Non-constant reputation effect in tourism demand at Spanish Mediterranean destinations

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Abstract This study analyzes the international tourism demand at Spanish Mediterranean area. This destination receives the highest number of international arrivals in Spain. A dynamic econometric model is built following the Tourism Area Life Cycle (TALC) theory. Unlike other dynamic tourism demand models, our specification allows that the reputation and persistence effect (the effect of the lagged demand on current tourism demand) not to be constant. We estimate the model using panel data consisting of the 11 provinces which make up the Spanish Mediterranean area, and the 7 European countries which are the main origin markets, for the period 2001 to 2015. The results show a strong persistence in tourism demand. Furthermore, the reputation and persistence effect is positive and decreasing with the ratio between tourists and carrying capacity of the destination. Thus, this effect is not constant but varies across provinces and over time.

1 Introduction

The Mediterranean is one of the most visited regions of the world: one of every three arrivals of international tourists is registered in this region (WTO). In Spain, according to the National Statistics Institute (INE), more than half (56,3%) of international tourists staying at hotels chose the Mediterranean coasts as destination in 2015. The temperate climate and the large number of beaches available for leisure use are the main reasons for the development of tourism on this area.

Spain has about 3500 km of coastline in the Mediterranean (INE), distributed between the peninsular coasts (2058 km) and the archipelago of the Balearic Islands (1428 Km). These kilometers of coastline belong to eleven provinces (Alicante, Almeria, the Balearic Islands, Barcelona, Castellon, Girona, Granada, Malaga, Murcia, Tarragona and Valencia) and include the well-known Costa del Sol, Costa Blanca, Costa del Azahar, Costa Dorada and Costa Brava (see Fig. 1). Furthermore, in these coasts, there are a large number of the most appealing sun and sea tourism sites for international tourism like Barcelona, Marbella, Benidorm, Mallorca, between others.

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Fig. 1 The Mediterranean coasts in the Spain country map

In the most of Spanish Mediterranean provinces, tourism is a prominent economic sector, and it has become one of the most important sources of employment. According to the INE, in 2015 the Mediterranean provinces account for 47.15% of the total staff employed in hotels in Spain, and 47.36% of hotel beds offered in Spain. Moreover, the number of visitors is increasing every year. International tourist arrivals have grown 26.30% over the past five years, with an average annual growth rate of nearly 5% (INE). Thus, the Spanish Mediterranean area is a consolidated or mature destination with a growing international demand.

In this paper, the international tourism demand at the Spanish Mediterranean provinces is analyzed. We are interested to know the determinants of this demand and, especially to ascertain how the previous tourists are affecting the current tourism demand. This effect of previous tourists on current tourists is usually known as the reputation and persistence effect (Albaladejo et al. 2016; Capacci et al. 2015). Most empirical studies on tourism demand include previous tourists in a linear regression model assuming that the reputation and persistence effect is constant (Garín-Muñoz 2006, 2007 and 2009, among others). This assumption contrasts with the Tourism Area Life Cycle (TALC) theory, one of the most accepted theories on tourism (Albaladejo et al. 2016). To estimate tourism demand, we adopt the dynamic tourism model proposed in Albaladejo et al. (2016), which includes a quadratic function of the previous tourists. This non-linear specification, derived from the TALC theory, represents an innovation with respect to majority of existing studies because it allows that the effect of previous tourists on the current tourism demand varies with the relationship between tourists and carrying capacity at the destination.

The data used in our empirical analysis are disaggregated both by province of destination (the 11 Spanish provinces that make up the Mediterranean area) and by country of origin. Since the main tourist market is Europe, we consider European tourists from the following countries: Belgium, France, Germany, Holland, Italy, Portugal and United Kingdom. In 2015 more than 86% of European tourists come from one of these countries (INE). We consider a panel data set for the period 2001 to 2015. A system GMM dynamic panel data analysis (Blundell and Bond 1998) is carried to estimate the model. The empirical evidence suggests a strong persistence in tourism demand. Furthermore, the reputation and persistence effect is not constant and it decreases with the lagged ratio between number of tourists and number of tourism sites at the province of destination. Thus, the influence of previous visitors varies across provinces and over time.

Our analysis extends the recent work of Albaladejo et al. (2016) on two main fronts. First, since the determinants of tourism demand may differ between destinations with different levels of tourists, this study is focused on the area with the highest number of international arrivals in Spain: The Mediterranean. Second, we use more disaggregated data in order to have more information. The results provide evidence to support the proposed dynamic tourism demand model and show that the reputation and persistence effect is clearly non-constant to international tourism.

