advantage. Moreover, communicating with a smaller part of the market leads to reduced marketing expenses. The tourism industry has completely adopted and adapted the concept, and there is not a single organization without a strategy for marketing segmentation, and the focus can be, for example, on tourists of different origins or with different patterns of vacation benefits preferences [32]. The pioneer of market segmentation was Josef Mazanec who, in 1984 [34], introduced the dominant approach in tourism marketing segmentation studies: cluster analysis. Even though cluster analysis dominates, there are also other techniques that have been adopted, like neural networks methods [35].

A condition for a good market segmentation is to make the correct choice of breakdown variables [36], which usually are socio-demographic, psychological or behavioral variables, as shown in [37] for the case of the tourist accommodation market. However, Haley [38] affirms that the most effective way to segment a market is the benefits customer (in our case, tourists) seek in each product, the advantage of this methodology being that it groups customers with similar real needs, which play a decisive role in the purchase of the product [39–41]. Benefit segmentation has been applied in tourism mainly to segment tourists by their expected benefits of destinations, attractions, or activities [42]; however, studies in the accommodation sector are scarcer [43]. Usually, they are based on data extracted from interviews with customers and experts [44], or factor analysis of surveys limited to subgroups of tourists, such as business travelers in luxury hotels [45], female travelers [46], AirBnB users [43] or spa hotels [47]. In the specific case of Spain, which is the country we study in our paper, Cordente-Rodríguez, Mondéjar-Jiménez and Villanueva-Álvaro [48] analyzed excursionists in the Serranía de Cuenca National Park and divided them into two groups: those whose only motivation is to enjoy nature and natural resources and those who have multiple motivations; not only do they want to enjoy nature but also the gastronomy, as well as visiting villages to learn about their culture and traditions. The study by Carrascosa-López, Carvache-Franco, Mondéjar Jiménez and Carvache-Franco [49], also carried out in the Serranía de Cuenca National Park and in the Albufera National Park, is similar to [48] in that it presents the known segments of nature and multiple motivations, but it also presents a third new segment, reward and escape, which is related to the dimensions of nature, rewards and having fun.

Nature-based tourism is a broad term for which subgroups have appeared [50,51], such as ecotourism, nature tourism and adventure tourism. The idea of ecotourism has been very popular in recent years and is a very frequent topic in literature. Ecotourism is close to sustainable tourism because they both should be ecologically, socially, and culturally sustainable, and minimize undesirable impacts on the environment [6]. Ecotourism is the environmentally responsible travel to unmodified natural and cultural areas that promotes environmental learning while contributing to the conservation of the environment and to economic development [52]. Nature tourism is the contemplation of fauna, flora, or landscape scenery [52], so it shares only part of the ecotourism requirements: its link with nature, its attractiveness, and the experience of the visitors in natural settings [6]. The

purpose of adventure tourism is to involve participants in activities that imply a degree of perceived risk or controlled danger related to personal challenges [53]. In addition to the subdivisions explained, authors such as [54] suggested four segments using a motivation-based segmentation: ecotourism, wilderness use, adventure travel and camping, [49] proposed combined, or hybrid, terms, to reflect the overlapping that tourist products present; for example, a tourist product can contain not only elements of adventure, but also natural and/or cultural attractions. Some studies have been published about benefit segmentation in the nature tourism industry. The author of [55] identified four different segments of tourists in Belize (ecotourists, nature escapists, comfortable naturalists, and passive players), while Bricker and Kerstetter [56] created four segments of tourists who decided to participate in a nature tour in the Fiji Islands (eco-family travelers, culture buffs, ecotourists and eclectic travelers). Kerstetter, Hou and Lin [57] identified three segments of tourists in the coast of Taiwan, and labelled them experience-tourists, learning-tourists and ecotourists.

As for motivations, Holden and Sparrowhawk [58] affirm that the main motivations for ecotourists are (1) learning about nature, (2) being physically active and (3) meeting people with the same interests, while Page and Dowling [59] add that ecotourists travel to satisfy their recreational and leisure needs, as well as to gather information on specific zones. Pearce and Lee [60] explain that motivating factors for travelling include relaxation, escaping, the improvement of relationships and personal development, among others. Kruger and Saayman [61] observed that tourists travel to National Parks for six main reasons: searching for knowledge, experiencing nature, to take photographs, relaxing and escaping, experiencing the park's characteristics and nostalgia, while, for South Korea, the seven main factors, following Lee et al. [62], are linked with motivation, and are self-development, interpersonal links, reward, the construction of personal relationships, escape, ego-defensive function and the appreciation of nature. As for the Republic of Serbia, Panin and Mbrica [63] divide ecotourists into four groups: social activities, health and sports activities, nature-related motivations, and educational activities.

