TOURISM DEMAND IN CATALONIA: DETECTING EXTERNAL ECONOMIC FACTORS

Oscar Claveria
University of Barcelona

Jordi Datzira
Datzira Development Services, S.L. (Dds)

There is a lack of studies on tourism demand in Catalonia. To fill the gap, this paper focuses on detecting the macroeconomic factors that determine tourism demand in Catalonia. We also analyse the relation between these factors and tourism demand. Despite the strong seasonal component and the outliers in the time series of some countries, overnight stays give a better indication of tourism demand in Catalonia than the number of tourists. The degree of linear association between the macroeconomic variables and tourism demand is also higher when using quarterly rather than monthly data. Finally, there are notable differences between the results obtained for the different countries analysed. These results indicate that the best way to model tourism demand in Catalonia is to specify a quarterly model of overnight stays, differentiating between an aggregate demand model for the total number of tourists and specific models for each of the countries analysed.

Keywords: *tourism demand in Catalonia, external economic factors, expectations, descriptive analysis*

INTRODUCTION

Catalonia is one of the seventeen autonomous communities in Spain. It is located in the north-east of the Iberian Peninsula, and its capital is Barcelona. It has a population of over seven million, which represents 16% of the total population of Spain. Catalonia is a tourist region, as shown by the large number of tourist products and attractions and by the increasing number of visitors each year. Tourism in Catalonia accounts for 12% of GDP and provides employment for around 19% of the working population in the service sector. Over 14 million foreign visitors

come to Catalonia every year, leading to 111 million overnight stays and an estimated tourist expenditure of around 9 billion euros.

Tourism is generated by demand. Therefore, it is important to identify the factors that determine demand (at a tourist level). The study of aggregate tourism demand provides in-depth information about tourist flows. It also helps the making of business decisions and the drawing up of tourist policies.

Although studies have been undertaken for other countries, to date, there have been no analyses of tourism demand in Catalonia. The literature on tourism demand has developed in two areas simultaneously. The first area involves theoretical contributions, which are the basis of tourism demand studies. Such studies focus on defining tourism demand and on analysing its main characteristics. The main contributions to the economics of tourism include papers by Figuerola (1985), Bull (1994), Smith (1995) and De Rus and León (1997).

The second area involves different empirical studies, such as those of Crouch (1994a,b) and Lim (1997). Crouch (1994a,b) carried out a meta-analysis of eighty empirical studies to analyse the variables used to explain tourism demand, and the estimated values of the corresponding elasticity. The work of Witt (1995) is also notable in this area. Lim (1997) extensively reviewed the empirical literature from a more methodological perspective. In addition, pioneering contributions have been made by O'Hagan and Harrison (1984), Uysal and Crompton (1985) and Witt and Martin (1987). Padilla (1988) was the first to draw up indices of income and prices to give an approximation of the relative importance of different foreign countries in the demand for Spanish tourism services.

Other more recent contributions include papers by González and Moral (1995) and Buisán (1997). González and Moral (1995) were the first to use structural time series models in this environment. Buisán (1997) carried out a cointegration analysis. Garín-Muñoz and Amaral (2000), and Ledesma-Rodríguez et al. (2001) used panel data from Spain and Tenerife respectively to estimate a model of tourism demand segmented by nationality.

This brief literature review shows that there is a lack of studies on Catalonia. Thus, the aim of this paper is to detect and analyse the factors that determine tourism demand in Catalonia. In Section 2, we define what we understand by tourism demand and determine how to measure it. External factors that determine tourism demand are identified and a database is compiled. Section 3 contains a descriptive and correlations analysis of both tourism demand in Catalonia and the external factors that

could explain this demand. Finally, the main conclusions are set out in Section 4.Start each new paragraph with indent like this.

TOURISM DEMAND IN CATALONIA

Aggregate analysis of tourism demand emerged in the sixties, from the single equation models devised by Gerakis (1965). Since then, the theoretical specification of these models has not altered. However, the econometric techniques used in empirical applications have changed, becoming increasingly sophisticated. Nevertheless, there are inherent limitations in the analysis of aggregate data. As indicated by Morley (1994), individual decisions are diluted in aggregated information.

Different variables are used to measure tourism demand: expenditure at the destination (which is equivalent to tourism income); the number of visitors, arrivals or overnight stays. As indicated by De Rus and León (1997), the choice of one or other variable largely depends on the availability of data and the aims of the study. Frequently, the dependent variable is transformed into per capita terms and scaled up according to the population of origin, as the size of the market determines the total number of visitors.

Crouch (1994a, b) observed that the number of visitors was the dependent variable in 70% of the studies analysed. This is due to the fact that most cases consisted of specific studies between the destination and the country of origin. The remaining studies used tourism income as the dependent variable, apart from a few that used length of stay.