The paper is organized as follows. The following section discusses the role of the previous tourists on tourism demand. It summarizes the empirical literature for the panel data case, and provides the theoretical foundations of our model. Section 3 presents the data and some descriptive statistics for the variables considered in the study. It also provides the empirical model and describes the econometric method used for estimation. Section 4 contains the results and their interpretation. Finally, Section 5 draws some conclusions.

2 The impact of previous tourists

2.1 Literature review

The majority of the published studies use quantitative methods to model and forecast tourism demand. This literature is dominated by two sorts of methods: non causal time-series models and causal econometric approaches. One of the main advantages of econometric approaches over the time-series models lies in their ability to analyze the causal relationships between the tourism demand and its influencing factors. Since the 1990s, demand econometric analysis has shifted from static regression models to more sophisticated dynamic specifications. Dynamic models aim to avoid potential problems such as spurious regression, poor predictions and structural instability (Witt and Song 2000; Song and Turner 2006), and allow important factors like lags in implementing the decision to travel, information lags, supply rigidities and previous visitors flows to be considered (Morley 2009).

Previous visitors have a twofold impact on the current tourism demand. First, through their influence on other potential visitors (word-of-mouth recommendations). Previous tourism flows increase information about a destination, thereby reducing uncertainty for potential visitors. Second, through their own repeat visits (habit persistence). There is less uncertainty associated with a destination with which you are already familiar, therefore habits might induce tourists not to vary their destination over time. Both influences of previous tourists on current tourists are usually called the reputation and persistence effect (Albaladejo et al. 2016; Capacci et al. 2015).

Most common dynamic specification simply include previous tourists in the model to capture the role of reputation, and the tendency of tourists of one destination to return to the same place to spend their holidays (persistence). Regarding analysis with panel data, there is an important number of studies that have estimate a lagged dependent variable model. As examples, we have the work by Maloney and Montes Rojas (2005) for tourist demand at Caribbean destinations, Naudé and Saayman (2005) for tourist demand in 43 African states, Garín-Muñoz (2006, 2007 and 2009) for tourism demand at different Spanish destinations, Garín-Muñoz and Montero-Martín (2007) for tourism demand in the Balearic Islands (Spain), Massidda and Etzo (2012) for domestic tourism in Italy, and Rodríguez et al. (2012) for academic tourism demand in Galicia (Spain). More recently, Capacci et al. (2015) includes two lags of the dependent variable to analyze the impact of the Blue Flag on foreign tourists to the Italian coasts, and Poprawe (2015) uses a panel data set of over 100 countries to test the hypothesis that corruption has a negative effect on tourism. All these studies include previous tourists as explanatory variables in a linear fashion, therefore the persistence and reputation effect is constant over time and across the cross section.

Morley (1998, 2009) and Albaladejo et al. (2016) have questioned this way of incorporating dynamics into the model. Morley (2009) argues that the simple inclusion of the lagged dependent variable allows repeat visits to be incorporated into a model, but not word-of-mouth recommendations. He shows that this information flow has generally been neglected in the literature. Using the diffusion model (Bass 1969; Mahajan et al. 1990), Morley (1998, 2009) incorporate relevant tourism information flows in a traditional tourism demand model. The result is a nonlinear model that includes quadratic functions of previous tourists as terms. Morley (1998), Roselló et al. (2005), Aguiló et al. (2005), and Hsu and Wang (2008) have estimated the model with time series data. They have found evidence to support this model, suggesting that the usual constant elasticity demand models are likely to be miss-specified.

Albaladejo et al. (2016) argue that the constant reputation and persistence effect resulting from the usual dynamic econometric model is not in agreement with the TALC theory of Butler (1980), which is one of the most widely accepted theories in tourism literature. Taking into account both this theory and the traditional tourism demand model, Albaladejo et al. (2016) propose a new dynamic specification to analyze the tourism demand. The proposed model is a quadratic form where the reputation and persistence effect can vary as function of the previous tourists and carrying capacity of the destination. They test the model using panel data from Spanish regions during the period 2000-2013. Unlike what has been considered in previous studies, they found a positive and decreasing reputation and persistence effect. Their results are much clearer in domestic tourism than in international tourism, probably because international tourist arrivals are not homogeneously distributed among Spanish regions. In this line our study is an improvement to the international tourism analysis in Spain since we consider a more international destination.