The motivations of rural tourists, as well as their behaviors, are very different from those that do conventional tourism (López-Sanz et al., 2021) [64]. Said motivations are, as studied by Lois et al. [65], Tirado [66], Devesa et al. [67] and Leco et al. [68], linked to nature, culture, and the environment. The cited authors proposed ten different main motivations for rural tourists, which are: contact with nature, rest and calmness, cleanliness of air and water, open-air spaces and healthy environment, gastronomy, activities related with agriculture, the discovery of new cultures, hospitality of the local population, contact with the heritage and travelling back in time while having the comfort of the present.

To complete the contextualization of our study, in the following section we give a brief description of the Monfragüe Biosphere Reserve and its main characteristics.

4. The Monfragüe Biosphere Reserve: An Emblematic Protected Space in Southwestern Europe

Extremadura is an Autonomous Region of Spain consisting of two provinces, Cáceres and Badajoz, which borders on Castilla y León to the north, Andalusia to the south, Castilla La Mancha to the east, and Portugal to the west (Figure 1).

It has a total of 41,634 km², which corresponds to 8.2% of the surface area of Spain [3]. The area subject of our study, the National Park of Monfragüe, can be found in the province of Cáceres; it is the largest area of Mediterranean woodland and the best preserved in the world, and it also has great biodiversity thanks to the rivers and reservoirs that irrigate it [69]. According to data published by the Ministry for Ecological Transition and the Demographic Challenge (MITECO) in the Report of the Network of National Parks for 2019, Monfragüe National Park has a surface area of 18,396 hectares, a peripheral protected area of 97,764 hectares, and an area of socioeconomic influence of 195,500.73 hectares [70]. Monfragüe has been a Special Protection Area since October 1998 [71]; this protection is recognized in the legislation of Extremadura by the Decree 232/2000 of 21 November. This

recognition is highly relevant owing to the ornithological richness of Monfragüe as many tourists travel there to see the birds which nest in the park in their natural habitat, among which the black vulture stands out [72]. In 2003, Monfragüe was recognized as a Biosphere Reserve [72] and in 2007 the approval of Law 1/2007 of 2 March meant that Monfragüe was declared a National Park. Finally, Monfragüe was designated a Special Conservation Area in 2015 [73], which is reflected in the legislation of Extremadura by Decree 110/2015 of 19 May. The vegetation of the park makes it even more attractive with its holm oaks, cork oaks, and alders, among other species. As far as tourism is concerned, the latest data available of accommodation businesses and restaurants in Monfragüe, from December 2020, are shown in Table 1.

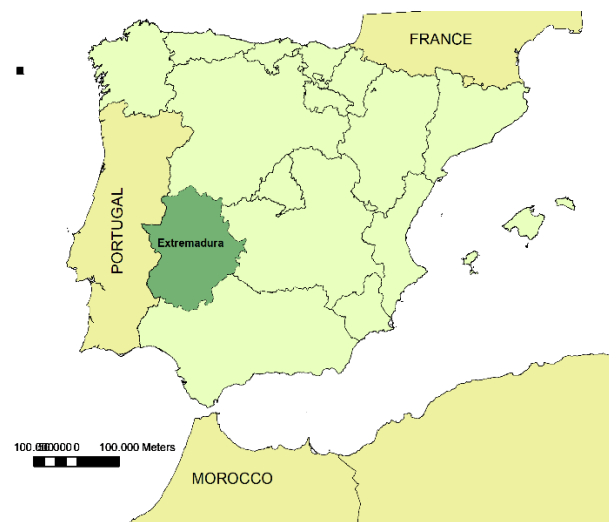


Figure 1. Location of area of study. Source: own elaboration.

Table 1. Accommodation establishments and restaurants in Monfragüe National Park.

	Total Number	Breakdown
Hotel-type accommodation	23	9 hotels 8 budget hotels 6 boarding houses
Non-hotel-type accommodation	60	47 rural accommodation establishments 9 tourist apartments 3 hostels 1 campsite
Restaurants and catering	94	77 restaurants 3 catering companies 14 banquet halls

Source: Sánchez-Oro et al. (2021) [74].

As for the number of travelers, in 2020, a total of 38,235 visited Monfragüe and accounted for a total of 79,571 overnight stays; they remained in the park for an average of 2.08 days. These figures represent a decrease of 49% in the number of travelers and of 42.5% in the number of overnight stays compared with 2019 [74]. To conclude, although some aspects have already been mentioned, we highlight below the main natural characteristics of Monfragüe National Park [70]: (1) Monfragüe is the largest area of preserved Mediterranean woodland in the world and is crossed by the river Tagus. The great variety of natural environments explains the wide variety of both animal and plant species in the park. (2) The landscape is characterized by being the result of human action. The dehesa woodland and pastureland system is the most outstanding example of sustainable interaction between man and the environment. (3) The birds nesting in the park include the griffon

vulture, the black stork, the peregrine falcon, and the eagle owl. (4) With regard to vegetation, Monfragüe has holm and cork oak groves, heaths, and populations of maples, ashes, and alders.

5. Methodology

5.1. Estimated Probability of Tourist Visits to the Monfragüe Biosphere Reserve

The data used to estimate the previous logit model have been obtained from the surveys carried out by the Tourism Observatory of Extremadura on the Network of Tourism Offices of the region. The sample size was 4683 tourists, with no distinction being made between Spanish and foreign tourists and between the high and low season.

