Tourism in the Balearic Islands: A dynamic model for international demand using panel data

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Abstract

The Balearic Islands are one of the most important tourist destinations in the Mediterranean Sea. The tourism sector dominates the economic activity of the islands. The purpose of this study is to identify and measure the impact of the main determinants of the inbound international tourism flows. The annual panel data set includes the number of arrivals from the 14 most important generating countries during the period 1991–2003, and a number of possible explanatory variables. Taking into account the changing structure of consumer preferences, a dynamic model is estimated. The estimated coefficient for the lagged dependent variable may be reflecting the importance of consumer loyalty to the destination as a determinant of tourism demand. The results suggest that the demand is heavily dependent on the evolution of economic activity in each of the origin countries and on the relative cost of living of tourists in the destination. This study also suggests that diversification of promotion and provision of high-quality services are some recommended measures of tourism policy.

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1. Introduction

The Balearic Islands are one of the most popular tourist destinations in Spain and one of the most visited sun and sea destinations in Europe. Located in the Mediterranean off the north-east coast of Spain, the islands are easily reached from most European countries in no more than 4 h from the most distant countries (see Fig. 1). With a total surface area of 5040 km\textsuperscript{2} and 1428 km of coastline, the region comprises three main islands, namely Mallorca, Menorca and Ibiza, and the two tiny and unspoilt islands of Formentera and Cabrera.

The Balearic Islands have usually been considered in the literature as a typical example of a second generation European mass tourist resort (Knowles & Curtis, 1999). Those high-density tourist areas that emerged in the Mediterranean in the 1960s have experienced a rapid development that has usually created a tourism monoculture. And this has been the case of the Balearic Islands. The boom of tourism has caused a deep transformation of the islands from a rural area into one of Spain’s richest regions. Today, Balearic GDP per capita is on par with the EU average and well above the Spanish national average.

However, the Balearic Islands’ dependence on tourism is also its greatest challenge. These islands have one of the highest tourist rates per capita in the world with 11 million tourists a year, i.e. a ratio of 14:1 to the local population. In terms of economic importance, tourism contributes around 85\% of GDP. Being extremely dependent on tourism can be problematic because tourism revenues are seasonal, create uneven demands on infrastructure, cause concern about environmental issues and, overall, can fluctuate according to global and regional trends. This problem of heavy dependence on tourism has been a concern for several researchers. In fact, there is a paper (Capó, Riera, & Roselló, 2005) stating that the Balearic economy shows signs of what in the economic literature is known as Dutch Disease\footnote{The term Dutch Disease refers to the adverse effect on Dutch manufacturing of natural gas discoveries in the 1960s. It was used by} and, as a result, its economic growth might be compromised in coming years.
Given the importance of the tourism sector for the Balearic Islands, it is not surprising that many works have recently been published dealing with different aspects of tourism in the islands. Some of these papers are about the market viability of the destination (Aguilo, Alegre, & Sard, 2005; Knowles & Curtis, 1999).\(^2\) There is also literature dealing with the environmental repercussions of tourism on the Balearic Islands and the different economic instruments used to internalise the environmental costs and their implications (Aguilo, Riera, & Roselló, 2005; Palmer & Riera, 2003). Tourism demand has been studied from different points of view. Some papers have been devoted to the study of some characteristics of the demand like seasonal patterns and duration of the visit (Alegre & Pou, 2005; Roselló, Riera, & Sansó, 2004).\(^3\) Other papers try to improve the forecasts of tourism flows by using either time-series procedures or econometric models (Hoti, McAleer, & Sansó, 2005; Roselló, Aguiló, & Riera, 2005).

With this work, we try to contribute to a better understanding of the international tourism flows to the Balearic Islands, by developing a dynamic model that quantifies the relative importance of each one of the determinants in final demand. The rest of the paper is organized as follows. In Section 2, the tourism data sources are presented and, based on these data, a market analysis is developed where the evolution and main characteristics of demand from the different generating countries are studied. Section 3 discusses the model for explaining tourism demand and justifies the use of a dynamic model. The econometric methods used for estimation are also presented in the same section. Section 4 contains the estimation results and their economic interpretation, as well as a comparison of the results with other empirical studies. Conclusions and economic implications of the results are summarized in Section 5.

