Micro-economic determinants of tourist expenditure: a quantile regression approach

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Abstract
We assess the effect of the main determinants of tourist expenditure by applying both linear and quantile regression models to individual micro data collected by a survey addressed to non-resident tourists who spent their holidays in Sardinia during the period April-October 2012. We find that, in addition to income and foreign nationality, tourist expenditure is crucially driven by trip-related (party size, stay length, accommodation, sea and sun typology and transport modality) and psychographic characteristics (repeated visits and holiday motivations). Moreover, our results indicate that the effects vary with respect to the expenditure component and the level of spending, thus confirming the high complexity of the tourism product. Higher positive effects were found for heavy spenders in the case of foreign nationality, previous visits and notoriety-motivated holidays, while party size and the number of visited sites contribute to reducing the level of expenditure for light-spending tourists.

Key words: tourist expenditure, micro data, quantile regression, Sardinia

JEL classifications: D12, L83, C21

Highlights:

Linear and quantile regression analysis of individual tourist spending survey data.
Large set of variables accounts for tourism product high degree of differentiation.
Evidence provided on the high complexity of the tourism product.
Income, foreigners, trip and psychographic variables relevant spending determinants.
Relevant difference in spending behavior between light and heavy-spending tourists.

1. Introduction

The tourism industry is becoming one of the most relevant industries worldwide, and tourist expenditure make a considerable contribution to economic growth at both the national (Lee and Chang, 2008; Figini and Vici, 2010; Brida and Pulina, 2010) and regional levels (Cortés-Jiménez, 2008; Paci and Marrocu, 2014). Thus, for scholars, managers and policy makers, it is extremely important to identify which factors influence tourist consumption decisions and to measure the effect of those factors on tourist expenditures using appropriate econometric tools.

Over the past decades, several studies have investigated the characteristics and determinants of tourism demand using a broad range of theoretical and methodological approaches. The widespread interest in this issue among academic researchers is confirmed by two recent review articles on tourism demand modeling and forecasting (Song and Li, 2008) and on the determinants of tourist expenditure based on micro data (Brida and Scuderi, 2013).[1]

Our study is performed within the latter framework and seeks to address some of the shortcomings usefully discussed by Brida and Scuderi (2013) in their survey article. More specifically, given that the "tourism good" is a highly differentiated product along both the demand and supply dimensions, we address the heterogeneity issue by analyzing a comprehensive set of factors that are expected to account for the major distinctive characteristics of tourists and the specific traits of destinations. The explanatory variables are grouped based on the taxonomy proposed by Wang et al. (2006), which distinguishes among four main categories of determinants, namely, (1) economic constraints such as tourist income; (2) socio-economic characteristics such as age, gender, education, occupational status, and nationality; (3) trip related features such as the length of stay, the number of people in the holiday party, the number of destinations, the type of accommodation and transport used, and the time of the trip; and (4) psychographic characteristics such as repeated behavior and trip motivation. Specific sets of the listed variables have been used in various combinations in previous studies; in the present study, a wide-ranging set of 25 variables is considered together, with the expectation that the effects on tourist expenditures will be more rigorously assessed.

The second relevant element of our study is that the application of the widely used linear regression approach is complemented by the use of the quantile regression (QR) method. The first method is a useful econometric tool to assess central tendencies present in the data and to provide a

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[1] The econometric methods applied in analyzing tourism demand range from time series approaches, mainly focused on forecasting, to microeconometrics approaches. A non-exhaustive list of recent studies includes methods based on vector autoregressive models (Chatziantoniou et al., 2013), cointegration (Tang and Tan, 2015), multivariate forecasting models (Gunter and Önder, 2015), almost ideal demand system models (Li et al., 2013; Lee et al., 2015), logistic transition regression models (Wang, 2014), dynamic multinomial logit models (Grigolon et al., 2014), hurdle models (Bernini and Cracolici, 2015), dynamic panel models (Capacci et al., 2015) and panel system generalized method of moments models (De Vita, 2014).

measure of the average response of tourist expenditure to changes in its determinants. When such a response exhibits strong patterns of heterogeneity, the QR approach is expected to provide a more comprehensive picture of different spending behaviors because it allows the coefficients to vary over the whole spectrum of the tourist expenditure distribution.

The theory of QR was developed by Koenker and Bassett (1978) and is has been applied in many research fields, such as labor economics (see among many others, Buchinsky 1994, 1997; Gosling et al., 2000), finance (Engle and Manganelli, 2004), and health economics (Atella et al., 2008). Recently the QR approach has also been adopted in tourism studies, these include the analyses in Hung et al. (2012) on tourism consumption behavior in Taiwan, Lew and Ng (2012) on Hong Kong visitors spending, Saayman and Saayman (2012) on three sport events in South Africa, and Chen and Chang (2012) on the influence of travel agents in Taiwan.

The third feature of our analysis is that, given that tourism is a complex product formed by different complementary elements, we also examine the determinants of the main components of visitor expenditure, such as accommodation, meals and restaurants, entertainment and shopping. The analysis of the various segments is relevant because it enables us to provide specific information to the different business categories involved in the tourism industry in addition to providing a general picture to destination managers.

Our study is based on a survey performed in Sardinia from April to October 2012 consisting of 1,445 interviews with non-resident tourists in the main ports and airports when leaving the island at the end of their vacations. Sardinia is an interesting case study because it is one of the most renowned tourist destinations in Italy and in the Mediterranean Sea more generally.

The paper is organized as follows. In the next section, we briefly discuss the related literature. The survey methodology is presented in Section 3, and Section 4 presents the empirical model together with a detailed discussion of the explanatory variables. The econometric estimation is presented in Section 5, and the results are fully discussed in Section 6. Section 7 concludes.

2. Literature background

Tourist expenditure and its determinants have been widely investigated in the literature from the macro perspective, with the general aim of assessing the economic impact of tourism. On the other hand, the analysis of tourist expenditure at the individual level, which is the concern of this study, has received less attention (Craggs and Schofield, 2009); in particular, there is a lack of accuracy in the econometric methods employed (Brida and Scuderi, 2013). In general, researchers following a micro approach have mainly been interested in examining the factors that influence the

three specific dimensions of tourist expenditure: (i) why consumers spend on tourism; (ii) how much they spend; and (iii) which goods they purchase.

Some authors have modeled more than one dimension simultaneously. For instance, Wu et al. (2013) employ a scobit model to analyze the choice to spend on tourism (dimension i) and the level of expenditure (dimension ii), which appear to be strongly correlated. As regards the first dimension, they found that the choice to travel is positively influenced by education and income, while being gendered male and having a large household size exert a negative effect. On the other hand, the level of tourism expenditure is negatively affected by household size and positively by income and travel distance. It should be noted that the authors admit they consider total expenditure for the entire holiday; thus, the positive effect of travel distance is probably due to travel costs and length of stay. Chang et al. (2013) analyze the difference in the level and composition of tourist expenditure for first time and repeat visitors to Taiwan. They found that previous travel experience does not contribute to significant differences in visitors' preferences and expenditure patterns.

The second dimension - the determinants of tourist expenditure levels - is the most frequently investigated, and the majority of authors define the dependent variable as the per capita value of the expenses, often transformed in logarithms. The literature has included a large set of explanatory variables which, following Wang et al. (2006) and the recent survey by Brida and Scuderi (2013), may be grouped in four main categories: economic constraints, socio-demographic, trip-related and psychographic characteristics. Divergent findings have been found depending on the definition of the dependent variable (i.e., total expenditure, per day expenditure, personal spending, travel part spending) and its measurement (metric, categorical, natural logarithm, level-form), on the methodology employed and on the geographical scope. We will account for the findings of these previous studies in detail in section 6 while discussing our empirical results.

As regards the third dimension, Divisekera and Deegan (2010) and Divisekera (2010) investigate the consumption behavior of foreign tourists by analyzing the major components of tourist expenditure, namely accommodation, food, transport, shopping and entertainment. Consumption behavior is also investigated by Craggs and Schofield (2009), who divided visitors into three segments according to their expenditure level and analyzed their characteristics and different spending patterns, similarly to the study by Mok and Iverson (2000).

Another crucial issue debated in the literature concerns the empirical methodology and the many different approaches - from descriptive statistics to econometric models - that have been used to investigate the relationship between tourist spending and its explanatory variables. Recently, Hung et al. (2012) argued that Ordinary Least Squares (OLS) estimations consider only the average response of tourist expenditure to changes in its determinants while possible differences among

consumer segments, like heavy spenders and light spenders, are overlooked. Thus, following the seminal work by Koenker and Hallock (2001), Hung et al. (2012) highlight the increased accuracy of the quantile regression method to identify the determinants of tourist expenditure. In their findings, the OLS regression reveals an average negative relationship between income and tourist expenditure expressed as a share of total household income; conversely, the quantile regression shows a negative different marginal effect for the low spenders (i.e., tourism is inferior good) and a positive effect for higher spenders (tourism is a normal good). Similarly, Lew and Ng (2012), replicating Wang's (2004) OLS analysis of mainland Chinese tourists' spending in Hong Kong, emphasize the adequacy of the quantile regression to describe tourist spending market segments.

3. Survey methodology and data

Our study is based on a survey performed in Sardinia's main ports and airports from April to October 2012. We interviewed non-resident tourists who spent at least one night in Sardinia for non-business purposes as they left the island at the end of their holiday. The choice to interview tourists at the end of their vacation once all the holiday expenses had been incurred allows us to obtain a more reliable measure of tourist expenditures and to avoid its estimation for remaining vacation days, as in other survey-based studies (Craggs and Schofield, 2009). It is important to note that we interviewed the tourists in the gate area of the airports after check-in and after ferry boarding in the ports. This circumstance implies that, in both cases, the respondents were simply waiting for departure with no pressure from additional travel procedures, and thus, we had adequate time to interview them and to collect all the required information.

The questionnaire consisted of 4 sections. The first section is related to the characteristics and the organization of the holiday; it included items like the length of stay, party size, the destinations visited, the use of travel intermediaries and accommodation. The second section collects data on overall expenditure and on the cost components such as incoming transport, accommodation, restaurants and cafes, food, internal transport, recreation, shopping, personal care, housing and other expenses. The third part aims to obtain information about motivations, satisfaction, the typology of the holiday and the intention to return to Sardinia or recommend it as a destination to other tourists. The last section collects socio-economic information on the interviewees.

To identify our statistical sample we consider total tourist arrivals in Sardinia in 2010. Total arrivals include tourist flows formally registered in classified accommodation facilities (hotels, holiday villages, campgrounds, B&Bs, official touristic residences), which amount to about 2 million people. In addition, there is a flow of non-Sardinian tourists to holiday houses rented in the informal

market or owned by the tourists (or their friends or relatives) themselves, which is quite difficult to quantify.

We used a stratified sampling method to select our sample, using four dimensions of tourist arrivals in Sardinia. The first dimension is the period of the visit and, given the strong characterization of Sardinia as a sea and sun destination, we considered the arrivals in July and August as high season flows (60% of the total sample) and those occurring in the other five months (April, May, June, September and October) as low season flows (40%). The second dimension is tourist origin, and we assigned a share of 60% to Italian tourists and 40% to foreigners. For both dimensions, population data are taken from the Italian Institute of Statistics (ISTAT, 2010). The third layer is the gateway to the island, for which we considered the three ports of Porto Torres (12% share), Olbia (45%) and Cagliari (3%), and the three airports of Alghero (9%), Olbia (16%) and Cagliari (15%). Finally, regarding tourist arrivals through the airports, we also stratified the sample by the flight typology, considering traditional (51%), low cost (44%) and charter (5%) airlines. Data on gateways and type of flights were obtained from the Italian Ministry of Transportation. We collected a total of 1,445 valid questionnaires distributed according to the shares presented above.