This questionnaire was used with the aim of finding out the profile and motivations of tourist demand in Extremadura. For this purpose, surveys were carried out randomly, establishing the minimum number of observations necessary for the sample to be representative in each territory, in each of the tourist offices in the region. The survey included a total of 12 questions distributed in different thematic blocks: socio-demographic profile of the tourist (questions 1 to 3), characteristics of the trip to the region (questions 4 to 7), activities carried out and places visited (questions 8 and 9), tourist expenditure (question 10) and degree of satisfaction with the visit (questions 11 and 12). Of all these questions, those that have been used for the present study were formulated as follows: “9. Which natural spaces have you visited, or do you plan to visit during this trip? (Monfragüe National Park as an option)”; “1. Gender”; “3. Age”; “4. Who are you travelling with?”; “7. What type of lodging have you selected?”. In more detail, the questionnaire used aims to find out the motivations of tourists visiting the region. As well as requesting socio-geographical data (gender, origin and age), the questionnaire includes questions related to the way of travelling (type of travel company, accommodation chosen for overnight stays, etc.), the tourist activities to be carried out, the places to be visited, daily tourist expenditure and the evaluation of the tourist services used.

To estimate the probability of visiting the Monfragüe Biosphere Reserve, a regression analysis has been used in which the dependent variable (Y_i) is a binary variable, which will have the value of 1 if the tourist has visited Monfragüe during his/her visit to the region (Extremadura) and the value 0 if he/she has not. Given the binary nature of this dependent variable, the following binary logistic regression model (or logit model) has been proposed:

$$P(Y_i = 1) = \frac{\exp(z)}{1 + \exp(z)}$$

with

$$z = \beta_0 + \beta_1 GEN_i + \beta_2 AG1_i + \beta_3 AG2_i + \beta_4 COMP1_i + \beta_5 COMP2_i + \beta_6 H1_i + \beta_7 H2_i + \beta_8 H3_i + \beta_9 VAL_ALO_i + \beta_{10} VAL_REST_i + \beta_{11} VAL_EMP_i + \beta_{12} VAL_NAT_i \quad (1)$$

in which $P(Y_i = 1)$ represents the probability that the tourist i visits Monfragüe, and in which the explanatory variables of the model may be grouped in three main categories:

Sociodemographic variables:

GEN: gender (1 = male; 0 = female).

AG1: age (1 = 35 years or less; 0 = others).

AG2: age (1 = between 35 and 55 years of age; 0 = others). Note: Over 55 years of age (AG1 = AG2 = 0).

Variables of trip characterization:

COMP1: type of travel (1 = as a couple or as a family; 0 = others).

COMP2: type of travel (1 = with friends or in a group; 0 = others). Note: Alone (COMP1 = COMP2 = 0).

H1: type of lodging selected for overnight stay (1 = hotel; 0 = others).

H2: type of lodging selected for overnight stay (1 = rural lodging; 0 = others).

H3: type of lodging selected for overnight stay (1 = apartment, campsite or budget hotel; 0 = others). Note: other lodgings (H1 = H2 = H3 = 0).

Variables of assessment of destination:

VAL_ALOJ: assessment on a scale of 0 to 10 points of the accommodation on offer.

VAL_REST: assessment on a scale of 0 to 10 points of the restaurants on offer.

VAL_EMP: assessment on a scale of 0 to 10 points of the tourist activity company.

VAL_NAT: assessment on a scale of 0 to 10 points of the conservation of the natural heritage.

With the inclusion of sociodemographic, trip characterization, and destination assessment variables in model (1), we aim to identify the variables that condition (or which could condition) the probability of tourist visits to be estimated.

The logit model [75–78] has been frequently used in the field of tourism research. It has, for example, been used for issues as diverse as identifying the factors determining innovation in tourism [79,80], establishing space–time relations between hotels in urban tourism destinations [81], determining the influence of High Speed Rail on the probability of returning to visit a destination [82], studying the consumption of local food in rural tourism [83], analyzing the behavior of tourists in terms of the consumption of certain products [84], analyzing the air quality of museums [85], and determining the predictive factors of tourists' loyalty to a destination [86]. This methodology is therefore widely used in the field of tourism research.

5.2. The Presence/Absence of Structural Change in the Estimation of the Probability of Visiting Monfragüe

The test for structural change known as the Chow test [87] is habitually used with conventional regression models to determine whether on dividing a model into two subsamples there is stability in the model parameters. In a conventional regression model, this Chow test includes an F statistic in which the sum of squares of the errors of the model estimated based on the total sample (restricted model) are compared against the sum of squares of the errors of the models estimated based on each subsample (non-restricted model).