### 2. Tourism demand

This section describes the most relevant characteristics of tourism demand in the Balearic Islands. The volume, composition and recent evolution of tourist flows are analysed by using the number of arrivals of tourists by air for the period 1991–2003. These data are taken from the official statistics on air passengers to airports in the Balearic Islands, which are compiled periodically by AENA (Spanish Airports and Air Navigation). Also, the
Tourist Expenditure Survey (TES) conducted by the Regional Government of the Balearic Islands is used to explore the socio-demographic characteristics of the visitors, as well as other important features such as: average expenditure, length of stay, seasonal structure, kind of accommodation, reasons for travelling, degree of satisfaction and so on.

The goal of this work is to study the international tourism demand, which represents 85% of all tourism arrivals with a total of almost 9 million foreign visitors in 2003.4

In order to get an idea of the tourism market for the islands, one of the first variables that should be analysed is the evolution of tourism arrivals. The total number of foreign tourists rose by an accumulative yearly average of 4.5% between 1991 and 2003. This does not support the hypothesis of a post-stagnation phase of the destination held by some authors.5 Fig. 2 shows the evolution of arrivals and reveals that growth was not homogeneous throughout the period. In fact, tourism increased rapidly during the first part of the sample and reached a peak in 2000; after that, a 2-year decline is observed with a slow recovery beginning only in 2003.6 The most important decline took place in 2002 with a 7% drop in the numbers. There are at least four reasons that may explain such a decrease: (a) the worldwide evolution of tourism as a consequence of 2001 events, (b) the economic recession in some of the most important origin countries (Germany), (c) the shift of tourism to emerging destinations and (d) regulatory policies such as the introduction of the environmental tax (ecotax).7

However, the evolution of tourism has differed greatly depending on the considered countries of origin (see Graphs 1 and 2 of the Appendix A). The most positive evolution of tourism arrivals corresponds to Ireland with an accumulative yearly average of 16.7%, and at the opposite end is Finland with a decrease in 6.2%. Differences in the rates of growth have also been observed between the two main generating markets (Germany and UK). Tourist arrivals from both countries show a positive evolution, but the rates of growth were larger for tourists from the UK (6.3%) than for tourists arriving from Germany (3.7%). Fig. 3 shows the rates of growth for the 14 most important origin markets during the period 1991–2003.

The traditional tourism market for the Balearic Islands has been northern Europe, and, in particular, Germany. However, since 2001, Germans have been surpassed in numbers by the British. Table 1 shows the relative importance of each of the origin markets according to 2003 data on numbers of arrivals by air.

In terms of composition, it can be observed that international tourism is highly concentrated in a few countries of origin. Germany and the UK represent more than 76% of international arrivals. When the next three markets are added (Italy, France and Ireland), they represent up to 87% of the tourism arrivals.

When talking about tourism demand, not only is the number of visitors important, but also how these visitors are distributed over the year. In the case of the Balearic Islands, as in other Mediterranean destinations, the weather conditions and the holiday calendar in European countries tend to create a strong seasonal pattern. In fact, more than 80% of total arrivals in 2003 took place during the May–September period. Fig. 4 shows the monthly profile of international arrivals in 2003.

Although the seasonal pattern is similar across origin countries with respect to the peak month (August in all the cases), distribution throughout the year is different. Fig. 5 shows the distribution of arrivals from the different generating markets. The most irregular pattern of seasonality corresponds to Italian tourists who visited the islands mainly during the peak season (more than 85%), followed by Ireland (more than 75%). Taking a look at the two main markets, it can be observed that Germany (with 55% of the visits during the peak season) has a more homogeneous distribution of arrivals than UK (with 63% of visits concentrated during the peak months).

Even when there is a problem of seasonality, it is important to note that a dynamic analysis of seasonality shows a more homogeneous distribution of tourism demand during the last years of the sample (Roselló et al., 2004). However, the data inspection revealed a basic need for further development of diversified tourist attractions in order to smooth the seasonal profile.

According to the TES, most of the tourists arriving in the Balearics during 2003 came for holiday purposes
Their main motivations included weather, sun, beaches and a good quality/price ratio. These holiday-makers gave a rating of 8.1 for their general impression of the trip (on a scale of 1–10). On the same scale, the level of satisfaction with quality of accommodation is 7.6. Related to this good impression, the survey reveals a high repeat rate of about 75% during 2003. The high rate of repetition shows a considerable degree of loyalty to the destination and can be interpreted in two ways: (1) as a symptom of the weaknesses of the market to capture new clients and (2) as an asset in terms of fidelity that helps save resources for promotion and marketing.