Table 1 reports the descriptive statistics of our variable of interest, tourist expenditure. The daily expenditure per person is, on average, 104 euros, and a relevant share of this cost is spent for accommodation (37 euros), followed by travel costs (29 euros) and food and drinks (20 euros), while the expenditure on other services, like recreation, shopping and wellness, is about 9 euros per day.

Table 2 reports the main features of our sample listed according to the four categories of explanatory variables: economic constraints, socio-economic, trip-related and psychographic characteristics. Among the economic constraints, we consider the income of the vacation party; the largest component of the sample has a medium net income level in the range of 30-60 thousand euros per year (41.8%), followed by low income of less than 30 thousand (41%). Considering the socio-economic characteristics, the highest share of the interviewees are male (51.4%), aged between 26-40 years (38.5%) and 41-60 (37.1%), employed (76.5%), with a tertiary education (48.9%) arriving from Northern Italy (35.8%) and, among the foreign countries, from Germany (10.7%) and France (5%).

In terms of trip-related characteristics, our sample shows an average party size of 2.5 persons, a stay of 11 nights and 1.4 locations visited as trip destinations with at least one overnight. The largest share of tourists visited the island in August (35.4%) and July (24.7%), while the remaining 40% arrived in the low season as imposed by the stratification criterion based on the official statistics. The phenomenon of seasonality is confirmed by the high percentage (72%) of tourists who choose Sardinia for sea and sun vacations. The most common accommodation typology is the hotel (40%),

followed by private houses (27%) and other accommodations (17%), like campgrounds, B&Bs or rural facilities. It is interesting to note that only 36% of tourists purchased their holiday through an intermediary, while a large majority are self-organized visitors. Finally, the most visited provinces are Olbia (43%), which includes the world-renowned destination of Costa Smeralda, followed by Sassari (19%) in the north of the island and Cagliari (18%) in the south.

Among the psychographic characteristics, we consider previous behavior and holiday motivations. Approximately one quarter (26.4%) of our sample are first-time visitors to Sardinia, while the large majority (73.6%) shows a repeated behavior with 16% of the tourists declaring they had spent their vacation in Sardinia more than 10 times previously. Considering the stated motivation for choosing Sardinia as holiday destination, the quality of Sardinia's environmental resources, particularly its beaches, is recognized by a large portion of the sample (28%). The island is also preferred for its notoriety (20.5%), for visiting relatives or friends (VRF, 19.5%), and because the respondent owns a house in the region (11.8%).

Before describing in detail the empirical analysis we provide a brief description of the supply side of tourism in Sardinia. This is expected to provide valuable information on the context in which the hospitality industry operates, and thus should allow for a better evaluation of the results presented in section 6. According to ISTAT in 2012 Sardinian tourist supply consists of 204,571 beds and 4,401 accommodation establishments. Hotels provide 52% of the beds and the 22% of the facilities, while the remaining supply is offered by a wide range of different establishments, such as B&B, camp sites, or private rented houses. The majority (78%) of hotel beds is offered by 3 and 4 stars hotel; the highest quality supply, that is the one provided by 5 stars hotels, consists of 5,631 beds (5% of total hotel beds). As for the complementary supply, most of beds are offered in camp sites and tourist villages (62%), while 16% of beds are offered by B&Bs and the remaining 28% by farm holidays, hostels and rented houses. A distinguishing feature of the Sardinian supply is the large size of hotels in term of the number of beds: on average there are 117 beds per establishment, 225 for the five stars hotels and 228 for four stars ones. This supply characteristic is mainly due to the fact that Sardinia tourism demand is largely related to the sea and sun typology.

4. The empirical model

As stated in the introduction, our study aims to investigate the determinants of tourist demand from a micro-level perspective. Given that the "tourist good" is a composite and highly differentiated good, specific prices are not readily available. Thus, it is preferable to analyze its determinants within an empirical model derived from the theoretical microeconomic Engel's curve, on the basis of which

tourist expenditure can be expressed as a function of income and consumer preferences. In formulating the empirical model, we adopt the classification of the determinants of tourist expenditure proposed by Wang et al. (2006), who identify four distinct groups of explanatory variables: economic constraints (*EC*), socio-demographic (*SD*), trip-related (*TR*) and psychographic (*PG*) characteristics. Therefore, the relationship between tourist expenditure and its main determinants can be formulated as follows:

$$tourist\ expenditure_i = f(EC_i, SD_i, TR_i, PG_i) \tag{1}$$

In the empirical analysis, the general formulation reported in model (1) is specified with respect to total tourist expenditure (including or excluding travel costs) and to some of its specific components, namely accommodation, food and beverages and other activities (entertainment, attractions, shopping). In all specifications considered, the observational unit (*i*) is expenditure per person per day for the sample of 1,445 tourists interviewed at the end of their visit to Sardinia during the year 2012.

In what follows, we describe the selection of the variables included in the four categories listed above, along with a detailed description of how they were operationalized (refer to Table 2 for main summary statistics).

4.1. Economic constraints

Income is one of the most relevant determinants of tourist expenditures and the main variable in the economic constraints subset of regressors. It has been included in the great majority of empirical studies (Brida and Scuderi, 2013), which provide results consistent with a positive effect for a medium-high level of income, confirming the normal to luxury trait of the tourist good. Evidence of negative income effects are found (Alegre et al., 2011) in only a limited number of cases when low levels of earnings are considered. Empirical studies differ considerably with respect to the way income is measured, i.e., by means of a continuous metric or by dummy variables for some specified classes. In performing our survey, we chose not to ask for the exact level of income given that individuals are generally not keen to provide this type of information. Therefore, to obtain a reliable answer at least for the relevant income interval, our questionnaire asked respondents to indicate the relevant range of income (yearly, after taxes) for their holiday party by choosing one of the following classes: less than 30 thousand euros, 30 to 60 thousand euros, or higher than 60 thousand euros. In our regression models, we included dummy variables for the different income classes, considering tourists reporting income in the lower range as the reference group.

4.2. Socio-demographic characteristics

Occupation status, education, gender, age and place of residence are the variables selected to describe the tourists' socio-demographic traits.

We consider four occupation statuses, namely, employed, unemployed, retired and student. In the empirical model they are included by means of dummy variables and employed tourists are considered as the reference group. Most previous studies considered the occupation as being defined by the categories of professional, i.e. white collars or blue collars. Although a positive correlation is expected between highly compensated professional categories and tourist expenditure, according to Wang et al. (2006) empirical results are quite uncertain. This is reasonably due to the fact that the simple distinction between white and blue collars induces a high correlation with income. For this reason in our empirical models we prefer to focus on occupation status rather than on professional categories. This choice allows us to account simultaneously for the effect of income and for the heterogeneity in tourists' preferences. The latter are expected to be correlated with the occupation statuses listed above: intuitively, a student has significantly different tastes with respect to a retired person as far as travel and recreation activities are concerned. It is worth noting that the joint inclusion of income classes and occupation statuses does not induce multicollinearity problems in the estimated models: the highest pair-wise positive correlation (0.20) is found for the "student" status and the "low income" case, followed by the case for the pair of "employed" and "high income" dummies (0.11).

Education, either in the form of a continuous (schooling years) or categorical variable (degree levels), is included in most empirical investigations. Recreational activities such as traveling are enhanced by highly educated individuals who "have relatively fewer tourism information-related search costs than less educated people do and, thus, have more travel opportunities;" moreover, highly educated people also "have better communicative competence and knowledge than less educated ones and, thus, willing to spend more on travel" (Hung et al., 2012, p. 496). Although a positive effect of education on tourist expenditure is expected, particularly for the heavy spenders group (Hung et al. 2012), the education regressors rarely turn out to be significant (Brida and Scuderi, 2013). In our study, we consider the three levels of primary, secondary and tertiary education, operationalized by means of dummy variables, with primary being the reference level.

Although gender is seldom found to have a significant relationship with tourist expenditures in most empirical studies (a recent exception is the analysis by Craggs and Schofield, 2009, who found that female visitors tend to spend more than males), we have included it in our study to control for unobservable factors that might be correlated with gender.

According to the survey by Brida and Scuderi (2013), age is the variable included most frequently in the empirical literature on tourist expenditures. Although a positive significant effect – with younger tourists spending less than older ones – seems to prevail (Craggs and Schofield, 2009; Perez and Sampol, 2000), it is difficult to generalize this finding because the effect depends markedly on how age is measured; in particular, there is considerable variability in the cut-off values adopted to define age classes, which also means that results are not directly comparable. In a few cases, the relationship between age and tourist expenditure is inverse (Brida and Scuderi, 2013), or becomes so after reaching a certain threshold (52 years of age in Thrane and Farstad, 2011) or for specific age classes. In our analysis, age is included as a continuous variable and for robustness, following Lew and Ng (2012), we also included dummy variables for the age classes 15-24, 26-40 and 41-60; tourists aged over 60 years are the reference group.

Finally, we consider the respondents' place of residence in order to take into account the set of factors related to nationality, spoken language, cultural attitudes or geographical distance from the holiday destination. In general, it is expected that the larger the distance along the above dimensions, the higher the effect on tourist expenditures (Wu et al., 2013). The information collected from our survey is the country of origin for foreign tourists and the macro-region (North, Centre, and South) for the Italian visitors. This information in included in the empirical models by means of dummy variables.

4.3. Trip-related characteristics

In our study, the most salient features of the holiday are represented by length of stay, size of the travel party, time of the trip and its typology, accommodation, means of transport, number of visited sites and travel intermediaries.

Length of stay is found to be positively and significantly related to tourist spending in most studies, although, as stressed by Brida and Scuderi (2013), this outcome is more often the case when trip expenditures are not standardized by the number of overnight stays. Moreover, some authors provide evidence of significant non-linearities when total travel party expenditures are modelled: Roehl and Fesenmaier (1995) found that the relationship could be adequately approximated by an inverted *U* curve, increasing up to a determined number of nights and decreasing thereafter. More recently, Thrane and Farstad (2011) found that the positive effect tends to decline in magnitude as the length of stay increases, while Lew and Ng (2012) found a positive effect for only some specific portions of the total expenditure distribution. On the contrary, by focusing on daily expenditure per person, Alegre et al. (2011) found a negative effect for the length of stay. We expect a similar result for the length of stay in our study, measured by the nights spent at the holiday destination.

Travel party size is one of the most frequently investigated determinants of tourist expenditure. In the majority of studies, this determinant is found to be significant, although with a varying sign. A positive sign is associated with total tourist expenditure (Craggs and Schofield, 2009; Downward and Lumsdon, 2003; Laesser and Crouch, 2006; Lee, 2001; Seiler et al., 2002) and a negative sign with per person tourist expenditure (Alegre et al., 2011; Mok and Iverson, 2000; Wu et al., 2013). Thrane and Farstad (2011) also report evidence of significant non-linearities, with per capita expenditure becoming positive beyond a certain number (nine) of participants.

In our empirical models we also include quadratic terms for both length of stay and travel party size to unveil possible non-linearities. If the latter are relevant, we expect a curvilinear *U* relationship between tourist expenditure and each of the two trip-related variables. This would indicate that scale economies could be relevant but their magnitude declines as the size of the holiday party increases or the length of stay becomes longer.

Holiday timing is included to account for increases in tourist expenditures due to higher prices applied in the high summer season. Thus, people traveling during the summer tend to spend more than people traveling in other seasons. Closely associated with the time of holiday is trip typology; we single out the sea and sun typology with respect to all other typologies because Sardinia is well known worldwide as a sea and sun holiday destination. As highlighted in the previous section, holiday timing induces a strong seasonal pattern, with the great majority of tourists (72%) visiting the island in the summer months of July and August.