However, when the estimated regression model is a binary logistic regression model, as in this case, this Chow test is conducted as a likelihood ratio test between the restricted (pooled) logit model (model (1)) and the non-restricted logit model. The latter model defines the z function as follows:

$$\begin{aligned}
 z = & \beta_0 + \beta_1 GEN_i + \beta_2 AG1_i + \beta_3 AG2_i + \beta_4 COMP1_i + \beta_5 COMP2_i + \\
 & \beta_6 H1_i + \beta_7 H2_i + \beta_8 H3_i + \beta_9 VAL_ALoj_i + \beta_{10} VAL_REST_i + \beta_{11} VAL_EMP_i + \\
 & \beta_{12} VAL_NAT_i + \beta_{13} D_i + \beta_{14} GEN_i \times D_i + \beta_{15} AG1_i \times D_i + \beta_{16} AG2_i \times D_i + \\
 & \beta_{17} COMP1_i \times D_i + \beta_{18} COMP2_i \times D_i + \beta_{19} H1_i \times D_i + \beta_{20} H2_i \times D_i + \beta_{21} H3_i \times D_i + \\
 & \beta_{22} VAL_ALoj_i \times D_i + \beta_{23} VAL_REST_i \times D_i + \beta_{24} VAL_EMP_i \times D_i + \\
 & + \beta_{25} VAL_NAT_i \times D_i
 \end{aligned} \quad (2)$$

in which the D_i variable is a control variable and assumes the value of 1 in the case of the presence of a certain characteristic and 0 if the characteristic is absent.

In our case, and given the fact that the output of the Gretl results provides the logarithm of the Log-likelihood function, the contrast which has been used is the log-likelihood ratio test between both models as shown in the following equation:

$$D = -2[\log(\Lambda_1) - \log(\Lambda_2)] \quad (3)$$

in which $\log(\Lambda_1)$ is the logarithm of the log-likelihood function of the restricted model (model (1)) and $\log(\Lambda_2)$ is the logarithm of the log-likelihood function of the non-restricted model (model (2)).

Wilks [88] demonstrates that the D statistic follows an asymptotic χ^2 distribution with $df2 - df1$ degrees of freedom, in which $df1$ and $df2$ represent the degrees of freedom of

the models (1) and (2), respectively. If the p -value associated with this D statistic is lower than the level of significance, the presence of a structural change may be admitted; it would therefore be possible to conclude that significant differences exist in the adjustment of the binary logit model for the high and low seasons and for Spanish and foreign tourists.

Although this test for conventional structure change (i.e., that based on a classic regression model) has also been used quite frequently in tourism research [89–93], its use with logistic regression models and therefore its contrast through a likelihood ratio test is practically non-existent in tourism research. This study thus presents a methodological novelty in the field of tourism research.

6. Results

6.1. Estimated Probability of Tourist Visits to the Monfragüe Biosphere Reserve

The results of the model estimation (1) using the Gretl statistics package are shown in Table 2. It can be appreciated in it that gender (GEN), travel in the company of one's partner or family (COMP1), the type of accommodation chosen (H1, H2, and H3), and the assessment given to the conservation of the natural heritage are the only factors which condition the probability of visiting Monfragüe, considering a degree of statistical significance of 5% or less.

Table 2. Estimation of the binary logistic regression model (1).

Explanatory Variables	β	S.E.	Z	Wald	p -Value	Sig. ^a	Exp (β)
GEN	−0.140	0.065	−2.137	4.565	0.033	**	0.87
AG1	0.085	0.099	0.862	0.743	0.389		1.089
AG2	−0.005	0.08	−0.066	0.004	0.509		0.995
COMP1	0.461	0.133	3.467	12.022	0.001	***	1.585
COMP2	0.01	0.149	0.068	0.005	0.946		1.01
H1	0.23	0.079	2.913	8.488	0.004	***	1.259
H2	0.282	0.103	2.74	7.508	0.006	***	1.326
H3	0.383	0.106	3.617	13.08	0	***	1.467
VAL_ALOJ	0.022	0.034	0.638	0.407	0.524		1.022
VAL_REST	−0.002	0.036	−0.057	0.003	0.566		0.998
VAL_EMP	−0.046	0.026	−1.780	3.168	0.075	*	0.955
VAL_NAT	−0.080	0.033	−2.435	5.927	0.015	**	0.923
Constant	−0.300	0.305	−0.984	0.968	0.325		0.74

Log-likelihood: −2801.020

Schwarz criterion: 5711.912

Akaike criterion: 5628.040

Hannan-Quinn criterion: 5628.040

McFadden's R^2 : 0.0141

Number of cases correctly predicted: 3298 (70.4%)

Ratio likelihood test: Chi-Square (12 df) = 79.9742 (p -value: 0.000)

* Significant at 10% level; ** significant at 5% level; *** significant at 1% level. Source: own elaboration.

In the first place in relation to gender, the negative value of coefficient β and the value of less than 1 of $exp(\beta)$ imply that in the case of *ceteris paribus* the probability that a male tourist (GEN = 1) will visit Monfragüe is lower than the probability that a female tourist (GEN = 0) will do so. In any case, the proximity to the unit of $exp(\beta)$ determines in this case small differences between both possibilities.