In 2003, the most important group (43.3%) of all visitors were between 30 and 45 years of age. The tourists, who usually visit the islands on a package tour are generally from the medium to medium-low income brackets, thus having a limited capacity for expenditure (the average spending per day was 83.19 euros in 2003). For organizing the holiday, 61.9% of visitors say they use travel agency services and 16.8% the internet.

In terms of accommodation, hotel establishments concentrate most on the international visitors (81%). However, there has been a relative increase during recent years in the importance of other types of accommodation (especially own-homes and family or friends’ homes).

Given that the measure of tourism used in this study is number of arrivals, it may be relevant to assess the average duration of stay. The average length of stay is showing a downward trend. According to the data, the number of nights has decreased during the period 2000–2003 from 9.5 to 8.4 nights.

To summarize the previous data, the following characteristics should be emphasised:

- The Balearic Islands received a growing number of foreign tourists during the period 1991–2003.
- Most of the tourists arrive in the Islands for holiday reasons and most of them fly in from UK and Germany.
- They are attracted by the climate, the beaches and the quality of the supply.
- Tourists are highly satisfied with their stay and show high repetition rates.
- Finally, as a sea and sun destination, most arrivals are heavily concentrated during the summer months.

3. Model specification and econometric method

The importance of tourism demand models in tourism planning and tourism policy formulation has been widely documented in such studies as Frechtling (1996), Loeb (1982), and Wong and Song (2002). Studies published between the 1960s and the 1990s mainly followed the traditional regression approach in that the models were specified in static form with very limited diagnostics reported. However, static regression models can suffer from a number of problems, including structural
instability, forecasting failures and spurious regression, as pointed out by Witt and Song (2000). In order to avoid these potential problems, several papers have tried to find alternative tourism demand specifications by considering the possibility of a change in consumer preferences.

One way of handling the dynamic structure of preferences is to consider taste changes as endogenous by including previous consumption in the model (Fujii & Mak, 1981; Garin-Munoz, 2006; Witt & Martin, 1987). This latter approach is the one followed in this study.

There are two main reasons for including previous consumption as an explanatory variable of the model (Garin-Munoz, 2006): “One reason is that there is less uncertainty associated with holidaying in a country that you are already familiar with, compared with travelling to a previously unvisited foreign country. The other reason is because knowledge about the destination spreads as people talk about their holiday, thereby reducing the uncertainty for potential visitors to that country”. Because of these reasons, if people are satisfied with a destination they may be more likely to come back and tell others about their favourable experiences related to the destination. Hence, the parameter for the lagged dependent variable may be considered as a measure of habit formation and interdependent preferences.

Morley (1998) points out that many empirical tourism demand studies suffer from this neglect of the dynamic structure. In fact, if the impact of past tourism is neglected, the effect of the relevant variables considered will tend to be overestimated (as the estimated coefficients will involve direct and indirect effects).

Apart from the inclusion of previous consumption as an explanatory variable, the model presented in this study is a traditional tourism demand model in the sense that income and price-type factors are likely to play a central role in determining the demand for international tourism. Therefore, from a theoretical point of view, the demand for tourism will be a function of the quantity of tourism demanded during the last period, the relative cost of living of tourists in the destination, the price of travel, the consumer’s level of income and several one-off events that occurred during the sample period.

One of the contributions of this paper is the utilization of panel data models. The availability of panel data will allow us to measure the effects of variables with little changes
within countries and more variability across countries. This represents a major advantage when compared with the utilization of time series.

Even when similar approaches are used in different studies, the estimated values of elasticities may differ depending on the selected measures of the variables. Here, we are going to describe the data used to measure either the dependent variable (volume of tourism) or the explanatory variables.

The measure for the volume of tourism used in this paper is the annual number of arrivals by air to the Balearic Islands, and the data period is 1991–2003. There are several other ways of measuring the volume of tourism, such as the number of people in tourism accommodations or the total expenditure generated by tourists. In our case, data on expenditure is unavailable and using overnight stays in tourism accommodations would ignore a significant number of people who arrive in the Islands and stay in their own residences or visit family or friends. There are good reasons for using the number of passenger arrivals to airports as the way of measuring tourism demand. First, due to location characteristics, people can only arrive by plane or boat. And by considering air passengers, we are taking account of 95% of the total arrivals to the Islands. Another reason for selecting this measurement unit was the certainty that the data had been correctly gathered, without changes in the compilation method during the sample period. Finally, by using this data source we are able to discriminate between origin countries.