2.2 A nonlinear dynamic demand model

The TALC theory (Butler 1980) argues for the existence of an S-shaped lifecycle in the growth of the tourism destinations with six key stages: exploration, involvement, development, consolidation and stagnation, arriving at a final post-stagnation stage where decline, rejuvenation or other intermediate solutions are possible. Each stage is characterized by a different rhythm of growth.

Lundtorp and Wanhill (2001) show that a logistic curve can be quite a good theoretical representation of Butler´s lifecycle path, where the stagnation stage is determined by the social, physical or economical carrying capacity of the tourist area destination. Using a discrete version of the logistic function, Albaladejo et al. (2016) show that the S-shaped curve given by the logistic function implies a positive but diminishing marginal effect of previous tourists on current tourism. The impact of previous tourists on the current tourists decreases as the number of tourists approaches the destination’s carrying capacity. This non-constant effect is essential for TALC theorists. It is surprising, however, that much of the literature on tourism demand modeling seems to omit this TALC theory implication.

Albaladejo et al. (2016) match the logistic curve of the TALC theory with the classical economic theory of tourism demand and propose a nonlinear dynamic specification for modeling tourism. Their specification includes a quadratic function of previous demand. Therefore, the model allows a decreasing marginal effect of previous tourism. Furthermore, the relationship between previous and current tourism is influenced by the carrying capacity of the destination, since Albaladejo et al. (2016) consider a carrying capacity that could evolve along time.[2] The proposed model is

$$T_t = \beta_0 + \beta_1 T_{t-1} + \beta_2 \frac{T_{t-1}^2}{CC_{t-1}} + \gamma' X_t + \varepsilon_t \qquad (1)$$

where the subscript t denotes the time period. The dependent variable is T_t, the current number of tourists, T_{t-1} is the previous number of tourist, CC_{t-1} is the previous carrying capacity and $X_t' = (x_t^1, x_t^2, \dots, x_t^k)$ is the vector of the remaining k explanatory variables (price, income, etc.), which can also include lagged explanatory variables and dummy variables. The regression error term is ε_t.

The marginal effect of T_{t-1} on T_t is the reputation and persistence effect. It is measured by the expression

$$\frac{\partial T_t}{\partial T_{t-1}} = \beta_1 + 2\beta_2 \frac{T_{t-1}}{CC_{t-1}} \qquad (2)$$

Both the previous number of tourists and carrying capacity can modify this marginal effect. Thus, the reputation and persistence effect is not constant. If, as expected, β_1 is positive and β_2 is negative, the quadratic function has a parabolic shape opening downwards, implying a marginal effect positive but diminishing with the ratio $\frac{T_{t-1}}{CC_{t-1}}$, in line with the TALC theory.[3] If the increases in the arrivals to a destination are not accompanied by an adequate carrying capacity expansion, the marginal effect decreases with previous tourism. That is, a destination can cushion the downward dynamics of the reputation effect by investing in tourism.

3 Data and Methodology

3.1 Tourism Demand

In this paper, the variable employed to measure tourism demand is the number of international tourists who choose hotels and similar establishments as accommodation from 2001 to 2015. The evolution of this variable for Spanish Mediterranean destinations is shown in Fig. 2. Tourism rose sharply from 2002 to 2006, but a stagnation is observed in 2007 and 2008, and a sharp drop occurs in 2009, as a result of the financial crisis and economic recession. Since 2010, the number of tourists seems to be experiencing a new growth phase.

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[2]Although tourism carrying capacity has traditionally been considered as a static value, several authors argue that it can be subject to change (Saveriades 2000; Cole 2012; Albaladejo and Martínez-García 2015). Carrying capacity could evolve over time due to changes in tourists' preferences, tourism supply, or the evolution of environmental or social restrictions. Moreover, destinations can expand their capacity simply by rejuvenating the products and services, by investing in developing new ones, opening up to new markets or improving the communication infrastructures.

[3]Note that the most common dynamic specification set $\beta_2 = 0$, omitting the quadratic term $\frac{T_{t-1}^2}{CC_{t-1}}$. In the resulting linear model, the marginal effect is constant.