The association between the variables H1, H2, and H3 and the estimated probability of visiting Monfragüe is, however, much clearer. For these three explanatory variables, the coefficient β is positive, which determines an $exp(\beta)$ value exceeding 1. In this case, the types of accommodation that induce a greater predisposition to visit the Monfragüe BR are tourist apartments, campsites, and hostels ($exp(\beta) = 1.467$). It therefore seems clear that the tourists visiting this protected natural space show a clear preference for these types of accommodation. To a lesser extent than those above, the tourists consulted are

also more likely to visit Monfragüe if they stay in rural accommodation (casas rurales or rural hotels) ($\exp(\beta) = 1.326$). Variable H1, which is associated with lodging in hotel-type establishments (in contrast to variables H2 and H3 which are clearly associated with non-hotel-type accommodation), was also statistically significant and therefore determines, under the assumption of *ceteris paribus*, a greater predisposition to visit the Monfragüe BR than tourists lodged in other establishments (which will not be the types mentioned above, which are those associated with higher estimated possibilities). Finally, the tourists with the lowest probabilities of making a tourist visit to Monfragüe are those lodged in other accommodation types (mainly budget hotels or boarding houses, inns, their own houses, and those of friends or relatives). Consequently, the estimation of model (1) has allowed for the identification of an empirically demonstrated association between a higher probability of visiting the Monfragüe BR and the use of non-hotel-type tourist accommodation when staying in the territory under study.

However, the most evident statistical association identified by means of the estimation of model (1) is that existing between the fact of travelling as a couple or with one's family and the probability of visiting Monfragüe. In effect, the coefficient β estimated from the COMP1 variable (0.461) and the clearly different value of 1 of $\exp(\beta)$ (1.585) determine that, *ceteris paribus*, the probability of making a tourist visit to Monfragüe is significantly greater among tourists who travel as a couple or with their family than among those who travel in other company. This would therefore seem to confirm that the practicing of ecotourism is of an eminently family type, at least in the protected natural space being considered in this study.

Finally, the estimated coefficient β of the variable VAL_NAT is negative and thus determines an $\exp(\beta)$ value of less than 1. This circumstance implies that if the remainder of the explanatory variables remain constant it is not the tourists who value most highly the conservation of the natural heritage of Monfragüe who are most likely to visit it. In other words, if the highest probabilities of making a visit to this protected natural space are shown by those giving the lowest score, it can be concluded that lovers of ecotourism are demanding as to the environmental protection of the natural space they visit, in such a way that the estimated values appear to recommend in this case extra effort in the conservation of the natural heritage of the Monfragüe BR.

However, the act of considering the demand for ecotourism in the Monfragüe BR in an aggregate manner, without differentiating for example between the high and low season on the one hand or between Spanish and foreign tourists on the other, may mask certain statistically significant relationships between certain explanatory variables and the probability of practicing ecotourism.

It is therefore necessary to introduce the season (high or low) and the origin (Spanish or foreign) of the tourists analyzed as control variables in the model (1) to determine if this segmentation of the ecotourism demand in accordance with the season and the origin of tourists results in differentiated behavior.

6.2. The Presence/Absence of Structural Change in the Estimation of the Probability of Visiting Monfragüe

Two control variables (D_i) are considered: one to measure the potential influence of the tourist season on the probability of visiting Monfragüe and the other to determine the effect of the tourism market of origin on this probability. In the case of the tourist season, therefore, the control variable D_i has a value of 1 for the high season (April to September) and 0 in all other cases. As for the case of the tourism market of origin, the control variable is given a value of 1 for Spanish tourists and 0 for foreign tourists.

After estimating the model (2) and taking the value of the logarithm of the log-likelihood function of this model while considering the two control variables, the results of the log-likelihood ratio test are shown in Table 3.

Table 3. Log likelihood ratio test of both control variables.

Control Variable	$\log(\Lambda_1)$	$\log(\Lambda_2)$	D	d.f.	p -Value
Season	−2801.020	−2794.745	12.55	13	0.4831
Tourist market	−2801.020	−2796.086	9.87	13	0.7047

Source: own elaboration.

It is therefore evident that there is no structural change in the estimated logit model either when considering the tourist season or the tourism market of origin as control variables. It may thus be concluded that the probability of visiting the Monfragüe BR is not significantly different in the high season or low season. This means that at least in the natural protected area analyzed the tourist season does not appear to have a significant influence on the demand for ecotourism, which is an advantage as a tourist destination since, unlike other types of tourism (such as sun or beach tourism, music festival tourism, or even MICE tourism, an acronym for Meetings, Incentives, Conferences and Exhibitions), ecotourism in the Monfragüe BR is a type of tourism which appears to have equal demand rates on a year-round basis.

On the other hand, and to conclude, no structural changes have been detected when considering the market of origin as a control variable. This means that the probability of visiting Monfragüe is not conditioned by the nationality of the tourist. Furthermore, it may not be necessary for tourism promotion campaigns of the Monfragüe BR to present different elements based on whether they are aimed at the Spanish or international market.