Although it represents a remarkable proportion of the holiday budget, accommodation is not frequently included in empirical analysis. Brida and Scuderi (2013) report that it was considered in only 17% of the studies they reviewed, and in most of them, it was found to be a relevant determinant of tourist expenditure. We collect information on the following types of accommodation: hotels (distinguished according to the number of stars), private houses (either personally owned or owned by parents or friends), rental houses or other (B&Bs, campgrounds, farm holidays).

Means of transportation are considered when analyzing total expenditure, including travel costs to reach the destination. Because Sardinia is an island, we focus on two travel modalities, ferryboat and plane. Although some authors (Thrane and Farstad, 2011) find that people travelling by plane tend to spend more, in our regression models we take into account the saving effect due to low cost flights; the plane modality is thus distinguished between traditional and low-cost air carriers.

We also considered whether tourist expenditure is significantly related to the number of sites visited during the holiday by distinguishing between one-site tourists and multi-site tourists. Based on previous studies, we expect the latter tourist group to exhibit higher spending levels.

Finally, we include an indicator variable to control for trip intermediation (Chen and Chang, 2012). We have no a priori expectations concerning the effect of holiday intermediaries because they constitute an additional cost in and of themselves, but may provide arrangements that could yield substantial savings or, conversely, even further spending due to suggested additional or higher quality travel opportunities.

4.4. Psychographic characteristics

The main psychographic characteristics are previous travel experience and holiday motivations.

The first factor is often included in empirical studies, although in most cases it does not turn out to be significant (Brida and Scuderi, 2013). When it is significant, a positive sign prevails, as in Lew and Ng (2012), but some authors (Craggs and Schofield, 2009) have also found evidence consistent with infrequent visitors spending more than frequent visitors. In our study, we made both a broad distinction – between tourists who had never visited Sardinia before and those who made at least one previous trip – and a finer one based on the following tourists groups: no previous visit, 1 previous visit, 2-4, 5-10 and more than 10 previous visits to the island.

Holiday motivations refer to the set of often intangible factors that reveal tourists' heterogeneous preferences and are directly linked to the specific purpose of the trip. Alegre et al. (2011) report that tourists keen on experiencing the local and cultural environment or social attractions are more likely to be high spenders than those who prefer basic "sea and sun" holidays. According to Thrane and Farstad (2011), tourists visiting relatives or friends spend less than all other tourists, including home owners. In our survey we include a set of twelve possible motives to visit Sardinia, namely VRF, frequent visitors, own a house, destination notoriety, service quality, environmental resources, cultural attractions, food and wine, events, low-cost flight, favorable offer and other, which were operationalized by individual binary indicators or group indicators.

5. Econometric analysis

The analysis of the determinants of tourist expenditures is based on the estimation of both classical linear regression models and quantile regression (QR) models. The former, being based on the conditional mean function, are useful econometric tools for detecting the central tendency of the data and thus estimating the average response of tourist expenditure to changes in the explanatory variables. The analysis of the average relationship is complemented by investigating specific portions of the expenditure's conditional distribution by means of quantile regressions. When heterogeneity is

also markedly present in the variables' effects, the latter approach is expected to provide a more comprehensive picture of the spending behavior because each determinant's effect is allowed to vary over the whole spectrum of the distribution. More specifically, the QR approach features the advantage of allowing for distinctions among light, moderate and heavy spenders.[2] This phenomenon, in turn, enhances the understanding of what drives the heterogeneous response of tourists, which is valuable information for policy makers and destination managers, as we discuss in detail in the next section.

The classical regression model is specified according to the following linear formulation:

$$y_i = \beta_0 + EC_i'\beta_1 + SD_i'\beta_2 + TR_i'\beta_3 + PG_i'\beta_4 + \varepsilon_i \tag{2}$$

where y_i is the log-transformed per person per day tourist expenditure considered as the total amount (including or excluding travel costs) or the amount paid for specific items (accommodation, food and beverages or other activities). The matrices EC_i, SD_i, TR_i and PG_i comprise the explanatory variables related to the distinct sets of economic constraints, socio-demographic, trip-related or psychographic determinants, discussed in the previous section.

Also, in the case of the QR models, we assume a linear relationship with respect to the set of explanatory variables, $Q_q(y|X)$:

$$Q(y_i|X_i) = X_i'\beta_q + v_i \tag{3}$$

where q is the specific quantile considered, with $0<q<1$ and X the regressors matrix. The estimator for $\hat{\beta}_q$ is derived by minimizing the function in (4) by applying linear programming methods:

$$Q(\beta_q) = \sum_{i:y_i \geq X_i'\beta}^{N} q|y_i - X_i'\beta_q| + \sum_{i:y_i < X_i'\beta}^{N} (1-q)|y_i - X_i'\beta_q| \tag{4}$$

When $q=0.50$, the conditional median function, *med(y|X)*, is obtained and the estimator for $\hat{\beta}_{0.50}$ is the least absolute deviation estimator. In this symmetric case, equal weight is assigned to predictions for observations with $y \geq X'\beta$ or $y < X'\beta$. For a value of q higher (lower) than 0.50, predictions for observations with $y \geq X'\beta$ are given more (less) weight. Under general conditions, the

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[2] Moreover, QR estimators are robust to outliers and are also efficient when the dependent variable is highly non-normal. For a comprehensive description of the QR method, see Koenker and Bassett (1978), Koenker and Hallock (2001) and Koenker (2005), Cameron and Trivedi (2005, 2010).

QR estimator is normally distributed; its variance-covariance matrix entails a very demanding estimation and for this reason, Cameron and Trivedi (2010) suggest the use of the paired bootstrap method. We follow this recommendation and compute bootstrap standard errors with 1000 replications; it is worth noting that bootstrap standard errors are robust to heteroscedasticity.

Unlike in previous applications of the QR method to the study of tourist expenditure, in our analysis, besides reporting the estimated coefficient for the different quantiles considered, we also test the equality of the effects of each explanatory variable at different conditional quantiles. More specifically, we performed pair-wise tests for each regressor; thus, we test whether the coefficient at a given quantile is significantly different from the same coefficient at any other specified quantile. The higher the number of rejections of the null hypothesis of coefficient equality, the stronger the evidence supporting the hypothesis that the intensity and/or sign of tourists' reaction to changes in spending determinants vary according to the level of their individual expenditure.

6. Results

6.1. Linear regression models

In Table 3, we report the results obtained by applying the linear regression model to total tourist expenditure – including or excluding travel costs – and expenditures incurred for accommodation, food and beverages and activities performed during the holiday. In all regressions, tourist expenditure is considered per tourist per day. Each estimated effect must be considered as the expected response to a change in a given determinant of tourist expenditures. It is worth recalling that as most regressors are binary variables, the coefficients must be interpreted as the differential effect with respect to that associated with the reference case. The significance of the coefficients is assessed on the basis of heteroskedasticity consistent standard errors because for most specifications considered we find evidence of non-constant error variance, which is a typical feature of individual micro-level data.

It is worth noting that in each model we also include a dummy variable that takes value 1 for the case of tourists that visited Sardinia more than ten times in the past, own a house in Sardinia and the house is located in the province of Olbia-Tempio. In this way we account for the specific group of tourists (4% of total flows) that is more likely to belong to the category of wealthy people that own luxury houses in the Costa Smeralda location and that are expected to exhibit different spending patterns with respect to the traditional tourist.

Our findings confirm previous evidence on the relevance of income as one of the most important drivers of tourist expenditure (Agarwal and Yochum, 1999; Thrane and Farstad, 2011; Wu

et al., 2013). With respect to the low income reference group, an individual with a medium level of income, ceteris paribus, is expect to spend 6.9% more during his or her holidays, while a high-income tourist increases his or her total expenditure by a sizeable 28.5%. Similar effects (5.5% and 25.3%) are found if holiday expenditures are considered net of travel costs (see the second column of the table). Significant differences are found among income-related groups of tourists as far as accommodation costs are concerned (third column). The positive differentials with respect to the reference group are estimated at 16% (medium income) and 42.7% (high), showing that spending for lodging is highly sensitive to income. On the contrary, expenditures related to food and beverages (column 4) or to other activities (column 5) do not exhibit any significant additional effect driven by higher income levels.

Among the socio-economic characteristics, gender and age are not found to significantly influence holiday expenditure. The result on gender is in line with previous evidence (Wang et al., 2006); this outcome may due to the fact that, as argued by Marshment (1997), the tourist market is not prominently differentiated along gender lines. As for age, we find a small negative effect only in the case of food expenditure. To gain more insights on the effect exerted by age, in a more general specification of the model not reported due to space constraints, we distinguish among four age classes, 14-25, 26-40, 41-60, and over 60, with the latter group being the reference group. Insignificant age effects are confirmed for all the classes and for all the types of tourist expenditure considered, with the exception of food and beverage spending. The latter was revealed to be the only component influenced by tourists' ages: the highest differential (35%) was found for the 26-40 age class, while the other significant effect (33.5%) was associated with the 41-60 age class. Our findings confirm that the age effect is very sensitive to how the variable is measured (Brida and Scuderi, 2013).

Focusing on the occupation status, we find that students and the unemployed spend less than employed tourists. For the latter group, the coefficient exhibits the expected negative sign in most regressions, although it is significant only in the case of spending in other activities. Students tends to spend 12% less on average by cutting significantly more on other activities (-22%) and food and beverages (-18%) than on accommodation. These findings are consistent with the unemployed and students having a more frugal attitude towards holidays. On the contrary, retired people tend to spend more than people still employed, particularly on food (31%); this phenomenon may reflect special dietary needs due to advanced age or preferences for high quality meals to be consumed in comfortable restaurants.

Tourist expenditure per day is not marked by significant differences according to the level of education. This result may be due to the fact that the effects of education are channeled through income, so that the latter's inclusion makes education redundant. As a matter of fact, the level of

education is often used to proxy the level of income when it is not available or tourists return unreliable information about their economic conditions (as done in Hung et al., 2012 and Saayman and Saayman, 2012). Another possible explanation for education not being significant is that more educated people are better equipped to balance the increase in expenditures induced by the tendency to participate in more recreational activities by taking advantage of saving opportunities. This is accomplished either by planning their holidays in advance or by processing the information available from different sources more rapidly and effectively.

Foreign tourists have a significantly higher level of expenditure with respect to Italian tourists resident in regions other than Sardinia (Wu et al., 2013). We recall that the majority of foreign tourists are from Germany, France and the UK. The difference is sizeable for total spending (14% when travel costs are included and 11% when they are not), accommodation (10%) and especially for food (22%).[3] Spending patterns are indistinguishable between national and foreign tourists in the case of other activities. Given its relationship to the local culture and natural environment, food is one of the most important experience goods when visiting a foreign country and it represents an effective way to discover the destination's traditions. Such a relationship is particularly evident for Sardinia, which has a large variety of local cookery characterized by the use of unique, high-quality natural products and a range of renowned wines that are not only consumed during the holiday but are often purchased to be taken home.