The selection of the price variable is also very important. For the case of tourism, price consists of numerous components. In our study, we are going to consider two of them: the relative cost of living of tourists in the destination and the cost of travel.

First, we construct an index expressing the cost of living of tourists in Balearic Islands relative to the cost of living in the origin country adjusted by the exchange rate.\(^9\) Data on exchange rates and on the CPI for the origin countries were collected from OECD Main Economic Indicators (1991–2003), and those on CPI for the Balearic Islands were collected from the National Statistics Institute of Spain (INE, 1991–2003). The second price component included as an explanatory variable of the model is the cost of travel.

In order to include income in the demand model, several measures have been used in different empirical works. Lim (1997) argued that discretionary income, defined as the income remaining after spending on necessities in the country of origin, should be used as the measure of income in the demand model. However, these data cannot be easily obtained in practice. Therefore, alternative measures of income have to be used as a proxy for discretionary tourist income. One of those alternative measures is the gross domestic product (GDP) used in this study and collected from the OECD main economic indicators. In order to homogenize the values for the different countries of origin, the GDP measure used is expressed in purchasing power parity.

We estimate a model to explain the demand for Balearic Islands international tourism by using data on number of tourists arriving from the 14 major origin countries (\(i = 1, ..., 14\)). These fourteen origins are: United Kingdom, Germany, France, Italy, Portugal, Norway, Belgium, Ireland, Netherlands, Denmark, Austria, Sweden, Switzerland and Finland. The data set corresponds to the annual arrivals during the 13-year period between 1991 and 2003 (\(t = 1991, ..., 2003\)). Consequently, we have a complete panel data set with 182 observations.

There are several advantages in using this type of data. First, the use of annual data avoids the problems stemming from seasonality. Second, by using the different origin countries as observational units, an increase in the range of variation of the variables is considered because of the substantial differences observed across countries in level of income and socio-demographical characteristics. Finally, the utilization of a pooled time-series/cross-sectional data set enables us to have more degrees of freedom than with time-series or cross-sectional data, and one can control for omitted variable bias and reduce the problem of multicollinearity, hence improving the accuracy of parameter estimates (Hsiao, 2003).

Therefore, the tourism demand function takes the following form:

\[
Q_{i,t} = f(Q_{i,t-1}, PT_{i,t}, PCOi_t, GDP_{i,t}, time\ dummies), \tag{1}
\]

where \(Q_{i,t}\) is the number of tourists arriving by air to the Balearic Islands from country \(i\) during year \(t\); \(PT_{i,t}\) is the relative cost of living of tourists in Balearic Islands; \(PCOi_t\) is the price of crude oil; and \(GDP_{i,t}\) is the gross domestic product in each of the origin countries. The dependent variable, as well as the lagged dependent and the GDP variables, are expressed in per capita terms.\(^{10}\) This is a standard practice and allows for the comparability of magnitudes across countries. See Graphs 3 and 4 of these variables in the Appendix A.

Eq. (1) is simply a statement that indicates that there is a relationship between the variables under consideration. However, in practice, we need to specify the functional

\(^{9}\) The defined index will be: \(PT_{it} = CPI_{it}/(CPI_{origin}\times ER_{it/origin})\). Where \(CPI_{it}\) is the consumer price index of the Balearic Islands; \(CPI_{origin}\) is the consumer price index of the market of origin of the tourists; and \(ER_{it/origin}\) is the exchange rate (number of monetary units of the destination by each monetary unit of the country of origin of tourists).