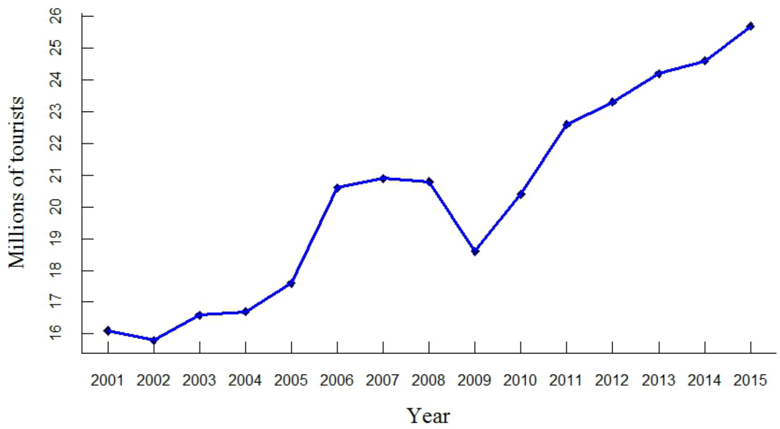

Fig. 2 Number of international visitors in hotel on Spanish Mediterranean coasts 2001-2015. Source: INE

As we noted in the introduction, the Spanish Mediterranean area is an important destination for tourism. It is the main destination of foreign tourists in Spain. According to the INE, in 2015, about 43.5 million tourists stayed at hotel in this area. Of these, nearly 60% were foreign tourists (25.7 million). However, international tourist arrivals are not homogeneously distributed among Mediterranean provinces. Table 1 shows the number of tourists lodged at hotels in 2001 and 2015 for the eleven provinces defining the Spanish Mediterranean coasts. Barcelona and Balearic Islands are the two provinces with the highest percentage of tourists in 2001 and 2015. In 2001, the Balearic Islands held a privileged position in the Mediterranean area, receiving nearly 37% of the tourists followed by Barcelona with almost 21% market share. During the period 2001 to 2015 Barcelona has experienced a major increase in the number of tourists, and the difference between the two provinces has declined. In 2015, both provinces had the same share, next to 30%, greater than the rest of the Mediterranean provinces.

Table 1 International tourism in the Spanish Mediterranean area by province of destination. Source: INE

	2001		2015	
	Number of tourists	Percentage share of the total	Number of tourists	Percentage share of the total
Alicante	1018336	6.30%	1536199	5.97%
Almeria	271303	1.68%	238202	0.93%
Balearic Islands	5904185	36.55%	7650394	29.75%
Barcelona	3369763	20.86%	7692176	29.91%
Castellon	152402	0.94%	175029	0.68%
Girona	1500625	9.29%	1862222	7.24%
Granada	854531	5.29%	1215172	4.72%
Malaga	1912238	11.84%	2908380	11.31%
Murcia	133583	0.83%	227604	0.88%
Tarragona	653706	4.05%	1067265	4.15%

Valencia	385244	2.38%	1145860	4.46%

Traditionally the largest tourism market for the Mediterranean is Europe. In 2015 nearly 75% of international tourists who chose hotels as accommodation on the Spanish Mediterranean coasts were Europeans (INE). The main nationalities of these tourists are Belgian, French, German, Dutch, Italian, Portuguese and British. Table 2 shows the relative importance of each of the origin markets according to 2001 and 2015 data on the tourists lodged at hotel. United Kingdom and Germany are the two European countries with the highest percentage of tourists arriving at the Spanish Mediterranean destinations.

Table 2 Arrivals of tourists lodged at hotels by countries of origin.
Source: INE

Countries of origin	2001		2015	
	Number of tourists	Percentage share of the total	Number of tourists	Percentage share of the total
Belgium	579892	4.50%	742219	3.85%
France	1590901	12.34%	3227726	16.76%
Germany	3897074	30.22%	4280458	22.22%
Holland	636987	4.94%	980951	5.09%
Italy	995571	7.72%	1417825	7.36%
Portugal	260032	2.02%	372933	1.94%
United Kingdom	4184418	32.45%	5620953	29.18%
Other European countries	751163	5.82%	2619797	13.60%

3.2 Carrying capacity in Spanish Mediterranean destinations

The measurement of the carrying capacity of a destination is not an easy task. There is no universal definition of carrying capacity in tourism. In its most traditional sense, it is understood as the maximum number of tourists or the tourist use that can be accommodated within a specific geographic destination (O'Reilly 1986). This capacity has been identified in terms of limits of environmental, social, economic or physical factors (Butler 1980; Saveriades 2000; Cole 2009; Diedrich and García-Buades 2009).