Turning to trip related characteristics, we find evidence of a nonlinear relationship of tourist expenditure with respect to the size of the tourist group and the number of days spent on holiday. Both the linear and the square term are significant and exhibit the expected negative and positive sign, respectively. Therefore, both variables contribute to significantly reduce daily per person expenditure in all regression models reported in Table 3 (the only exception is found for accommodation spending), but the saving effects decline in magnitude as the number of members of tourist group or the days of holidays increases. More specifically, each additional traveling companion is expected to reduce total tourist expenditure by around 26% when the effect is calculated with respect to the sample mean value (2.5 persons). Similar effects are found for total expenditure excluding travel costs and for spending in other activities, while a larger reduction (-28%) was found for food and beverage and a smaller one (-21%) for accommodation spending. Our results confirmed previous evidence provided by Thrane and Farstad (2011), Alegre et al. (2011) and Wu et al. (2013), among others. As in Alegre et al. (2011), an additional day of holiday induces a saving effect on spending, although the effects are much lower in magnitude when compared to those associated with party size; when calculated at

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[3] Even more remarkable differences are found between Italian tourists and extra-EU tourists.

the mean value (10.9 nights) they range from -4.4% for total expenditure to -3.5% for accommodation expenses. It is worth noting that for both variables the computed turning point of the curvilinear *U* relationship, after which expenditure per tourist per day is expected to increase, is a value outside the range of observed values: it is estimated in 13 people for the party size (12 is the observed maximum value) and in 230 days for length of stay (observed maximum 180 days). Therefore, our findings suggest that the relevant portion of the non-linear curve is the decreasing one, so that significant economies of scale arise thanks to sharing. Although the island is known worldwide as a luxury tourism destination, our results seem to indicate that the vacation market is differentiated enough to offer affordable holidays to diversified groups of tourists.

According to our results, tourists taking their holidays during the high season period (mainly July and August) tend to substitute other activities with accommodation; the latter induces an increase (20%) in expenditure that is compensated by a more frugal consumption of other activities (-23%). This balancing between the two expenditure components results in the high season yielding an increase of around 6% in total tourist expenditures.

Accommodation costs tend to increase for tourists choosing lodging typologies different from their own or relatives' or friends' private houses. For total expenditures and for accommodation, the highest effect is found for holidays spent in hotels, followed by rental houses, campgrounds and B&Bs. Compensating effects obtained by reducing food and beverages spending (column 4 of Table 3) are detected only in the case of lodging at hotels. However, it is worth noting that this result may be due to either a proper saving behavior with respect to food costs or to the price being inclusive of half board accommodation.

The trip typology does not exhibit significant different effects on expenditure when contrasting the usual sea and sun holiday with all other kinds of vacations.

Although air-related transport modality does not exert a significant effect on total expenditure, it is associated with higher spending on accommodation (11%) and with a reduction in expenditure on food and beverages (-21%) and other activities (-30%). On the contrary, sizeable saving effects are attained by tourists who choose to fly with low-cost airline carriers (-21% overall). For the same tourists, we also detect a significant reduction in expenditure net of travel costs (-10%) and in accommodation spending (-11%). This finding may indicate that this kind of traveler has a significantly different attitude towards holidays with respect to other tourists insofar they exhibit more parsimonious consumption behavior.

Holidays organized by means of travel intermediaries do not tend to be characterized by higher levels of spending in general, although we find that accommodation costs are higher on average (17%), while food and beverages are lower (-25%). As highlighted in section 4, the effect of travel

intermediation cannot be known a priori and has to be established on empirical grounds. As a matter of fact, expenditures could either increase or decrease depending on the number and quality of the items (activities, accommodation) suggested by travel agents on the one hand, and on the saving opportunities that a better informed and skilled operator is able to offer to his or her customers on the other (Chen and Chang, 2012).

When more locations are visited during the same holiday total expenditure increases by 6%, such an effect is mainly attributable to food and beverages (25%), which in this case is the most responsive expenditure component, and to other activities (15%); conversely, spending on accommodation tends to decrease. This is probably due to the fact that when visiting different places in a relatively short period of time, tourists tend to eat in restaurants more frequently both for logistical reasons and because it allows them the opportunity to enjoy different types of local cuisine.

Finally, focusing on the psychographic characteristics, we find that repeat visitors to Sardinia have expenditure levels 7% higher with respect to first-time visitors (12% in the case of accommodation). This result, in line with some previous evidence (Rosenbaum and Spears, 2005; Lew and Ng, 2012), may be due to the fact that returning tourists are likely to have spent satisfactory holidays in the past and therefore are more inclined to spend more on the latest holiday. It is worth noting that the repeat visitors result is robust with respect to the inclusion of the dummy variable for tourists that visited Sardinia more than ten times in the past, own a house in Sardinia and the house is located in the province of Olbia-Tempio (where Costa Smeralda is located).[4] Such binary variable, having a positive and significant effect (18%), accounts for the higher level of spending behavior of the category of tourists that are expected to be the wealthiest ones.

As in Alegre et al. (2011), we find that the holiday motivation is an important driver of tourist expenditure. This is particularly true when the purpose for visiting Sardinia is directly related to its natural environment or the island's notoriety as a famous tourist destination; in these instances, total spending increases by 12% and 13%, respectively, compared to the level paid by tourists that own a house in Sardinia or visit relatives or friends, as in Thrane and Farstad (2011). The spending component most influenced by trip motivation is that related to other activities (31% for environment and 39% for notoriety), because the entire holiday time is likely to be organized to enjoy such activities and visit famous sites.

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[4] To check whether relevant differences could be detected in the behavior of "repeat tourists" that own a house in Sardinia or spend their holidays in the island to visit relatives or friends with respect to the behavior of traditional tourists, we also included a dummy variable taking value of 1 for tourists that visited Sardinia more than 10 times in the past and whose main motivation was related to own a house or to visit relatives or friends (12.6% of the cases), but it did not turn out to be significant.

Overall, our findings confirm the main results of the previous empirical literature on tourist expenditure. Moreover, they show how the hospitality industry is characterized by a great degree of heterogeneity on both the demand and the supply side: individuals exhibit highly diversified touristic behavior, and at the same time, the destinations feature a fairly diversified mix of characteristics. Although in the analysis discussed so far we have accounted for both the demand and supply factors-related heterogeneity by including a wide set of explanatory variables, it may yet be the case that the heterogeneity also affects the coefficients, as the same determinant may yield different effects depending on the level of tourist expenditure. This issue is investigated in the next section by means of quantile regressions, which, as discussed in section 5, are specifically designed to analyze this kind of varying coefficients case.

6.2. Quantile regression models

Quantile regression analysis was performed for certain selected percentiles of the tourist expenditure distribution and is intended to capture the most relevant potential differences in spending behavior when on holiday. We consider the following percentiles, q=0.10, 0.25, 0.50, 0.75 and 0.90; similar quantiles are also analyzed by Saayman and Saayman (2012) and Hung et al. (2012).

QR analysis is performed on total tourist expenditure (with and without travel costs) and on the three components analyzed in this study. As in the linear regression models discussed above we consider daily expenditure per person and the same set of explanatory variables. The regression results are reported in Tables 4A-8A, while Tables 4B-8B report test results for the hypothesis of coefficients' equality across quantiles.[5] It is worth emphasizing that this is the first time that the equality tests are reported for tourist expenditure analysis performed within the quantile regression framework. In previous studies, conclusions on the existence of varying effects were based solely on the absolute difference of the reported estimates. Equality tests allow us to provide a more rigorous assessment of the quantile results, as they help to discriminate between proper coefficient differences related to significant variations in tourist behavior and differences due to sample variability.

6.2.1. Total tourist expenditure

Focusing on Table 4A, when discussing the quantile regression results, it is interesting to first compare the estimated coefficient for the median (q=0.50) with those obtained for the mean on the base of the linear regression model reported in the first column of Table 3. As the median estimator is robust to the existence of outliers and peculiar behavior at the tails of the expenditure distribution,

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[5] Tests results are reported only for the variables associated with significant coefficients in the QR models presented in Tables 4A-8A.

the mean vs. median comparison allows us to assess whether the linear model provides an adequate picture of the central tendencies featured in the data. This is revealed to be the case in our study, as the comparisons of the significant coefficients estimates show: only 3 coefficients appear to be different in magnitude, namely, those associated with unemployed status, high season, and incoming transport.

We now turn to a detailed discussion of the results for the complete set of quantile regressions reported in Table 4A for total tourist expenditure. Focusing on the estimates for the constant coefficient, which represent the estimated level of tourist expenditure for the reference group, we find strong evidence that the estimated level of expenditure for the reference group changes significantly throughout the distribution.

Turning to the explanatory variables, QR estimation confirms the irrelevant contribution of gender, age, holiday typology, and trip intermediation to tourist expenditure. Medium level income, retired occupation status and tertiary education do not exhibit significant differential effects with respect to the reference group over all the quantiles considered. Only one case of significance is found across the different quantiles, for unemployed occupation status (q=0.50) and secondary education (q=0.10).

Focusing on the significant covariates, we found that high level income estimates reveal a certain degree of variability, ranging from 0.16 (q=0.10) to 0.36 (q=0.90); however, the tests reported in Table 4B indicate that the differences computed between any two quantiles are not significant at conventional levels, so that in this case it is reasonable to rely on median estimates, which are very similar to the ones obtained from the linear model (Table 3).

With respect to employed individuals, students reduce expenditure for all the quantiles with the exception of the highest one, but the effect is negligible for this case because, as expected, in correspondence to the latter quantile, there are few tourists in the student group. Foreign tourists have significantly higher expenditure levels with respect to Italian nationals at all the quantiles considered but the first. The highest effect (0.56) is found for high spenders and according to the tests reported in Table 4B, it is significantly larger than the effects estimated at the lower quantiles (0.12 for q=0.25 or q=0.50 and 0.16 for q=0.75).

The variables related to trip characteristics exhibit the larger number of significant parameters. Both party size and length of stay are effective in reducing expenditure at all quantile, even if the tests in Table 4B detect just few cases of significant differences. With respect to the private house reference category, the three accommodation categories considered show positive differential effects. The intensity of the latter, in the case of rental houses, campgroups and B&Bs, declines as we move along the distribution, from low to high quantiles. Arriving in Sardinia by air shows an increasing effect on

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holiday costs for only the upper half of the distribution, with no significant differences between quantiles greater than the median. Low-cost flights reduce expenditures at all quantiles with respect to other transport modalities, with a larger effect for the higher quantiles; however, such increase in the magnitude of the effect is not corroborated by coefficients equality tests. The number of visited locations appears to have a positive effect on expenditure for the lowest quantile considered and only marginally for higher quantiles (q=0.50 and q=0.75). Previous holidays spent in Sardinia contribute to increasing tourist expenditure for levels above the median, which are thus significantly different from the lower ones, but no relevant differences are detected among them. Finally, it appears that light spenders prefer environmentally-oriented holidays, while notoriety increases the expenditure levels for medium and heavy spenders. However, also for these two determinants the tests do not detect significant differences across quantiles.

6.2.2. Total tourist expenditure without travel costs

The results discussed above for total tourist expenditure are broadly confirmed when the QR analysis is performed on total expenditure net of travel costs. The most noteworthy differences are related to the occupation indicators, which turn out to be significant in a smaller number of quantiles; the higher magnitude of the effects related to accommodation typologies and repeated visitors; these results are complemented by the highest number of rejections for the test of equality of the effects reported in Table 5B. Another difference is represented by the relevance detected for the environment and notoriety holiday motivations. Environment-motivated tourists tend to spend more not only at lower quantiles (for q=0.10 the effect is an increase in expenditure of 27%) but also at higher ones. In the case of notoriety the effects are highly significant for medium-high quantiles (around 15%). However, on the basis of the coefficients equality tests there is no evidence of significant differences when carrying out the pair-wise comparing for the various quantiles.

6.2.3. Accommodation expenditure

The QR analysis for the accommodation spending distribution confirms the relevant contribution of individual economic condition and of trip related characteristics, whereas the socio-economic features play a very minor role. Differently from the case of total expenditure, noteworthy are the effect exhibited by high season, trip intermediation and previous holidays in Sardinia. The latter two variables show significant effects for medium high quantiles, while high season has a significant effect up to the 75th quantile. Evidence already discussed for party size and length of stay is confirmed. As far as motivation is concerned, in the case of accommodation its impact for both environment and notoriety is confined to quantiles as high as q=0.25.