\(^{10}\) Using per capita terms, the population acts as a scale variable reducing the differences in error variances across countries of origin.
form of the model. In this study, as in most of the previous empirical literature, the tourism demand model has adopted the double-logarithmic form. The model to be estimated will be

\[
\ln Q_{it} = \alpha + \beta_1 \ln Q_{it-1} + \beta_2 \ln PT_{it} + \beta_3 \ln PCO_{it} + \beta_4 \ln GDP_{it} + \beta_5 d_{2002} + \lambda_t + \eta_i + \varepsilon_{it}. \tag{2}
\]

In Eq. (2), \(v_{it} = \lambda_t + \eta_i + \varepsilon_{it}\) is the fixed effects decomposition of the error term, in which \(\lambda_t\) and \(\eta_i\) are the time and country-specific effects, respectively. The error component \(\varepsilon_{it}\) is assumed to be serially uncorrelated with zero mean and independently distributed across countries, but heteroskedasticity across time and countries is allowed for. Moreover, \(\varepsilon_{it}\) is assumed to be uncorrelated with the initial condition in \(Q_{it}\) for \(t = 2, ..., T\), and with the individual effects \(\eta_i\) for any \(t\). The dummy variable \(d_{2002}\) was included to capture the influence of possible effects on tourism of the September 11th events. A positive sign is expected for the coefficients \(\beta_1\) and \(\beta_2\), and a negative one for the coefficients of \(\beta_3, \beta_4, \beta_5\).

When a model for panel data includes lag dependent explanatory variables, the simple estimation procedures are asymptotically valid only when there is a large number of observations in the time dimension (\(T\)). And this is not the case of our sample. Here the within estimator (least squares after transformation to deviations from means) is inconsistent. The current available response to this problem (Arellano & Bond, 1991; Holtz-Eakin, 1988; Hsiao, 2003) is to first difference the equation to remove the individual effects and then estimate by instrumental variables (IV), using as instruments the values of the dependent variable lagged two or more periods. This treatment leads to consistent but not efficient estimates, because it does not make use of all the available moment conditions. These conditions may be exploited in a generalized method of moments (GMM) framework. The estimation procedure used in this study is the GMM proposed by Arellano and Bond (1991).

The dynamic model to be estimated will therefore be

\[
\Delta \ln Q_{it} = \beta_1 \Delta \ln Q_{it-1} + \beta_2 \Delta \ln PT_{it} + \beta_3 \Delta \ln PCO_{it} + \beta_4 \Delta \ln GDP_{it} + \beta_5 \Delta d_{2002} + \Delta \varepsilon_{it}, \tag{3}
\]

where \(t = 1, ..., 14; t = 1991, ..., 2003\); and all the variables are in first differences. That means \(\Delta \ln Q_{it} = \ln Q_{it} - \ln Q_{it-1}\) and, analogously, for the other variables.

Because of the double-logarithmic form of the model, the parameters may be interpreted as elasticities. The parameter \(\beta_1\) indicates to what degree current tourism purchases are determined by the value of previous consumption. As it is a dynamic model, the estimated coefficients are the short-run elasticities. Long-run elasticities can be obtained by dividing each of the coefficients by \((1 - \beta_1)\).

Thus, one of the advantages of using a dynamic model is that both short-run and long-run elasticities may be obtained. A further advantage relates to the fact that, by differencing data, we avoid the problem of non-stationarity and this method will give us confidence in the reported coefficients and standard errors.

4. Empirical results and policy implications

This section presents the estimation of Eq. (3) using the GMM-DIFF estimator of Arellano and Bond. For the estimation, we have used STATA v.8.0 econometric software. The consistency of the estimation depends on whether the lagged values of the endogenous and exogenous variables are valid instruments in our regression. This methodology also assumes that there is no second order autocorrelation in the errors, and, therefore, a test for the previous hypothesis is needed. We have also conducted a test for autocorrelation and the Sargan test of over-identifying restrictions as derived by Arellano and Bond (1991). Failure to reject the null hypothesis in both tests gives support to our model.

The empirical results from the estimation are shown in Table 2. The results of Table 2 show that the model performs satisfactorily. The magnitudes and signs of the coefficients seem to be theoretically reasonable and significant. No signs of serial correlation are found and the Wald test denotes the joint significance of the explanatory variables.

In order to interpret the results of Table 2, it should be noted that the estimated coefficients are short-run demand elasticities. In order to obtain long-run elasticities, some transformations need to be made. The long-run elasticity values are income elasticity = 2.02; cost of living elasticity = -1.65 and price of travel elasticity = -0.30.

The results show that habit persistence is important for explaining foreign tourism demand in the Balearic Islands. In fact, 54% of total international arrivals are attributable to habit persistence and/or word-of-mouth effects. This result is consistent with our expectations because of the large number of repeat visitors observed in the Balearic Islands.