7. Analysis of the Variability of the Estimated Probabilities of a Tourist Visit in Terms of the Characteristics of the Tourist Profile

Given that only four of the explanatory variables of the model (1) are statistically significant at 5%, we give below an estimate of the probability of visiting Monfragüe based on the following reduced logistic regression model:

$$z = \beta_0 + \beta_1 GEN_i + \beta_2 COMP1_i + \beta_3 H1_i + \beta_4 H2_i + \beta_5 H3_i + \beta_6 VAL_NAT_i \quad (4)$$

The relative frequency histogram of these estimated probabilities is shown in Graph 1. The mean value of these estimated probabilities is 0.2951, with a standard deviation of 0.0562. This means that ecotourism is not currently practiced on a large scale (it is not a mass tourism practice) given that it is estimated that about 3 out of 10 of the tourists visiting the territory, which is the subject of this study practice ecotourism in Monfragüe. This conclusion could help the sustainable management of the park because the number of tourists it receives every year is within its tourism carrying capacity.

The analysis of the values of the estimated probability, together with the relative frequencies corresponding to the same, which is shown in Figure 2, allows for the identification of three different levels in the possibility of getting to know and enjoying Monfragüe as part of a visit to the region:

- Low probability of visiting: tourists with an estimated probability of visiting Monfragüe of less than 25% (lower values than those of average probability, which are more than a typical deviation away from the same).
- Average probability of visiting: tourists with an estimated probability of visiting Monfragüe of between 25% and 35% (estimated values no more than one typical deviation away from average probability).
- High probability of visiting: tourists with an estimated probability of visiting Monfragüe of over 35% (values higher than average probability, which are more than one typical deviation from the same).

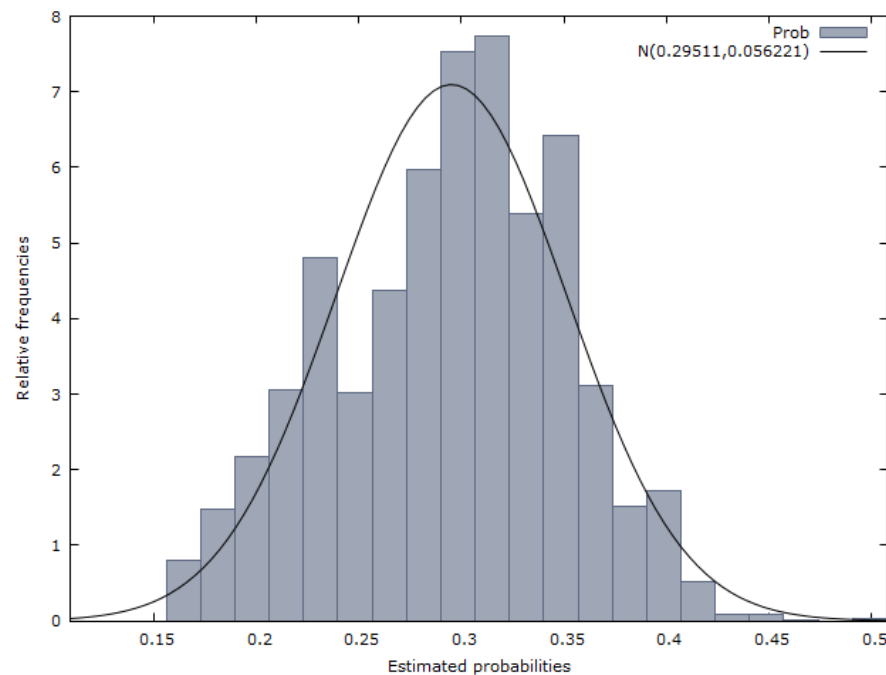


Figure 2. Frequency histogram of the estimated probabilities of visiting the Monfragüe BR. Source: own elaboration using Gretl software.

As from this segmentation of the demand based on likelihood criteria and statistical coherence, we analyze below the relationship between the explanatory variables of the estimated logit model (gender, travel type, accommodation type, and the assessment of the conservation of the natural heritage) and these three segments or levels identified.

To begin with gender (Table 4), it can be appreciated that the probability of visiting the Monfragüe BR among men (28.01%) is slightly lower than among women (30.91%). Indeed, while over a quarter of female tourists are to be found in the segment of high probability (25.9%), only 7.4% of male tourists are from this segment. In any case, to confirm empirically that this difference, although slight, is statistically significant, we have carried out test *t*. After confirming the hypothesis of the equality of variances with Levene's test ($F = 3.328$; p -value = 0.068), the high negative value of the statistic *t* (-18.240) and its low associated p -value (<0.0001) allow for the rejection of the hypothesis of the equality of estimated average probabilities between men and women, and therefore the confirmation that the probability of visiting the Monfragüe BR is higher among women than among men.

Table 4. Relationship between gender and the estimated probability of visiting the Monfragüe BR.