6.2.4. Food and beverage expenditure

Also for this component of the tourist expenditure the relevant role played by party size and length of stay is confirmed. For lower levels of expenditure (up to the 25th quantile) spending in food and beverages decreases remarkably when the lodging typology is represented by hotels or when the air modality is chose to reach the island. Conversely, spending in food and beverages increases at all quantiles when more than one location is visited during the holiday. This result has important implications for destination management, in so far it indicates that revenues from tourists' activities could be enhanced if carnets of multi-destination holidays are offered by tourist operators. For the highest quantiles analyzed (q>0.75) we also find evidence that repeated visits are associated with higher level of spending on food and beverages. Finally, a noteworthy results is represented by retired tourists as a sizeable positive effects is found up to the 75th quantile, although the highest impact (0.65) is obtained at the initial portion (q=0.10) of the distribution.

6.2.5. Other activities expenditure

In the case of spending in various activities during the holiday, it is worth highlighting that the coefficients of most variables are not significant at lower quantiles because of the very low level of daily expenditure per person. The most remarkable result is represented by the effects related to the environmental and notoriety related motivations. For other activities, which are expected to be specifically related to the purpose of the holiday, the effects are significant and sizeable (on average yielding expenditure increases of around 40%) for the medium-high (q≥0.50) quantiles.

In general, the QR results confirm the existence of varying effects according to the level of tourist expenditure. However, such evidence is not common to all determinants and must be rigorously established on empirical grounds. Only in this way can the analysis provide useful insights for destination management and local policy makers alike in order to target specific group of tourists and support highly profitable market segments.

7. Conclusions and policy implications

The analysis presented in this paper identified the main determinants of tourist consumption and their effects on visitor expenditure on the basis of individual micro data and the application of both linear and quantile regression models. We assess such effects in the case of total expenditure and for the selected components of accommodation, food and beverages and other activities. We accounted for the high degree of differentiation featured by the tourism good on both the demand and

the supply side by investigating a comprehensive set of possible determinants consisting of 25 variables and related to four different categories (economic constraints, socio-demographic, trip-related and psychographic characteristics). The data were collected by means of a survey addressed to non-resident tourists who spent their holidays in Sardinia during the period April-October 2012.

Our empirical findings confirm the high complexity of the tourism product, as we found evidence that the effects vary not only with respect to the expenditure component or the explanatory category considered, but also as a function of the level of spending, as revealed by results based on the quantile regression model. Although this finding makes it difficult to provide a straightforward summary of the results of our empirical investigation, it provides a highly articulated and comprehensive picture of visitors' consumption patterns in Sardinia, a small regional economy that has great potential to benefit from the tourism industry in terms of economic growth. From such a comprehensive picture a number of implications that are relevant for both policy makers and destination managers can be derived, and are discussed below.

Overall, our results confirm the prominent role played by income and foreign nationality on tourist expenditure; occupational status suggests that unemployed people and students exhibit a parsimonious attitude towards holidays, while retired people tend to spend more only on particular expenditure components, such as food. The effect of age is complex, as it depends on the age class and the expenditure component considered; the expenditure component most affected was revealed to be the food component for tourists aged 26-40 years. Consistent with previous results, gender and education did not show any significant effect on holiday expenditure in our study. Conversely, the latter turned out to be strongly influenced by most trip-related characteristics. This outcome was particularly true for party size and length of stay (with declining negative effects thanks to sharing), accommodation, sea and sun typology and transport modality. Only specific spending components significantly reacted to trip intermediation (accommodation and food) and to the number of visited sites (food). Psychographic characteristics related to repeated visits and holiday motivation (natural environment and Sardinia's notoriety as a famous tourist destination) are also crucial determinants of tourist spending. The quantile regression analysis confirmed varying effects depending on the level of spending considered: higher positive effects were found for heavy spenders in the case of foreign nationality, previous visits and notoriety-motivated holidays, while party size and the number of visited locations contribute to more effectively reduce the level of expenditures for light spending tourists.

Given foreign tourists' higher propensity to spend, both destination managers and policy makers should define effective marketing strategies aimed at promoting Sardinia abroad as an attractive destination within the network of the national and Mediterranean tourist locations.

Promotional emphasis should be placed on Sardinia's most valuable assets, represented by the highly preserved natural resources and local productions, such handicraft and gastronomy, deeply rooted in the island historical and cultural heritage. Such promotional activities should target in particular medium-high spenders tourists given that our analysis has highlighted that environment-motivated tourists predominantly belong to the category of light spenders.

Moreover, tourist activities revenues could be enhanced by managerial practices aimed at strengthening and enlarging the network of sites that tourists could find interesting to visit during their holiday. This would entail combining the traditional sea and sun vacation with visits to other interesting sites, usually located in the inner territories of the island, which are often overlooked by international tour operators. To be successful, this kind of initiative requires significant coordination efforts on the part of destination managers, as well as local policies supporting the enhancement of public infrastructures (transport networks and large scale cultural attractions such as museums, theatres and conference centers), the provision of local high-quality services and the organization of cultural events. In this way, policies would tackle a very critical aspect of Sardinia tourist demand, represented by the long average stay and the very low number of location visited during the holiday, induced by the preferred "sea and sun" kind of holiday.

Furthermore, given the higher level of expenditures associated with accommodation typologies other from private houses, regional policy makers should discourage further private house building, especially in high quality natural areas, but at the same time, provide incentive schemes that make it profitable for local entrepreneurs to create new tourist accommodations by renovating old traditional houses or public buildings that are no longer in use. This way, a larger share of tourism revenues is likely to remain in the island and be re-invested in hospitality activities, so that economic stimulus could be channeled towards the general regional economic system.

Finally, given that our empirical analysis detected the existence of different segments in the tourism market on the basis of both the occupation status (employed, retired, students) and the level of spending (heavy, moderate, light spenders), destination managers could also target the lower spending tourists by offering them valuable packages in the off-peak months; this could also contribute to reducing the strong seasonality pattern featured by tourism demand.

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Table 1. Tourist expenditure

(€per person, per day)

	total	without travel cost
Mean	103.8	74.9
Percentiles		
1%	10.3	4.3
10%	29.8	17.0
25%	51.3	33.8
50%	85.3	60.8
75%	129.8	97.2
90%	194.9	148.6
99%	397.5	298.8

Table 2. Explanatory variables, descriptive statistics

(total obs. 1445; % over total if no otherwise specified)

Economic constraint			
Income (net, per year, thousands €)			
low (<30)	41.0		
medium (30-60)	41.8		
high (>60)	17.2		

Socio-economic characteristics			
Gender		**Age**	
female	48.6	15-24	12.8
male	51.4	26-40	38.5
Occupation status		41-60	37.1
employed	76.5	over 60	11.6
retired	10.0	**Origin**	
student	9.0	North Italy	35.8
unemployed	4.5	Centre Italy	18.0
Education		South Italy	6.9
primary	8.1	Germany	10.7
secondary	43.0	France	5.0
tertiary	48.9	UK	4.5

Trip related characteristics			
Party size (number, mean)	2.5	**Trip intermediation**	
Length of stay (nights, mean)	10.9	yes	35.7
Destinations (number, mean)	1.4	no	64.3
Time		**Holiday typology**	
low season	39.9	sea & sun	72.7
ligh season, July	24.7	other	27.3
high season, August	35.4	**Province of destination**	
Accommodation		Olbia	43.3
hotel	40.1	Sassari	18.7
private house	27.2	Cagliari	17.7
rental house	15.4	Nuoro	9.2
other	17.3	other	11.2

Psychographic characteristics			
Previous holiday in Sardinia		**Holiday motivation**	
never	26.4	environment	28.4
1	19.3	notoriety	20.5
2-4	21.4	visit r&f	19.5
5-10	16.8	own a house	11.8
more than 10	16.1	favorable offer	5.3
		routine	4.5
		other	10.0

Table 3. Basic model for total expenditure and selected components

Dependent variable: expenditure per tourist per day (log)

	total expenditure *with travel cost*	total expenditure *without travel cost*	expenditure on accomodation	expenditure on food and bevereges	expenditure on other activities
Economic constraint (ref. low income)					
income, medium	0.069 **	0.055	0.161 ***	0.001	-0.098
income, high	0.285 ***	0.253 ***	0.427 ***	0.091	-0.089
Socio-economic characteristics					
Gender (ref. female)	-0.013	-0.010	-0.050	0.024	-0.032
Age (years)	-0.0005	-0.0003	0.002	-0.005 *	0.002
Occupation status (ref. employed)					
unemployed	-0.077	-0.111	0.046	-0.204	-0.459 ***
retired	0.070	0.126 *	0.035	0.314 ***	-0.015
student	-0.122 **	-0.135 **	-0.033	-0.178 *	-0.216 *
Education (ref. primary school)					
secondary	-0.010	-0.026	-0.035	0.064	-0.079
tertiary	0.025	0.042	0.033	0.164	0.016
Foreign origin (ref. Italian)	0.137 ***	0.106 ***	0.095 **	0.220 ***	0.099
Trip related characteristics					
Party size (number) - linear	-0.325 ***	-0.311 ***	-0.257 ***	-0.355 ***	-0.328 ***
Party size (number) - square	0.025 ***	0.024 ***	0.016 ***	0.029 ***	0.032 ***
Length of stay (number nights) - linear	-0.046 ***	-0.036 ***	-0.037 ***	-0.038 ***	-0.045 ***
Length of stay (number nights) - square	0.0002 ***	0.0002 ***	0.0002	0.0002 ***	0.0002 ***
High season (ref. low)	0.059 **	0.050	0.200 ***	-0.042	-0.227 ***
Accommodation (ref. private house)					
hotel	0.717 ***	1.039 ***	1.905 ***	-0.283 ***	-0.021
rental house	0.496 ***	0.824 ***	1.511 ***	0.143	-0.175
camping, B&B, rural	0.381 ***	0.680 ***	1.324 ***	-0.043	-0.185
Typology (ref. sea & sun)	0.031	0.002	-0.073	0.069	0.114
Incoming transport (ref. ferryboat)	0.041	0.042	0.112 **	-0.212 ***	-0.299 ***
Low cost airlines (ref. other transport)	-0.205 ***	-0.101 *	-0.109 *	0.059	-0.119
Trip intermediation (ref. No)	-0.008	-0.024	0.172 ***	-0.245 ***	0.022
Destinations (ref. 1 location)	0.060 *	0.080 **	-0.079	0.252 ***	0.152 *
Psychographic characteristics					
Previous holiday in Sardinia (ref never)	0.073 **	0.110 ***	0.118 ***	0.085	-0.034
Holiday motivation (ref. own house or VRF)					
environmental resources	0.123 ***	0.185 ***	0.156 **	0.162 *	0.313 ***
notoriety	0.133 ***	0.189 ***	0.154 **	0.130	0.385 ***
other motivations	0.073	0.110 *	0.040	0.136	0.281 **
Dummy for specific tourists[a]	0.180 **	0.328 ***		0.345 **	-0.027
Constant	4.743 ***	3.947 ***	2.216 ***	3.589 ***	2.463 ***
R^2	0.604	0.553	0.414	0.173	0.143

Number of observations 1445 (1044 for Accomodation model)

Unless otherwise indicated, all explanatory variables are expressed as dummy variables

Estimation method: Least Squares

Significance based on heteroskedasticity consistent standard errors : *** 1%; ** 5%; * 10%

[a] The dummy takes value of 1 for tourists that visited Sardinia more than ten times in the past, own a house in Sardinia and the house is located in the province of Olbia-Tempio