Albaladejo et al. (2016) use as a measure of the carrying capacity, the number of tourism sites of a destination. In Spain, the INE identifies as "tourism site" a municipality where the concentration of tourism supply -not only lodgings- is significant. All these sites count on some important tourism attraction (beaches, monuments, wildlife, museums, theme parks, golf courses, etc.) or are near to an attraction. The number of tourism sites is a quantitative measure of the tourism supply of a destination but also of the space distribution of the services offered. The greater the number of tourism sites, the larger the spatial dispersion of supply and therefore the higher the chance to accommodate visitors, that is, lower tourism congestion.

Fig. 3 and Fig. 4 show the tourism sites in Spanish Mediterranean provinces in 2001 and 2015. In 2001, although all provinces have some tourism sites, there are only 31 sites. In 2015, the number is considerably higher; there are 58 sites in total.

Fig. 3 Tourism sites in the Spanish Mediterranean provinces on 2001

Fig. 4 Tourism sites in the Spanish Mediterranean provinces on 2015

The increase of the number of tourism sites in the Mediterranean for the period 2001 to 2015 implies a higher carrying capacity of this destination. Therefore, the maximum number of tourists that can be accommodated has grown.

3.3 Data and Variables

To explain the international tourism demand at the Spanish Mediterranean destinations, we estimate the model proposed in Section 2 using disaggregate data by province of destination and country of origin. We use a balanced panel data set consisting of the 11 provinces which make up the Spanish Mediterranean area and the 7 European countries which are the main origin markets, for the period 2001 to 2015. The panel data has some advantages over cross sectional or time series data. One is that it enables us to control for unobservable cross sectional heterogeneity, which is common in regional data. Time series and cross section studies not controlling for this heterogeneity run the risk of obtaining biased results. Moreover, panel data usually give a large number of data points, so increasing the degrees of freedom, reducing the collinearity among explanatory variables and improving the efficiency of econometric estimates (Hsiao 2003; Baltagi 2008).

Our model includes economic demand variables, such as income and prices, a variable accounting for destination attributes (hotel beds per coastline kilometers), a dummy variable for controlling the effects of the economic crisis, and a quadratic form to capture the effect of the lagged demand. The quadratic function allows a non-constant reputation and persistence effect. It can vary with the ratio between number of previous tourists and previous carrying capacity of the destination (Eq. (2)).

According to the model, the dependent variable is the number of international tourists (T) who choose hotels and similar establishments as accommodation. Data are taken from the INE. Two traditional economic factors are included among the explanatory variables: origin income and price. To measure origin income, we use the real per capita GDP of each origin country (GDP). This variable was taken from OCDE. The price variable included in our model reflects the cost of living of tourists at the different destinations relative to the cost of living in the country of origin (IP):

$$IP_{destination/origin} = \frac{CPI_{destination}}{CPI_{origin} \cdot EX_{Spain/origin}} \quad (3)$$

where $CPI_{destination}$ and CPI_{origin} are the consumer price indices (CPIs) for each of the 11 provinces considered and each origin country, respectively; $EX_{Spain/origin}$ is the nominal effective exchange rate of Spain vs each country.[4] Data on exchange rates and CPIs for each country were collected from Eurostat. Data on CPI for the 11 Spanish provinces were collected from the INE.

A variable reporting on the characteristics of the destination is also included among the explanatory variables. It is the ratio between the number of hotel beds at the destination province and the length of province´s coastline measured in kilometers (BEDKM):

$$BEDKM_{destination} = \frac{hotel\ beds_{destination}}{coastline\ kilometers_{destination}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots..(4)$$

This variable measures the intensity of tourism supply in each Mediterranean province. It allows us to analyze the role of the degree of tourism vocation of the province, derived from the intentions of residents to develop or promote tourism. Data on coastline kilometers are taken from the Instituto Geografico Nacional and data on hotel beds are taken from the INE.[5]

Additionally, based on Fig. 2, we also consider a dummy variable to capture the influence on tourism of the financial and economic crisis initiated in 2008. This variable, $D2008$, takes the value 1 from 2008 onward and 0 in other years.

Finally, the carrying capacity of the provinces has to be considered to build the quadratic form of our model. As it has been said in the previous section, the number of tourism sites in each province is used as a proxy of its carrying capacity, CC. The greater the number of tourism sites in a province, the higher the chance of accommodating its visitors. A relevant advantage of using this measure is that its homogeneous character allows comparisons among several provinces.