The estimated coefficient for the income variable has the expected sign and absolute value. According to the estimated short-run elasticity value (0.92), tourism to the Balearic Islands is considered by foreigners as a non-luxury service. However, the long-run income elasticity suggests that tourism is very dependent on the economic conditions of the generating countries. As a result, it would be advisable to diversify the promotion effort to different countries in order to avoid vulnerability to the evolution of economic conditions in a single market. Diversification of

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11Given that the terrorist attack took place at the end of year 2001, after the peak tourism season, we assume that its main effects appear in the year 2002. Wald test of significance of omitted variable for \(d_{2001}\) supports this idea.

12If long-run equilibrium is assumed, the following expression should be true: \(\ln Q_{it} = \ln Q_{it-1}\). The corresponding long-run elasticities have then been calculated by dividing each of the estimated coefficients by \((1 - \beta_1)\).
promotion is also advisable in order to direct promotion to countries with a smoother (or more complementary) seasonal profile. One of the main problems for the implementation of this policy in the case of the Balearic Islands is that the powers of promotion and distribution remain largely in the hands of northern European mass tour-operators.

The estimated short-run price-elasticity (−0.76) could lead to the conclusion that revenues could be increased by increasing prices. However, the long-run effects of prices on tourism demand (−1.65) may be a reflection of the numerous alternative sand and sea holiday destinations. Consequently, care must be taken by the industry to maintain or improve price competitiveness. Special efforts need to be made in order to avoid competition from several emerging destinations that can be considered as substitutes for the Balearics (i.e.: Turkey, Croatia and Tunisia). Because the relative cost of living of tourists in Spain can no longer be considered as low (in fact, relative cost of living has been increasing very rapidly since the 1980s), the effort must focus on improving the quality of the product according to new consumer demands. However, when talking about competitiveness with respect to those emerging destinations, it is important to note the comparative advantage of the Balearic Islands in terms of safety, public health and infrastructures.

In contrast to other studies of tourism demand, the estimated results show that the price of travel is a significant determinant of tourism demand. This may be due to the size and variability of this panel data set. The estimated short- and long-run values of this elasticity are −0.14 and −0.30, respectively.

The dummy variable \(d_{2002}\) has been included to reflect the impact of the terrorism attacks of September 11th. The results confirm the expected negative sign and show that it is significant for explaining the number of arrivals.

We also included a dummy variable for controlling the impact of the ecotax on the number of arrivals and we did not find any significant effect.

To test whether the estimated parameters can be assumed to be the same for all the countries, we present a test of stability in Table A.1 of Appendix A. The results do not reject the absence of stability across countries.

Finally, for a precise interpretation of the results, it must be remembered that the dependent variable of our model is the number of arrivals. When elasticities are estimated using demand models based on quantity of visitors, the final effect of variations in the explanatory variables on the demand are underestimated, since the reduction in the length of stay is ignored.

The results of this and several other studies are shown for purposes of comparison in Table 3. The papers included in the table have been selected either for the similarity of the destination or for the theoretical and econometric approach.

The table shows the estimated price and income elasticities (short- and long-run values) and the coefficient

### Table 2

**Estimation results for the dynamic model (1991–2003)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>GMM-DIFF estimator of Arellano and Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\ln Q_{i,t-1})</td>
<td>0.54 (8.85)</td>
</tr>
<tr>
<td>(\ln GDP)</td>
<td>0.92 (1.94)</td>
</tr>
<tr>
<td>(\ln PT)</td>
<td>−0.76 (−3.39)</td>
</tr>
<tr>
<td>(\ln PCO)</td>
<td>−0.14 (−6.74)</td>
</tr>
<tr>
<td>(d_{2002})</td>
<td>−0.09 (−6.92)</td>
</tr>
<tr>
<td>Autocorrelation2</td>
<td>0.95</td>
</tr>
<tr>
<td>Sargan (d.f.)</td>
<td>10.64 (10)</td>
</tr>
<tr>
<td>Wald test</td>
<td>218.78 (5)</td>
</tr>
<tr>
<td>No. observations</td>
<td>154</td>
</tr>
</tbody>
</table>

Dependent variable: Logarithm of the number of arrivals (per capita) by air. Dependent variable (\(\ln Q_{i,t}\)): log of arrivals per capita. \(t\)-ratios in parentheses. The estimates are obtained by using the instruments \(\ln Q_{i,t}\), lagged up to two periods in order to reduce finite sample biases resulting from having too many instruments relative to the cross-sectional sample size (Alonso-Borrego et al., 1999).