Table 4A. Quantile regression models for total tourist expenditure

Dependent variable: Total expenditure per tourist per day (log)

	q=0.10	q=0.25	q=0.50	q=0.75	q=0.90
Economic constraint (ref. low income)					
income, medium	0.051	0.051	0.083 **	0.058	0.073
income, high	0.160 **	0.220 ***	0.265 ***	0.293 ***	0.357 ***
Socio-economic characteristics					
Gender (ref. female)	-0.072 *	0.003	0.006	0.001	0.023
Age (years)	0.001	0.000	-0.001	0.000	0.003
Occupation status (ref. employed)					
unemployed	0.032	-0.094	-0.165 ***	-0.142	0.012
retired	0.061	0.098	0.017	0.077	-0.002
student	-0.154 *	-0.135 **	-0.138 **	-0.150 **	-0.028
Education (ref. primary school)					
secondary	-0.129 *	0.035	-0.064	0.032	-0.089
tertiary	-0.022	0.086	-0.054	0.074	-0.075
Foreign origin (ref. Italian)	0.083	0.124 ***	0.119 **	0.161 ***	0.249 ***
Trip related characteristics					
Party size (number) - linear	-0.324 ***	-0.349 ***	-0.320 ***	-0.311 ***	-0.304 ***
Party size (number) - square	0.028 ***	0.028 ***	0.025 ***	0.024 ***	0.021 ***
Length of stay (number nights) - linear	-0.045 ***	-0.045 ***	-0.049 ***	-0.062 ***	-0.053 ***
Length of stay (number nights) - square	0.000	0.000	0.000	0.000 ***	0.000 ***
High season (ref. low)	0.081 *	0.115 ***	0.088 **	0.048	-0.039
Accommodation (ref. private house)					
hotel	0.768 ***	0.832 ***	0.713 ***	0.648 ***	0.602 ***
rental house	0.571 ***	0.616 ***	0.503 ***	0.443 ***	0.332 ***
camping, B&B, rural	0.537 ***	0.477 ***	0.373 ***	0.345 ***	0.231 ***
Typology (ref. sea & sun)	0.016	0.037	-0.011	-0.019	0.051
Incoming transport (ref. ferryboat)	-0.034	0.028	0.076 *	0.088 *	0.062
Low cost airlines (ref. other transport)	-0.121 *	-0.176 ***	-0.209 ***	-0.214 ***	-0.259 ***
Trip intermediation (ref. No)	-0.033	-0.020	-0.018	0.031	0.087 *
Destinations (ref. 1 location)	0.121 **	0.056	0.074 *	0.093 *	0.091
Psychographic characteristics					
Previous holiday in Sardinia (ref never)	-0.038	0.041	0.083 **	0.140 ***	0.133 ***
Holiday motivation (ref. own house or VRF)					
environmental resources	0.192 ***	0.093	0.101 *	0.103	0.104
notoriety	0.119 *	0.044	0.128 **	0.141 *	0.130 *
other motivations	0.140 *	0.046	0.080	0.082	0.042
Dummy for specific tourists[a]	0.102	0.106	0.188 *	0.138	0.076
Constant	4.267 ***	4.388 ***	4.811 ***	5.053 ***	5.277 ***
Expenditure per tourist per day (euros)	29.8	51.3	85.3	129.8	194.9
Pseudo R^2	0.451	0.427	0.386	0.350	0.348

Number of observations 1445

Unless otherwise indicated, all explanatory variables are expressed as dummy variables

Estimation method: Quantile Regressions

Significance based on bootstrapped standard errors (1000 replications): *** 1%; ** 5%; * 10%

[a] The dummy takes value of 1 for tourists that visited Sardinia more than ten times in the past, own a house in Sardinia and the house is located in the province of Olbia-Tempio

Table 4B. Testing for equality of coefficients at the different conditional quantiles of table 4A, *p* -values - Total tourist expenditure

Null hypothesis	q10=q25	q10=q50	q10=q75	q10=q90	q25=q50	q25=q75	q25=q90	q50=q75	q50=q90	q75=q90
Economic constraint (ref. low income)										
income, high	0.334	0.141	0.123	**0.051**	0.417	0.343	0.149	0.659	0.276	0.390
Socio-economic characteristics										
Occupation status (ref. employed)										
unemployed	0.086	**0.023**	0.166	0.885	0.272	0.671	0.415	0.815	0.149	0.169
retired	0.687	0.684	0.904	0.654	0.242	0.820	0.389	0.461	0.861	0.416
student	0.819	0.863	0.969	0.326	0.962	0.851	0.324	0.854	0.271	0.171
Foreign origin (ref. Italian)	0.412	0.538	0.246	**0.018**	0.894	0.474	**0.030**	0.318	**0.014**	**0.063**
Trip related characteristics										
Party size (number) - linear	0.581	0.935	0.813	0.747	0.367	0.395	0.382	0.797	0.728	0.866
Party size (number) - square	0.970	0.650	0.571	0.395	0.408	0.413	0.232	0.798	0.492	0.593
Length of stay (number nights) - linear	0.996	0.586	**0.053**	0.375	0.520	**0.044**	0.370	**0.051**	0.619	0.221
Length of stay (number nights) - square	0.836	0.528	**0.024**	0.115	0.407	**0.027**	0.120	**0.043**	0.307	0.576
High season (ref. low)	0.431	0.900	0.567	**0.065**	0.483	0.174	**0.007**	0.327	**0.015**	**0.058**
Accommodation (ref. private house)										
hotel	0.384	0.534	0.289	0.144	**0.060**	**0.052**	**0.023**	0.403	0.220	0.564
rental house	0.556	0.433	0.250	**0.041**	**0.072**	**0.060**	**0.007**	0.427	**0.064**	0.169
camping, B&B, rural	0.410	**0.074**	**0.081**	**0.007**	0.113	0.144	**0.016**	0.723	0.142	0.161
Incoming transport (ref. ferryboat)	0.228	**0.065**	**0.077**	0.207	0.272	0.298	0.606	0.801	0.822	0.634
Low cost airlines (ref. other transport)	0.376	0.260	0.299	0.142	0.577	0.620	0.321	0.938	0.491	0.475
Trip intermediation (ref. No)	0.771	0.772	0.279	**0.053**	0.946	0.292	**0.043**	0.225	**0.034**	0.190
Destinations (ref. 1 location)	0.149	0.400	0.684	0.696	0.658	0.510	0.618	0.694	0.800	0.965
Psychographic characteristics										
Previous holiday in Sardinia (ref never)	**0.077**	**0.026**	**0.003**	**0.014**	0.262	**0.031**	0.113	0.156	0.373	0.888
Holiday motivation (ref. own house or VRF)										
environmental resources	0.119	0.227	0.349	0.351	0.890	0.909	0.898	0.980	0.968	0.985
notoriety	0.276	0.910	0.819	0.908	0.201	0.270	0.366	0.855	0.981	0.883
Constant	0.385	**0.001**	**0.000**	**0.000**	**0.001**	**0.000**	**0.000**	**0.079**	**0.015**	0.164

The tests are computed only in the case of the significant coefficients reported in Table 4A

Figures in bold indicate rejection of the null hypothesis of coefficients equality up to the 10% significance level

Table 5A. Quantile regression models for total tourist expenditure without travel costs

Dependent variable: Total expenditure without travel costs per tourist per day (log)

	q=0.10	q=0.25	q=0.50	q=0.75	q=0.90
Economic constraint (ref. low income)					
income, medium	0.065	0.086 *	0.082 *	0.073 *	0.073
income, high	0.127	0.199 ***	0.268 ***	0.266 ***	0.375 ***
Socio-economic characteristics					
Gender (ref. female)	-0.111 *	-0.013	0.045	0.031	0.001
Age (years)	0.002	-0.001	-0.002	0.0001	0.003
Occupation status (ref. employed)					
unemployed	-0.136	-0.141	-0.172 *	-0.145	-0.090
retired	0.074	0.158 *	0.123	0.037	0.050
student	-0.230	-0.112	-0.118 *	-0.135 **	-0.103
Education (ref. primary school)					
secondary	-0.038	-0.053	-0.025	0.028	-0.067
tertiary	0.064	0.055	0.031	0.063	-0.002
Foreign origin (ref. Italian)	0.037	0.116 **	0.055	0.078 *	0.228 ***
Trip related characteristics					
Party size (number) - linear	-0.288 ***	-0.361 ***	-0.360 ***	-0.342 ***	-0.296 ***
Party size (number) - square	0.016	0.030 ***	0.027 ***	0.026 ***	0.021 ***
Length of stay (number nights) - linear	-0.035 ***	-0.043 ***	-0.033 ***	-0.040 ***	-0.042 ***
Length of stay (number nights) - square	0.0002	0.0002	0.0001	0.0002 *	0.0003 **
High season (ref. low)	0.097	0.086 *	0.084 **	0.058	-0.041
Accommodation (ref. private house)					
hotel	1.416 ***	1.097 ***	0.993 ***	0.821 ***	0.728 ***
rental house	1.274 ***	0.913 ***	0.775 ***	0.573 ***	0.457 ***
camping, B&B, rural	1.140 ***	0.731 ***	0.615 ***	0.527 ***	0.348 ***
Typology (ref. sea & sun)	-0.062	-0.047	-0.011	-0.006	0.035
Incoming transport (ref. ferryboat)	-0.037	0.029	0.095 **	0.153 ***	0.124 **
Low cost airlines (ref. other transport)	0.044	-0.082	-0.158 ***	-0.197 ***	-0.156 *
Trip intermediation (ref. No)	-0.042	-0.008	0.006	0.054	0.069
Destinations (ref. 1 location)	0.103	0.092 *	0.072	0.123 **	0.086
Psychographic characteristics					
Previous holiday in Sardinia (ref never)	0.004	0.093 *	0.090 **	0.163 ***	0.157 ***
Holiday motivation (ref. own house or VRF)					
environmental resources	0.268 ***	0.193 **	0.166 ***	0.162 **	0.145 *
notoriety	0.140	0.154 *	0.204 ***	0.213 ***	0.201 **
other motivations	0.093	0.113	0.110	0.150 *	0.100
Dummy for specific tourists[a]	0.567 **	0.237 *	0.156	0.185	0.083
Constant	2.996 ***	3.727 ***	4.100 ***	4.366 ***	4.713 ***
Expenditure per tourist per day (euros)	17.0	33.8	60.8	97.2	148.6
Pseudo R^2	0.414	0.388	0.348	0.308	0.303

Number of observations 1445

Unless otherwise indicated, all explanatory variables are expressed as dummy variables

Estimation method: Quantile Regressions

Significance based on bootstrapped standard errors (1000 replications): *** 1%; ** 5%; * 10%

[a] The dummy takes value of 1 for tourists that visited Sardinia more than ten times in the past, own a house in Sardinia and the house is located in the province of Olbia-Tempio

Table 5B. Testing for equality of coefficients at the different conditional quantiles of table 5A, *p* -values - Total tourist expenditure without travel cost