3.4 Methodology and model specification

Following the model proposed in Section 2 and considering the variables defined above, the econometric model to be estimated with panel data is represented as

[4]The nominal exchange rate between Spain and Eurozone countries is equal to 1. Therefore, we only need to multiply the CPI of the origin country by the nominal exchange rate in the case of United Kingdom.

[5] The data of hotel beds correspond to beds available in the month of August of each year.

$$T_{ij,t} = \eta_{ij} + \beta_1 T_{ij,t-1} + \beta_2 \frac{T_{ij,t-1}^2}{CC_{i,t-1}} + \beta_3 GDP_{j,t} + \beta_4 IP_{ij,t} + \beta_5 BEDKM_{i,t} + \\ + \beta_6 D2008_t + \varepsilon_{ij,t} \quad (5)$$

where the subscript i denotes the destination province (Alicante, Almeria, Balearic Islands, Barcelona, Castellon, Girona, Granada, Malaga, Murcia, Tarragona and Valencia), j denotes the origin country (Belgium, France, Germany, Holland, Italy, Portugal and United Kingdom), and t indicates the time period ($t = 2001 - 2015$). η_{ij} is the unobserved fixed effect that varies across the cross-section but is invariable over time, and $\varepsilon_{ij,t}$ is a disturbance term. A key assumption throughout this paper is that the disturbance $\varepsilon_{ij,t}$ is uncorrelated across the cross-section, but heteroscedasticity and serial correlation is allowed for across time. The number of tourists, real per capita GDPs, relative prices and the beds-kilometers ratio are in logs, and therefore their coefficients may be interpreted as elasticities.

As discussed in Section 2, the reputation and persistence effect depends on β_1 and β_2 (see Eq. (2)). Since a positive sign is expected for β_1, a negative β_2 would imply that the elasticity between current and previous tourism is positive but decreasing with the ratio between previous tourists and tourism sites. If β_2 is zero, the elasticity (and thus the reputation and persistence effect) is constant. We expect a positive sign for β_3 and β_5 and a negative sign for β_4 and β_6.

A generalized method of moments (GMM) panel data estimation (Arellano and Bond 1991; Arellano and Bover 1995; Blundell and Bond 1998) was applied to conduct our empirical analysis. Ordinary Least Squares (OLS) is not appropriate to estimate dynamic panel models with the lagged dependent variable among the regressors. The lagged dependent variable is correlated with the unobserved fixed effect (η_{ij}) which gives rise to "dynamic panel bias" (Nickell, 1981). The within groups and random effects estimators do not eliminate the "dynamic panel bias" and are biased and inconsistent. To solve this problem, Arellano and Bond (1991) suggest first-differencing the model to remove the unobserved fixed effects (η_{ij}). As the differenced lagged dependent variable is still potentially endogenous, it is instrumented with lagged levels of the endogenous variable to solve the problem of autocorrelation. If the $\varepsilon_{ij,t}$ are not serially correlated, we can use lags 2 and upwards of the endogenous variable as instruments. Blundell and Bond (1998) extended this estimator by building a system of equations formed by the equation in first differences and the equation in levels. The extended GMM estimator, called system GMM, uses lagged first-differences as instruments for equation in levels, in addition to the usual lagged levels as instruments for equation in first-differences.

In this paper, we apply the system GMM (Blundell and Bond 1998) procedure to estimate Eq. (5). We use the one-step robust to heteroscedasticity estimator and the two-step estimator for comparison.[6] Although the two-step estimator is theoretically preferred, it is appropriate to consider the one-step results when making inferences since the asymptotic standard errors of one-step GMM estimators are virtually unbiased (Arellano and Bond 1991).

A crucial assumption for the validity of GMM is that the instruments are exogenous. We conduct two diagnostic tests: Hansen (1982) J tests of the over

[6] One-step GMM estimator is based on the assumption that the $\varepsilon_{ij,t}$ are i.i.d. In this paper, we use one-step robust estimators, where the resulting standard errors are consistent with panel-specific autocorrelation and heteroscedasticity.

identifying restrictions for the GMM estimators, and the Arellano and Bond (1991) test for autocorrelation in the disturbance term, $\varepsilon_{ij,t}$.[7]

4 Results

We show two different GMM estimates: one-step and two-step versions of the system GMM (GMM-SYS). In both estimates the lag of the dependent variable and the quadratic term are treated as endogenous. Since the usual formulas for coefficient standard errors in two-step GMM tend to be downward biased when the instrument count is high, we use the Windmeijer (2005) standard errors correction.