### Table 3

**Comparison of results to previous studies**

<table>
<thead>
<tr>
<th>Study</th>
<th>Data</th>
<th>Price elasticity</th>
<th>Income elasticity</th>
<th>Coefficient of adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Origin-destination</td>
<td>Short run</td>
<td>Long run</td>
<td>Short run</td>
</tr>
<tr>
<td>Garín-Muñoz and Pérez-Amaral (2000)</td>
<td>Rest of the World–Spain</td>
<td>−0.10</td>
<td>−0.23</td>
<td>0.91</td>
</tr>
<tr>
<td>Garín-Muñoz (2006)</td>
<td>Rest of the World–Canary Islands</td>
<td>−0.66</td>
<td>−1.85</td>
<td>1.17</td>
</tr>
<tr>
<td>Roselló et al. (2005)</td>
<td>UK–Balearic Islands</td>
<td>−0.69</td>
<td>−1.25</td>
<td>2.30</td>
</tr>
<tr>
<td></td>
<td>Germany–Balearic Islands</td>
<td>—</td>
<td>−0.59</td>
<td>—</td>
</tr>
<tr>
<td>Song et al. (2000)</td>
<td>UK–Germany</td>
<td>−0.49</td>
<td>0.50</td>
<td>2.77</td>
</tr>
<tr>
<td></td>
<td>UK–Spain</td>
<td>−0.78</td>
<td>−1.08</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td>UK–France</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Present study</td>
<td>Rest of the world–Balearic Islands</td>
<td>−0.76</td>
<td>−1.65</td>
<td>0.92</td>
</tr>
</tbody>
</table>

*Source: own elaboration. The coefficient or elasticity of adjustment determines the relation between the short- and long-run elasticities and can be obtained by subtracting the estimated coefficient of the lagged dependent variable from 1.*
of adjustment of tourism to changes in the explanatory variables. Even when there are differences depending on the considered pair of origin and/or destination countries, the elasticities found in this study are in line with the results of previous studies. Note the comparison with Garín-Muñoz (2006), which deals with inbound tourism to Canary Islands. As both destinations are typical examples of sun and sea destinations, the estimated values of the elasticities would be expected to be very similar and, in fact, they are. It is also important to note that in all the cases where the coefficient of adjustment is available, the values are very close to each other. In the case of the Balearic Islands, more than half of the adjustment to changes in the variables takes place during the first year.

5. Conclusions

Fluctuations in the demand for international tourism are important for Spain and the Balearic Islands and are influenced by several factors. The purpose of this study is to measure the impact of the main determinants of inbound international tourism flows to the Balearic Islands.

Most studies on tourism demand have focused on income and price-type factors as the only determinants of such variations. This has led to some unexpected results in the elasticity values or to inaccurate forecasts.

In order to improve these results, we use a dynamic model estimated with a panel data set using up-to-date estimation techniques. Our panel has many degrees of freedom, high variability in all the variables and little multicollinearity. This allows us to take into account heterogeneity across countries and obtain efficient estimates of the coefficients.

The model was used to assess the performance of tourist arrivals from fourteen generating countries to the Balearic Islands between 1991 and 2003, and it was estimated by using the GMM-Diff estimator proposed by Arellano and Bond (1991) for the case of dynamic panel data models. The estimated elasticities were plausible in terms of their economic signs, magnitudes and statistical significance.

One of the main conclusions of the study is the significant value of the lagged dependent variable (0.54), which may be interpreted as high consumer loyalty to the destination and/or as an important word-of-mouth effect on the consumer decision in favour of the destination. Similar values have been obtained in previous studies for the case of foreign demand for tourism to the Canary Islands (Garin-Muñoz, 2006). The policy implication of this result is that, in order to attract more tourists to the destination, the suppliers of tourism products/services should improve their service quality and upgrade their brand image. The presence of repeat guests may also possibly be considered as a deterrent to quality cheating.

The values of the income elasticity suggest that the economic conditions of the generating countries are also an important factor in determining tourism demand in the Balearic Islands. Therefore, it would be advisable to diversify promotion of tourism to different countries in order to limit vulnerability to the evolution of economic conditions in a single market. Also, marketing strategies must focus on countries with different seasonal patterns in order to smooth the general monthly profile of arrivals.