Null hypothesis	q10=q25	q10=q50	q10=q75	q10=q90	q25=q50	q25=q75	q25=q90	q50=q75	q50=q90	q75=q90
Economic constraint (ref. low income)										
income, high	0.410	0.157	0.212	**0.062**	0.315	0.439	0.120	0.974	0.267	0.192
Socio-economic characteristics										
Occupation status (ref. employed)										
unemployed	0.959	0.785	0.956	0.798	0.745	0.981	0.748	0.803	0.566	0.677
retired	0.434	0.693	0.796	0.889	0.664	0.259	0.460	0.290	0.573	0.911
student	0.341	0.438	0.523	0.501	0.938	0.802	0.952	0.795	0.908	0.791
Foreign origin (ref. Italian)	0.234	0.812	0.616	**0.039**	0.229	0.529	0.117	0.591	**0.003**	**0.003**
Trip related characteristics										
Party size (number) - linear	0.380	0.425	0.573	0.937	0.979	0.740	0.339	0.674	0.261	0.350
Party size (number) - square	0.242	0.367	0.435	0.686	0.645	0.579	0.249	0.825	0.347	0.373
Length of stay (number nights) - linear	0.287	0.743	0.659	0.542	**0.090**	0.713	0.964	0.237	0.267	0.726
Length of stay (number nights) - square	0.872	0.609	0.586	0.338	0.439	0.636	0.370	0.161	0.132	0.521
High season (ref. low)	0.863	0.856	0.618	**0.106**	0.971	0.628	**0.063**	0.536	**0.027**	**0.045**
Accommodation (ref. private house)										
hotel	**0.010**	**0.002**	**0.000**	**0.000**	0.273	**0.022**	**0.005**	**0.035**	**0.008**	0.305
rental house	**0.002**	**0.000**	**0.000**	**0.000**	0.138	**0.004**	**0.001**	**0.010**	**0.002**	0.211
camping, B&B, rural	**0.001**	**0.000**	**0.000**	**0.000**	0.226	**0.086**	**0.003**	0.300	**0.012**	**0.048**
Incoming transport (ref. ferryboat)	0.369	0.124	**0.045**	**0.105**	0.223	**0.081**	0.242	0.273	0.666	0.645
Low cost airlines (ref. other transport)	0.172	**0.057**	**0.048**	0.131	0.195	0.181	0.468	0.565	0.980	0.616
Trip intermediation (ref. No)	0.573	0.490	0.212	0.182	0.726	0.243	0.205	0.260	0.242	0.755
Destinations (ref. 1 location)	0.875	0.707	0.827	0.854	0.696	0.629	0.931	0.314	0.830	0.503
Psychographic characteristics										
Previous holiday in Sardinia (ref never)	0.118	0.166	**0.018**	**0.052**	0.946	0.232	0.370	**0.056**	0.241	0.902
Holiday motivation (ref. own house or VRF)										
environmental resources	0.402	0.325	0.380	0.327	0.739	0.763	0.664	0.959	0.810	0.827
notoriety	0.878	0.564	0.559	0.648	0.557	0.570	0.695	0.903	0.972	0.883
Constant	**0.000**	**0.000**	**0.000**	**0.000**	**0.015**	**0.002**	**0.000**	**0.080**	**0.004**	**0.065**

The tests are computed only in the case of the significant coefficients reported in Table 5A

Figures in bold indicate rejection of the null hypothesis of coefficients equality up to the 10% significance level

Table 6A. Quantile regression models for accommodation expenditure

Dependent variable: Accommodation expenditure per tourist per day (log)

	q=0.10	q=0.25	q=0.50	q=0.75	q=0.90
Economic constraint (ref. low income)					
income, medium	0.223 ***	0.194 ***	0.176 ***	0.137 **	0.125 *
income, high	0.346 ***	0.399 ***	0.433 ***	0.454 ***	0.380 ***
Socio-economic characteristics					
Gender (ref. female)	0.009	-0.015	-0.053	-0.047	-0.003
Age (years)	0.003	0.001	0.000	-0.002	0.003
Occupation status (ref. employed)					
unemployed	0.022	-0.072	0.064	0.129	0.175
retired	0.047	0.091	0.070	0.011	-0.148
student	-0.013	-0.049	-0.019	-0.056	-0.102
Education (ref. primary school)					
secondary	-0.060	0.016	-0.024	-0.050	-0.026
tertiary	-0.029	0.084	0.042	0.075	0.044
Foreign origin (ref. Italian)	0.110	0.133 **	0.073	-0.018	0.177 ***
Trip related characteristics					
Party size (number) - linear	-0.324 ***	-0.335 ***	-0.244 ***	-0.253 ***	-0.209 ***
Party size (number) - square	0.023 **	0.025 ***	0.012 *	0.017 **	0.013 *
Length of stay (number nights) - linear	-0.023	-0.036 ***	-0.026 **	-0.028 *	-0.036 *
Length of stay (number nights) - square	-0.0003	0.0003	0.0001	0.0001	0.0005
High season (ref. low)	0.302 ***	0.270 ***	0.173 ***	0.115 *	0.112 0.1
Accommodation (ref. private house)					
hotel	1.456 ***	1.776 ***	2.107 ***	2.224 ***	2.712 ***
rental house	1.224 ***	1.494 ***	1.698 ***	1.684 ***	2.125 ***
camping, B&B, rural	0.857 ***	1.219 ***	1.546 ***	1.638 ***	2.036 ***
Typology (ref. sea & sun)	-0.062	-0.055	-0.098 *	-0.096	-0.004
Incoming transport (ref. ferryboat)	0.156 *	0.046	0.132 **	0.139 **	0.073
Low cost airlines (ref. other transport)	-0.095	-0.001	-0.113 *	-0.267 ***	-0.132
Trip intermediation (ref. No)	0.056	0.200 ***	0.180 ***	0.197 ***	0.243 ***
Destinations (ref. 1 location)	-0.116	-0.077	-0.056	-0.028	0.032
Psychographic characteristics					
Previous holiday in Sardinia (ref never)	0.029	0.073	0.106 **	0.197 ***	0.204 ***
Holiday motivation (ref. own house or VRF)					
environmental resources	0.386 ***	0.260 ***	0.074	0.042	-0.034
notoriety	0.255 *	0.190 *	0.094	0.101	0.008
other motivations	0.233 *	0.121	-0.041	-0.072	-0.074
Constant	1.819 ***	1.908 ***	2.086 ***	2.488 ***	2.056 ***
Expenditure per tourist per day (euros)	16.1	25.0	40.0	62.9	100.0
Pseudo R^2	0.245	0.247	0.250	0.255	0.287

Number of observations 1044

Unless otherwise indicated, all explanatory variables are expressed as dummy variables

Estimation method: Quantile Regressions

Significance based on bootstrapped standard errors (1000 replications): *** 1%; ** 5%; * 10%

Table 6B. Testing for equality of coefficients at the different conditional quantiles of table 6A, *p*-values - Accommodation expenditure

Null hypothesis	q10=q25	q10=q50	q10=q75	q10=q90	q25=q50	q25=q75	q25=q90	q50=q75	q50=q90	q75=q90
Economic constraint (ref. low income)										
income, medium	0.686	0.563	0.368	0.329	0.742	0.454	0.411	0.518	0.497	0.863
income, high	0.651	0.507	0.481	0.837	0.680	0.627	0.896	0.807	0.663	0.487
Socio-economic characteristics										
Occupation status (ref. employed)										
unemployed	0.497	0.800	0.584	0.428	0.348	0.285	0.204	0.683	0.547	0.778
retired	0.769	0.892	0.849	0.360	0.853	0.581	0.170	0.577	0.144	0.229
student	0.826	0.972	0.830	0.737	0.745	0.957	0.790	0.711	0.655	0.785
Foreign origin (ref. Italian)	0.749	0.647	0.160	0.492	0.281	**0.034**	0.595	**0.105**	0.152	**0.003**
Trip related characteristics										
Party size (number) - linear	0.889	0.380	0.487	0.276	0.152	0.309	0.147	0.870	0.634	0.492
Party size (number) - square	0.820	0.333	0.622	0.414	**0.093**	0.386	0.217	0.470	0.951	0.557
Length of stay (number nights) - linear	0.460	0.893	0.841	0.614	0.387	0.637	0.983	0.892	0.605	0.595
Length of stay (number nights) - square	0.188	0.418	0.515	0.306	0.541	0.615	0.840	0.922	0.581	0.444
High season (ref. low)	0.649	0.120	**0.050**	**0.063**	**0.054**	**0.030**	**0.052**	0.311	0.409	0.959
Accommodation (ref. private house)										
hotel	0.199	**0.052**	**0.047**	**0.002**	0.214	0.178	**0.006**	0.657	**0.041**	**0.032**
rental house	0.277	0.156	0.230	**0.021**	0.440	0.561	**0.060**	0.957	0.138	**0.047**
camping, B&B, rural	0.136	**0.035**	**0.040**	**0.002**	0.222	0.209	**0.015**	0.726	**0.088**	**0.071**
Incoming transport (ref. ferryboat)	0.176	0.782	0.856	0.490	0.200	0.265	0.806	0.915	0.549	0.429
Low cost airlines (ref. other transport)	0.334	0.865	0.171	0.798	0.149	**0.008**	0.302	**0.049**	0.866	0.180
Trip intermediation (ref. No)	**0.024**	**0.091**	**0.087**	**0.038**	0.684	0.963	0.580	0.742	0.339	0.443
Destinations (ref. 1 location)	0.672	0.561	0.468	0.238	0.734	0.571	0.262	0.685	0.305	0.442
Psychographic characteristics										
Previous holiday in Sardinia (ref never)	0.498	0.289	**0.050**	**0.058**	0.491	**0.071**	**0.087**	**0.090**	0.154	0.919
Holiday motivation (ref. own house or VRF)										
environmental resources	0.325	**0.044**	**0.049**	**0.014**	**0.061**	**0.085**	**0.026**	0.751	0.373	0.486
notoriety	0.646	0.336	0.398	0.175	0.356	0.486	0.193	0.945	0.506	0.415
Constant	0.770	0.490	0.149	0.613	0.558	0.152	0.713	0.198	0.929	0.136

The tests are computed only in the case of the significant coefficients reported in Table 6A

Figures in bold indicate rejection of the null hypothesis of coefficients equality up to the 10% significance level

Table 7A. Quantile regression models for Food and beverage expenditure

Dependent variable: Food and beverage expenditure per tourist per day (log)

	q=0.10	q=0.25	q=0.50	q=0.75	q=0.90
Economic constraint (ref. low income)					
income, medium	-0.076	-0.029	0.046	0.052	0.046
income, high	0.056	0.005	0.049	0.152	0.263 **
Socio-economic characteristics					
Gender (ref. female)	0.053	0.047	0.009	0.028	0.076
Age (years)	-0.015 **	-0.003	-0.003	-0.003	0.001
Occupation status (ref. employed)					
unemployed	-0.484 **	-0.459	-0.229 *	0.042	0.000
retired	0.635 **	0.296 *	0.178	0.258 **	0.116
student	-0.094	-0.048	-0.133	-0.111	-0.137
Education (ref. primary school)					
secondary	0.078	0.210	-0.084	0.017	0.008
tertiary	0.287	0.355 *	0.028	0.047	0.046
Foreign origin (ref. Italian)	0.223	0.188 *	0.155 **	0.168 ***	0.130 *
Trip related characteristics					
Party size (number) - linear	-0.249 *	-0.357 ***	-0.293 ***	-0.355 ***	-0.484 ***
Party size (number) - square	0.021	0.028 ***	0.023 ***	0.032 ***	0.047 ***
Length of stay (number nights) - linear	-0.017	-0.033 **	-0.043 ***	-0.049 ***	-0.051 ***
Length of stay (number nights) - square	0.0001	0.0001	0.0002	0.0003 0.11	0.0004 *
High season (ref. low)	-0.161	-0.054	-0.057	0.030	-0.024
Accommodation (ref. private house)					
hotel	-0.945 ***	-0.472 ***	-0.180	-0.060	-0.017
rental house	0.232	0.108	0.019	-0.057	0.067
camping, B&B, rural	0.026	-0.064	-0.045	-0.024	-0.129
Typology (ref. sea & sun)	0.054	0.069	0.015	0.048	0.006
Incoming transport (ref. ferryboat)	-0.465 ***	-0.309 ***	-0.134	-0.049	-0.037
Low cost airlines (ref. other transport)	0.216	0.080	-0.015	-0.052	-0.028
Trip intermediation (ref. No)	-0.253	-0.387 ***	-0.162 **	-0.103 *	-0.072
Destinations (ref. 1 location)	0.556 ***	0.266 ***	0.207 ***	0.149 **	0.222 ***
Psychographic characteristics					
Previous holiday in Sardinia (ref never)	0.140	0.037	0.095	0.162 ***	0.202 ***
Holiday motivation (ref. own house or VRF)					
environmental resources	0.370 0.11	0.225	0.173 *	0.087	0.062
notoriety	0.173	0.094	0.191 *	0.125	0.197 0.1
other motivations	0.076	-0.041	0.241 **	0.219 **	0.144
Dummy for specific tourists[a]	0.304	0.286 0.11	0.292 **	0.277 *	0.344 *
Constant	2.422 ***	3.086 ***	3.681 ***	4.054 ***	4.465 ***
Expenditure per tourist per day (euros)	3.1	7.1	14.8	25.0	40.7
Pseudo R[2]	0.180	0.115	0.100	0.118	0.146