Gender	% of the Total Sample	Low Probability	Average Probability	High Probability	Mean Value of Probability
Female	51.9	15.4	58.7	25.9	0.3091
Male	48.1	29.5	63.2	7.4	0.2801

Source: own elaboration.

On the other hand, Table 5 shows the distribution of the various travel types used by the tourists consulted in each of the probability segments identified. In this case, the differences between the average probabilities are more marked than in the case of gender. Therefore, travel as a couple or with one's family are the only two travel types registering average probabilities of visiting Monfragüe of higher than 30% (32.02% and 31.90%, respectively). Indeed, compared with the almost total absence of tourists travelling alone, with friends, or in an organised group in the category of high probability of visiting, the percentage of tourists travelling as a couple or with their family and showing a probability of visiting Monfragüe of over 35% is quite high (23.1% in the first case and 24.3% in the

second). The differences between these average probabilities have been ascertained by means of an ANOVA test ($F = 1112.663$; $p\text{-value} < 0.0001$) and two contrasts of independence between the lines (travel type) and the columns (probability segments) of Table 5 (Pearson's chi-square = 2310.397 with $p\text{-value} < 0.0001$; likelihood ratio = 2335.927 with $p\text{-value} < 0.0001$).

Table 5. Relationship between the type of travel and the estimated probability of visiting the Monfragüe BR.

Type of Travel	% of the Total Sample	Low Probability	Average Probability	High Probability	Mean Value of Probability
Travelling alone	8.0	65.1	34.1	0.8	0.2369
Travelling as a couple	47.1	3.7	73.2	23.1	0.3202
Travelling with friends	16.3	67.7	32.2	0.1	0.2310
Travelling with family	24.6	5.2	70.5	24.3	0.3190
Travelling with a group	4.0	75.1	24.9	0.0	0.2290

Source: own elaboration.

Similar conclusions can be obtained from analyzing Table 6, which shows the relationship between the type of accommodation used by the tourists consulted and the three segments of estimated probabilities of visiting identified. Indeed, the average estimated probabilities are within a range that exceeds 10% of the probabilities, as these are to be found between a minimum value of 24.82%, which is recorded among those who take lodging in an inn or in another type of accommodation, and of 35.41% of those who stay at a campsite. The results of the ANOVA test ($F = 170.766$; $p\text{-value} < 0.0001$) and of the contrasts of independence (Pearson's chi-square = 920.407 with $p\text{-value} < 0.0001$; likelihood ratio = 1009.584 with $p\text{-value} < 0.0001$) confirm that these differences in the probability of visiting Monfragüe depending on the type of lodging chosen by the tourists are statistically significant.

Table 6. Relationship between the type of lodging and the estimated probability of visiting the Monfragüe BR.

	% of the Total Sample	Low Probability	Average Probability	High Probability	Mean Value of Probability
4- or 5-star hotels	13.5	13.3	69.1	17.6	0.3084
1-, 2- or 3-star hotels	24.7	18.8	59.7	21.5	0.3044
Budget hotel or boarding house	7.8	40.8	58.9	0.3	0.2546
Spa	2.1	13.4	64.9	21.6	0.3085
Inn	2.8	45.7	54.3	0.0	0.2482
Casa rural	11.0	13.1	65.0	21.9	0.3179
Rural hotel	3.6	12.4	64.1	23.5	0.3213
Tourist apartment	4.9	5.2	47.0	47.8	0.3413
Campsite	4.5	2.3	44.6	53.1	0.3541
Tourist hostel	4.0	14.5	71.4	14.1	0.2924
Own home or that of friends or family	17.4	38.2	60.4	1.4	0.2578
Other lodging types	3.7	40.8	59.2	0.0	0.2483

Source: own elaboration.

Finally, Table 7 shows the distribution of the assessments given by the tourists regarding the conservation of the natural heritage of the Monfragüe BR for the three levels of probability defined. If we leave out the assessments between 0 and 4, which are completely marginal (only 0.3% of the total sample and therefore barely representative of the population being analyzed), a fairly clear association can be observed between a low score (5 or 6 points) and a high probability of visiting the Monfragüe BR (47.7% and 42.2%, respectively) and also between a very high score (9 or 10 points) and an extremely high proportion of cases with an average probability of visiting the Monfragüe BR (73.5% and 62.0%, respectively). It therefore seems clear that those who value most highly the conservation of the natural heritage of Monfragüe are not those who have the highest probability of visiting it. Indeed, and apart from the average probabilities associated with scores of between 0 and 4 points (which are not considered in this analysis owing to their very low or zero representation), the highest average probabilities of visiting Monfragüe are recorded among those giving a score of 5 or 6 points, while the lowest average probabilities occur among those who give a very high score (9 or 10 points). This apparent negative relationship between the assessment of the conservation of the natural heritage and the probability of visiting Monfragüe was found inferentially on calculating Pearson's correlation coefficient between both variables (-0.413) and the p -value associated with the hypothesis of the lack of correlation between the same (p -value < 0.0001).