Tourism in the Balearic Islands is very sensitive to prices. According to the selected model, the estimated values for the own-price short- and long-run elasticities are −0.76 and −1.65, respectively. Thus, suppliers must be careful with prices in order to maintain the competitiveness of their products. The important thing, at this point, is to control the quality/price relationship and, given that prices in Spain are no longer low, the strategy should be to increase the quality of the services. Tourism to the Islands is also sensitive to the costs of travel.

We have found that external shocks may have an impact on tourism demand. It seems reasonable to assume that after the terrorist attacks of September 11th, foreign tourists changed long-haul for short-haul destinations, and destinations accessible by car were preferred over destinations involving air travel.

Finally, we could not find any significant effect of the tax levied on stays by individuals in tourism accommodations (ecotax) on the volume of tourist arrivals. This result is not surprising, considering that the period of tax application (from May 2002 to October 2003) was too short as it did not last even a year.

The results can be used as a basis for policy-related discussions. The estimated elasticities obtained for this case may be representative of holiday destinations in general, given that most tourism arriving in the Balearic Islands is essentially holiday tourism. And this kind of tourism is very sensitive to price and income variations (on the contrary, business tourism is normally less sensitive to price and income).

Further research may improve the results by including the prices of alternative destinations in the model and testing which ones can be considered as substitute markets. Also, when data availability so allows, it would be desirable to use the same methodology for modelling tourism earnings.
Appendix A

GRAPH 1
Evolution of the number of arrivals by country

GERMANY

UK

Number of arrivals (thousands)

0

2000

3000

4000


Years

Graphs by year

GRAPH 2
Evolution of the number of arrivals by country

AUSTRIA

BELGIUM

DENMARK

FINLAND

FRANCE

IRELAND

ITALY

NETHERLANDS

NORWAY

PORTUGAL

SWEDEN

SWITZERLAND

Number of arrivals (thousands)

0

50

100

150

200


Years

Graphs by year
GRAPH 3

Evolution of the number of arrivals per capita

AUSTRIA  BELGIUM  DENMARK  FINLAND

FRANCE  GERMANY  IRELAND  ITALY

NETHERLANDS  NORWAY  PORTUGAL  SWEDEN

SWITZERLAND  UK

Number of arrivals per capita


Graphs by year

GRAPH 4

Evolution of GDP per capita

AUSTRIA  BELGIUM  DENMARK  FINLAND

FRANCE  GERMANY  IRELAND  ITALY

NETHERLANDS  NORWAY  PORTUGAL  SWEDEN

SWITZERLAND  UK

GDP per capita (thousands of dollars)


Graphs by year
Test of spatial stability of the coefficients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Whole sample</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln Q</td>
<td>0.54</td>
<td>0.54</td>
<td>0.50</td>
</tr>
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<td></td>
<td>(0.85)</td>
<td>(9.32)</td>
<td>(9.52)</td>
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<tr>
<td>ln GDP</td>
<td>0.92</td>
<td>1.02</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>(1.94)</td>
<td>(2.27)</td>
<td>(1.64)</td>
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<tr>
<td>ln PT</td>
<td>−0.76</td>
<td>−0.64</td>
<td>−0.92</td>
</tr>
<tr>
<td></td>
<td>(−3.39)</td>
<td>(−2.94)</td>
<td>(−3.99)</td>
</tr>
<tr>
<td>ln PPET</td>
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<td>−0.19</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>(−6.74)</td>
<td>(−7.25)</td>
<td>(0.84)</td>
</tr>
<tr>
<td>D2002</td>
<td>−0.09</td>
<td>−0.09</td>
<td>−0.05</td>
</tr>
<tr>
<td></td>
<td>(−6.92)</td>
<td>(−6.40)</td>
<td>(−542)</td>
</tr>
</tbody>
</table>

Group A is a subsample of 11 countries obtained by eliminating from the analysis Germany, UK and France. Group B is the subsample corresponding to the three most important origin markets (Germany, UK and France). *-ratios in parentheses.

Appendix A.1. Test of stability across countries

To test whether the estimated parameters can be assumed to be stable for all the countries, we compare the coefficients estimated by using different subsamples of countries with the results of the estimation obtained by using the whole sample (14 countries). Table A.1 shows the results, that indicate that the estimated coefficients for groups A and B are very similar to the ones for the whole sample.

References