Number of observations 1445

Unless otherwise indicated, all explanatory variables are expressed as dummy variables

Estimation method: Quantile Regressions

Significance based on bootstrapped standard errors (1000 replications): *** 1%; ** 5%; * 10%

[a] The dummy takes value of 1 for tourists that visited Sardinia more than ten times in the past, own a house in Sardinia and the house is located in the province of Olbia-Tempio

Table 7B. Testing for equality of coefficients at the different conditional quantiles of table 7A, *p* -values - Food and beverage expenditure

Null hypothesis	q10=q25	q10=q50	q10=q75	q10=q90	q25=q50	q25=q75	q25=q90	q50=q75	q50=q90	q75=q90
Economic constraint (ref. low income)										
income, high	0.783	0.973	0.637	0.338	0.716	0.300	**0.104**	0.328	**0.102**	0.275
Socio-economic characteristics										
Occupation status (ref. employed)										
unemployed	0.929	0.282	**0.062**	**0.069**	0.399	**0.109**	0.156	0.132	0.170	0.821
retired	0.160	**0.088**	0.187	**0.082**	0.448	0.837	0.382	0.522	0.701	0.312
student	0.853	0.887	0.954	0.885	0.529	0.669	0.592	0.825	0.978	0.800
Foreign origin (ref. Italian)	0.784	0.642	0.720	0.579	0.711	0.848	0.638	0.841	0.789	0.595
Trip related characteristics										
Party size (number) - linear	0.363	0.752	0.472	0.124	0.409	0.980	0.221	0.414	**0.038**	**0.086**
Party size (number) - square	0.648	0.939	0.589	0.195	0.554	0.776	0.172	0.388	**0.044**	0.172
Length of stay (number nights) - linear	0.143	**0.049**	**0.023**	**0.026**	0.288	0.172	0.184	0.514	0.536	0.892
Length of stay (number nights) - square	0.612	0.196	0.123	0.113	0.280	0.209	0.177	0.581	0.462	0.688
High season (ref. low)	0.362	0.411	0.157	0.341	0.972	0.350	0.770	0.162	0.685	0.374
Accommodation (ref. private house)										
hotel	**0.070**	**0.009**	**0.004**	**0.003**	**0.037**	**0.016**	**0.017**	0.285	0.254	0.678
rental house	0.564	0.377	0.252	0.535	0.483	0.288	0.819	0.477	0.741	0.257
camping, B&B, rural	0.698	0.788	0.857	0.589	0.882	0.806	0.727	0.851	0.554	0.325
Incoming transport (ref. ferryboat)	0.339	**0.062**	**0.023**	**0.026**	**0.082**	**0.020**	**0.029**	0.315	0.360	0.883
Low cost airlines (ref. other transport)	0.458	0.246	0.201	0.271	0.453	0.367	0.508	0.710	0.913	0.812
Trip intermediation (ref. No)	0.341	0.571	0.352	0.278	**0.007**	**0.002**	**0.002**	0.365	0.265	0.614
Destinations (ref. 1 location)	**0.046**	**0.033**	**0.018**	**0.061**	0.495	0.249	0.692	0.437	0.876	0.371
Psychographic characteristics										
Previous holiday in Sardinia (ref never)	0.375	0.728	0.872	0.663	0.509	0.217	0.133	0.281	0.179	0.507
Holiday motivation (ref. own house or VRF)										
environmental resources	0.479	0.371	0.232	0.215	0.657	0.360	0.336	0.395	0.382	0.809
notoriety	0.725	0.942	0.853	0.932	0.483	0.854	0.590	0.543	0.970	0.527
Constant	**0.102**	**0.006**	**0.001**	**0.000**	**0.041**	**0.004**	**0.000**	**0.097**	**0.006**	**0.069**

The tests are computed only in the case of the significant coefficients reported in Table 7A

Figures in bold indicate rejection of the null hypothesis of coefficients equality up to the 10% significance level

Table 8A. Quantile regression models for other activities expenditure

Dependent variable: Other activities expenditure per tourist per day (log)

	q=0.10	q=0.25	q=0.50	q=0.75	q=0.90
Economic constraint (ref. low income)					
income, medium	-0.001	-0.031	-0.086	-0.091	-0.090
income, high	-0.001	-0.016	-0.153	-0.115	0.155
Socio-economic characteristics					
Gender (ref. female)	0.000	-0.034	-0.037	0.060	0.091
Age (years)	0.000	-0.001	0.000	0.001	0.006
Occupation status (ref. employed)					
unemployed	-0.002	-0.147	-0.599 **	-0.380	0.043
retired	0.000	-0.026	0.023	-0.190	-0.198
student	-0.001	-0.112	-0.317	-0.294 *	-0.084
Education (ref. primary school)					
secondary	0.001	-0.079	0.044	-0.117	-0.245 *
tertiary	0.001	-0.080	0.076	-0.078	-0.171
Foreign origin (ref. Italian)	0.000	-0.010	0.169	0.110	0.074
Trip related characteristics					
Party size (number) - linear	0.025	0.008	-0.521 ***	-0.485 ***	-0.539 ***
Party size (number) - square	-0.008	-0.002	0.051 ***	0.047 ***	0.049 ***
Length of stay (number nights) - linear	0.005	-0.005	-0.045 ***	-0.058 ***	-0.065 ***
Length of stay (number nights) - square	0.000 **	0.000	0.000	0.000	0.000 *
High season (ref. low)	-0.002	-0.122	-0.311 ***	-0.230 ***	-0.105
Accommodation (ref. private house)					
hotel	-0.001	-0.072	0.075	0.064	-0.064
rental house	-0.002	-0.102	-0.008	-0.111	-0.325 *
camping, B&B, rural	0.000	-0.047	-0.097	-0.164	-0.256
Typology (ref. sea & sun)	0.000	0.050	0.039	0.143	0.164 *
Incoming transport (ref. ferryboat)	-0.001	-0.176	-0.561 ***	-0.191	0.114
Low cost airlines (ref. other transport)	0.000	0.021	0.032	-0.289 *	-0.460 ***
Trip intermediation (ref. No)	0.000	0.029	0.019	-0.030	0.000
Destinations (ref. 1 location)	0.001	0.070	0.138	0.201 *	0.102
Psychographic characteristics					
Previous holiday in Sardinia (ref never)	-0.001	-0.150	-0.083	-0.022	0.131
Holiday motivation (ref. own house or VRF)					
environmental resources	0.001	0.098	0.412 *	0.373 ***	0.400 **
notoriety	0.000	0.260	0.428 *	0.423 ***	0.531 ***
other motivations	0.001	0.059	0.294	0.265 *	0.311 *
Dummy for specific tourists[a]	-0.002	-0.044	0.021	0.089	-0.089
Constant	-0.032	0.569	2.972 ***	3.765 ***	4.134 ***
Expenditure per tourist per day (euros)	1.0	1.0	4.0	10.0	21.4
Pseudo R^2	0.020	0.005	0.112	0.119	0.139

Number of observations 1445

Unless otherwise indicated, all explanatory variables are expressed as dummy variables

Estimation method: Quantile Regressions

Significance based on bootstrapped standard errors (1000 replications): *** 1%; ** 5%; * 10%

[a] The dummy takes value of 1 for tourists that visited Sardinia more than ten times in the past, own a house in Sardinia and the house is located in the province of Olbia-Tempio

Table 8B. Testing for equality of coefficients at the different conditional quantiles of table 8A, *p* -values - Other activities expenditure

Null hypothesis	q10=q25	q10=q50	q10=q75	q10=q90	q25=q50	q25=q75	q25=q90	q50=q75	q50=q90	q75=q90
Economic constraint (ref. low income)										
income, high	0.908	0.336	0.438	0.308	0.358	0.554	0.362	0.788	**0.092**	**0.066**
Socio-economic characteristics										
Occupation status (ref. employed)										
unemployed	0.306	**0.033**	0.213	0.878	**0.087**	0.448	0.544	0.421	**0.050**	0.130
retired	0.855	0.905	0.288	0.255	0.786	0.409	0.413	0.247	0.336	0.963
student	0.402	0.139	0.125	0.627	0.264	0.325	0.881	0.901	0.300	0.206
Foreign origin (ref. Italian)	0.915	0.191	0.278	0.482	0.120	0.303	0.518	0.602	0.503	0.725
Trip related characteristics										
Party size (number) - linear	0.869	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	0.728	0.903	0.634
Party size (number) - square	0.693	**0.000**	**0.000**	**0.002**	**0.001**	**0.004**	**0.018**	0.716	0.889	0.902
Length of stay (number nights) - linear	0.325	**0.000**	**0.000**	**0.000**	**0.006**	**0.005**	**0.001**	0.312	0.132	0.538
Length of stay (number nights) - square	0.085	**0.011**	**0.028**	**0.008**	0.218	0.257	0.136	0.743	0.460	0.625
High season (ref. low)	0.233	**0.006**	**0.007**	0.242	0.112	0.358	0.894	0.420	**0.102**	0.157
Accommodation (ref. private house)										
hotel	0.552	0.750	0.702	0.740	0.485	0.458	0.971	0.960	0.600	0.470
rental house	0.392	0.981	0.483	0.059	0.629	0.961	0.250	0.601	0.178	0.180
camping, B&B, rural	0.721	0.694	0.355	0.215	0.822	0.542	0.366	0.758	0.563	0.629
Incoming transport (ref. ferryboat)	0.167	**0.000**	0.180	0.306	**0.017**	0.933	**0.088**	**0.007**	**0.000**	**0.016**
Low cost airlines (ref. other transport)	0.810	0.864	**0.082**	0.002	0.947	**0.064**	**0.003**	**0.061**	**0.014**	0.279
Trip intermediation (ref. No)	0.749	0.848	0.741	0.998	0.920	0.588	0.795	0.614	0.861	0.728
Destinations (ref. 1 location)	0.646	0.276	**0.072**	0.411	0.639	0.415	0.862	0.604	0.806	0.380
Psychographic characteristics										
Previous holiday in Sardinia (ref never)	0.275	0.446	0.818	0.196	0.605	0.378	**0.075**	0.546	**0.080**	0.116
Holiday motivation (ref. own house or VRF)										
environmental resources	0.395	**0.073**	**0.012**	**0.021**	0.132	**0.086**	0.118	0.841	0.958	0.867
notoriety	0.227	**0.059**	**0.009**	**0.003**	0.499	0.484	0.301	0.978	0.667	0.517
Constant	0.165	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.032**	**0.008**	0.303

The tests are computed only in the case of the significant coefficients reported in Table 8A

Figures in bold indicate rejection of the null hypothesis of coefficients equality up to the 10% significance level