Table 7. The relationship between an assessment of the conservation of the natural heritage and the estimated probability of visiting the Monfragüe BR.

Assessment	% of the Total Sample	Low Probability	Average Probability	High Probability	Mean Value of Probability
0	0.0	0.0	0.0	100.0	0.4990
1	0.0	0.0	0.0	0.0	0.0000
2	0.1	0.0	0.0	100.0	0.4174
3	0.0	0.0	0.0	100.0	0.3707
4	0.2	0.0	60.0	40.0	0.3684
5	0.9	13.7	38.6	47.7	0.3486
6	3.5	5.4	52.4	42.2	0.3438
7	12.0	12.8	55.1	32.1	0.3236
8	32.5	15.2	53.5	31.3	0.3066
9	27.0	23.7	73.5	2.8	0.2870
10	23.7	38.0	62.0	0.0	0.2633

Source: own elaboration.

8. Discussion, Limitations, and Future Lines of Research

The various types of protection of the territory are becoming an interesting resource for achieving sustainable management models for natural spaces by means of the development of ecotourism.

The responsible management of these spaces allows for the generation of income both to reinvest in the conservation of the natural resource itself and to generate employment and wealth to allow for the mitigation of adverse effects on the territory such as depopulation and the generation of territorial imbalances. It is for this reason that symbiosis between tourism and protected natural areas is clearly necessary.

To ensure that these spaces can achieve their objectives, it is necessary to obtain information on the profile of the tourist who is likely to practice this activity. Therefore, a satisfactory segmentation of the market would help the managers of destinations to design efficient strategy plans.

The starting point of this study is its objective of analyzing the probability that a tourist visiting the region under consideration, Extremadura in Spain, will practice this type of tourism based on a series of sociodemographic characteristics, the travel type, and the assessment given by the tourist of the destination by means of the designing of a logit model.

The results achieved have allowed us to discover that the gender of the traveler, the travel type, the accommodation chosen, and the level of assessment given by the tourist concerning the conservation of the heritage are variables that may be used to segment the market, as these characteristics influence the probability that a tourist visiting the region will practice tourism in a nature reserve.

The results obtained show similarities to and discrepancies with those found by previous research. For example, the greater preference of women for the practicing of this activity coincides with the results obtained in various studies concentrating on analyzing the profile of the tourist of natural spaces [6,94,95]. However, previous work shows a discrepancy regarding the age variable to segment the market. The authors of [6,95] find in their studies that there is a greater preference in middle-aged tourists for the carrying out of this activity. However, both the study carried out by [94] and the results of our research rule out age as a distinguishable variable of the profile of the tourist of natural spaces. It would be interesting to find out the reasons for this discrepancy, i.e., whether it may be due to characteristics of the destinations selected or if on the contrary age should be rejected as a variable allowing the segmentation of the tourist of protected natural spaces.

In parallel to this conclusion, we detected two variables to which little attention has traditionally been paid on segmenting the market for tourism of natural spaces in the existing literature, which are the travel type and the accommodation used; they have a strong influence on the probability of practicing this type of tourism. To be precise, it is confirmed that this type is strongly associated with family holidays and travel with a partner and that these tourists show a greater preference for staying in non-hotel-type accommodation. These characteristics must be considered by the managers of the destination with a view to designing capture and development strategies in line with the preferences of the tourists.

Finally, based on the knowledge gleaned from previous studies, which propose as a segmentation variable for tourism of natural spaces the seasonal component, the time of the year when the visit is made, high season vs. low season, and the market of origin, whether Spanish or foreign [6,94–96], the aim was to check the suitability of these characteristics for segmenting the market. To do so, a structural change test was carried out to allow for the analyzing of the influence of these factors by means of dividing the samples into two subsamples to subsequently confirm the stability in the parameters of the model proposed.

The results obtained from this analysis confirm that there are no structural changes depending on the tourist season (high or low), which demonstrates that this variable is not suitable for segmenting this market. These results contrast with those of [94], who found in their study on the nature tourism market of Norway that this variable was valid for segmenting the market. This discrepancy may be due to the limitation of the market in each of the studies, as the paper on Norway concentrates on nature tourism in a wide sense, while our research focuses more on the tourism of nature reserves. If this is so, it would be even more necessary to study the tourism of protected spaces as a market niche within nature tourism, as differential characteristics are detected, which may be interesting to consider. For its part, the market of origin of the tourist (Spanish or foreign) did not show any discrimination capacity in the practicing of this activity either.

As was indicated at the beginning of this study, the results obtained by this research help to take a closer look at knowledge of the profile of the tourist of natural spaces and in their turn constitute a valuable tool for the management of the destination analyzed.

To conclude this study, its main limitation is that of the designing of the research carried out, since as it is a case study some of the results obtained could be differentiated characteristics of the destination studied and therefore might not be comparable to the market of tourists of natural spaces. To overcome this limitation and as a future line of research it would be interesting to replicate this methodology in other similar destinations to reach conclusions that allow for the consolidation of knowledge on the niche of tourism of nature reserves.

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