The empirical results from the estimation of the model are shown in Table 3. The coefficient of the lagged dependent variable is significant and positive and the coefficient of the quadratic term is significant and negative, revealing a non-constant reputation and persistence effect, which is negatively affected by previous ratio between tourists and tourism sites. Additionally, the results reveal a general satisfactory performance of the econometric models. The autocorrelation tests (Arellano and Bond 1991) do not detect any serial correlation problem in the residuals. As expected, the residuals in differences are autocorrelated of order 1, while there is no auto correlation of second order. In addition, the Hansen (1982) J-test does not reject the null for joint validity of the instruments.

Table 3. Estimation results for international tourism demand model, 2001-2015
Source: Own using the xtabond2 command in STATA10 (Roodman, 2009).

Dependent variable: $T_{ij,t}$	GMM-SYS	
Explanatory variables	one-step	two-step
$T_{ij,t-1}$	0.9617***	0.9600***
$\frac{T_{ij,t-1}^2}{CC_{i,t-1}}$	-0.0009***	-0.0009***
$GDP_{j,t}$	0.0112*	0.0119*
$P_{ij,t}$	-0.2891***	-0.2899**
$BEDKM_{i,t}$	0.0649***	0.0664***
$D2008_t$	-0.0331***	-0.0322***
Hansen test (p-value)	0.431	0.431
AR(1) (p-value)	0.000	0.000
AR(2) (p-value)	0.306	0.310
Number of observations	1078	1078
Number of groups	77	77

*,**,*** denote significant at the 10%, 5% and 1% level respectively.

Both estimates (one-step and two-step) yield similar results, and all variables are statistically significant. Estimated β_1 (0.9617 and 0.9600) is positive and β_2 (-0.0009) negative, showing that the effect of previous tourists is positive and decreases slowly with the previous ratio between tourists and tourism sites. The estimated coefficients indicate that persistence and reputation have played an active role in the growth of tourism in the Spanish Mediterranean destinations. The estimated income elasticity (0.0112 and 0.0119) is positive and significant, showing that the arrival of European tourists to Spanish Mediterranean provinces depends positively on the wealth of its origin country. As expected, a negative elasticity is estimated for price with values of -

[7] The Hansen statistics is a chi-squared test to determine if the residuals are correlated with the instrument variables. If non-sphericity is suspected in the errors, the Hansen over identification test is theoretically superior to the Sargan (1958) test.

0.2891 and -0.2899, suggesting that tourist arrivals are also sensitive to price changes. The positive and significant estimated β_5 (0.0649 and 0.0664) suggests a positive elasticity for the variable BEDKM, which captures the capacity of different provinces to respond to tourism demand. According to our results, investment in hotel accommodation has a positive impact on tourism demand. Finally, the coefficient of the dummy variable representing the impact of the global crisis, D2008, has the expected negative sign (-0.0331 and -0.0322).

Our results show that the lagged dependent variable, which controls the role of the persistence and reputation, is an important determinant of the international tourism in the Spanish Mediterranean provinces. Additionally, the significant estimated β_2 proves the need for a quadratic specification in the model and indicates that the effect of previous tourists is not constant. This effect varies across the Mediterranean provinces, depending on the relationship between its tourism demand (tourists) and supply (tourism sites), and through time. Given a particular province, the reputation and persistence effect decreases when the increase in the number of arrivals is not accompanied by a proportional increase in the number of tourism sites. This result provides evidence of the existence of a growth of the tourism destinations in line with the TALC theory.

In order to examine the relationship between the estimated reputation and persistence effect and the number of tourists in each province, Fig. 5 shows the scatterplot and regression line between both variables in 2015.[8] The graph suggests a positive relationship between the number of tourists and the estimated effect. On average, the provinces that receive more tourists are those with a higher reputation and persistent effect. This can be explained by the fact that these provinces have made a greater investment effort in tourism sector and thus enjoy a greater proportion of tourism sites. The Balearic Islands are an example. However, there are provinces moving away from this average behavior. Almeria, Girona and Malaga have a high estimated reputation and persistent effect in relation to their number of tourists. On the opposite side, Valencia has a low estimated effect in relation to its number of tourists. As is shown in Fig. 5, Granada and Tarragona receive a similar number of tourists as Valencia. However, the estimated reputation and persistence effect in Granada and Tarragona is greater than in Valencia.

[8] The value of reputation and persistence effect has been calculated using the estimated coefficients shown in the third column of Table 3. For each province, the reputation effect is the average of the calculated effects for tourists arriving from different origin countries.

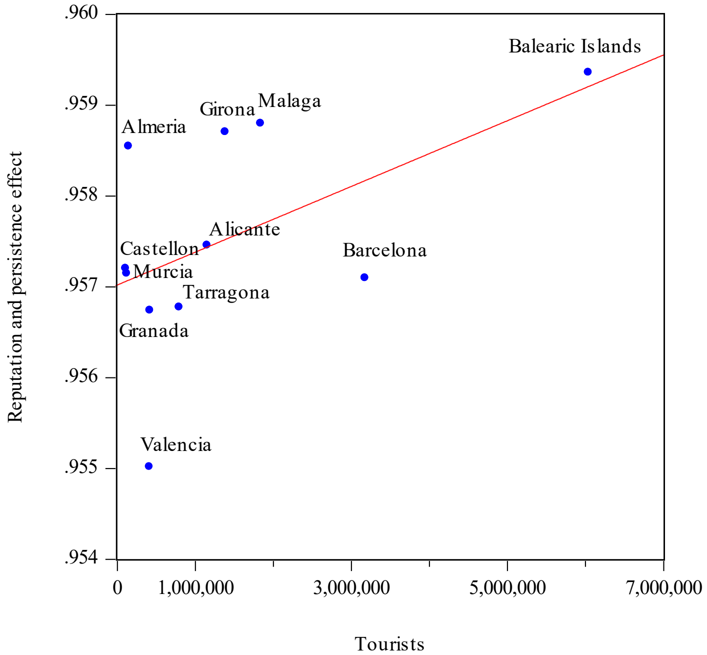

Fig. 5 Scatterplot between estimated reputation and persistence effect and number of tourists in 2015

5 Concluding remarks

This paper studies the international tourism demand at the Spanish Mediterranean destinations. The Mediterranean receives the highest number of international arrivals in Spain. Knowing the determinants of its demand can be helpful in designing the appropriate tourism policies for this destination.

Most empirical studies on tourism demand include previous tourists in a linear regression model to measure the reputation and persistence effect assuming that this effect is constant. This assumption contrasts with the TALC theory, one of the most accepted theories on tourism. Following this theory, we use the dynamic tourism model proposed in Albaladejo et al. (2016) to analyze the demand for international tourism in the Spanish Mediterranean provinces and investigate how previous tourists affect the current demand. This is a non-linear specification, which includes a quadratic form of the lagged demand and allows a non-constant reputation and persistence effect.

The model is estimated using a panel data set consisting of the 11 Mediterranean provinces and the 7 European countries which are the main origin markets, for the period 2001 to 2015. Our model includes traditional economic factors, destination attributes and a quadratic function of the lagged demand. This dynamic specification allows the reputation and persistence effect to depend on the relationship between previous tourists and the carrying capacity of the destination province, defined as its number of tourism sites.

We apply the system GMM procedure to estimate the econometric model. Our results support those of Albaladejo et al. (2016). One of the most important determinants of the international tourism demand seems to be the lagged dependent variable, suggesting that the Spanish Mediterranean provinces have a well-established reputation as tourist destinations. According to the TALC theory, the persistence or reputation effect is positive and decreasing with the ratio between number of previous tourists and tourism sites.

In addition, the estimation results suggest that reputation effect is not constant but varies across provinces and over time. In provinces with similar volume of tourism, the reputation effect is lower the smaller the number of tourism sites. This implies that the number of tourism sites is a fact to keep in mind. Tourists assess positively the quantity and diversity of supply, allocating a better reputation to those provinces where there are greater opportunities to accommodate tourists. Regarding the temporal dynamics, if tourist arrivals grow at higher rates than the number of tourism sites, the reputation and persistence effect diminishes over time. The dynamic of this effect depends on the tourism demand but also on tourism investment made by each province. Therefore, tourism investment is important. Efforts and actions to increase the investment in tourism could enhance the wellness of the tourists and, in consequence, would improve the image of the destinations. Increasing investment in tourism involves the creation of new hotels, restaurants, tourist attractions and, therefore, new tourism sites, which can lead to a higher reputation effect.

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