When using the number of visitors as a proxy of aggregate tourism demand, it is usual to differentiate between resident visitors and non-resident or foreign visitors. The numbers of foreign visitors are measured by movements at the border. However, such a measure is only feasible when analysing tourism demand at state level. In addition, Catalonia receives a notable number of day trippers (i.e. people who come to Catalonia but do not stay the night), either because the region is close to their place or residence or because they are just passing through.

In this study, we used both the number of tourists and the number of overnight stays (first destinations)[1] disaggregated by countries. Data includes the number of tourists arriving from each visitor market from January 1997 to August 2005; and the number of overnight stays, according to visitor country, from January 2001 to July 2005.

It is widely accepted in both theoretical and empirical literature that income and the price of tourism services have a major influence on tourism demand. Income acts as a restriction: until a certain level or

threshold has been reached, tourism consumption cannot begin. Over time, the critical level of tourism consumption that is linked to this threshold has decreased. Nevertheless, this process is asymmetrical: once tourism consumption has been consolidated, it becomes difficult to give it up. The consumer begins to consume other products, changing the destination if necessary. Thus, Figuerola (1992) indicated that income has a greater influence on the budget allocated to tourism consumption than on the decision to embark on a trip, as individuals adapt their activities, in terms of time, expenditure, destination, etc. but still continue to travel.

Although income and prices are the economic variables that are most commonly used to explain tourism demand, there are other variables:

✓ National income of the country of origin approximated using the gross domestic product (GDP) per capita.

✓ Prices in the destination approximated using the consumer price index (CPI) or a ratio between the CPI of the destination and that of the visitor markets. In addition, the purchasing power parity (PPP) is used to estimate relative prices.

✓ The price of substitute and/or complementary destinations, defined as an index that is the weighted average of prices in the other destinations that compete for the same market.

✓ Origin-destination cost of transport. Rus and León (1997) propose constructing an index of the cost of transport in tourist destinations for each mode of transport. Other studies that include this variable use the price of fuel as a proxy for the cost of transport (Buisán, 1997; Ledesma-Rodríguez et al, 2001).

✓ Origin-destination exchange rate. This variable could have an effect on tourism demand that is different to that of price.

✓ Promotion expenses. If this variable is available, the modelling should take into account the delay effect involved in advertising expenditure.

✓ Fashion and preferences, which are approximated by temporary trends. The effects of other variables that were omitted in the specification of the model can also be included here.

✓ Accumulated investment. This uses the series of investment in infrastructures in general (transport, communications, etc.).

✓ Origin-destination distance. Different kinds of distance can be used: physical (kilometres); economic (cost of the trip); temporal (length of the trip) and psychological or cultural. Thus, this variable can be interpreted, to a certain extent, as a proxy for the cost of the trip.

✓ Extraordinary events that have international repercussions. Dummy variables are normally used to include these events in the specification of models.

✓ Delayed dependent variable. This variable includes the limitations in the capacity of the tourism industry to meet increases in demand; the persistence of consumption habits (Witt and Martin, 1987): and the tourist capacity of a destination (Buisán, 1995; Garín-Muñoz and Amaral, 2000; Ledesma-Rodríguez et al., 2001).

This list is not exhaustive or closed. It simply aims to illustrate the main factors that determine tourism demand, as presented in the literature. The objective of this study is to analyse which of these factors are available for the visitor markets included in this analysis, and which factors are relevant to tourism demand in Catalonia. Thus, a database can be built using the homogeneous data that is available for the main visitor countries. This database enables us to analyse the characteristics of the selected dependent variables and their relation with tourism demand in Catalonia.

Table 1. Distribution of the frequency of tourists and overnight stays (expressed in thousands)

Year 2004	*Tourists*	*%*	*% cumulated*	*Overnight stays*	*%*	*% cumulated*
France	3566	32.29	32.29	27153	29.15	29.15
United Kingdom	2223	20.13	52.43	18662	20.03	49.18
Belgium and NL	1488	13.48	65.90	15388	16.52	65.70
Germany	1393	12.62	78.52	14959	16.06	81.75
Italy	986	8.93	87.45	7210	7.74	89.49
Switzerland	596	5.40	92.85	3158	3.39	92.88
US and Japan	330	2.99	95.83	2822	3.03	95.91
Russia	326	2.95	98.79	2465	2.65	98.56
Northern countries	134	1.21	100	1342	1.44	100

Source: Compiled by the author, using data from *Turisme de Catalunya* and the Statistical Institute of Catalonia (IDESCAT), as well as Frontur data from the Institute of Tourism Studies (IET).

An analysis of tourism demand in Catalonia for the year 2004 (first destinations), both in terms of the number of tourists and the number of overnight stays, shows that over three quarters of the visitors (87.45% in

the case of the number of tourists and 89.49% in the number of overnight stays in Catalonia) come from France; the United Kingdom; Belgium and the Netherlands; Germany; and Italy, in this order (see Table 1). Thus, this paper focuses on macroeconomic information from these five visitor markets[2.]

EMPIRICAL ANALYSIS

In this section we analysed the development of tourism demand, both in terms of the number of tourists arriving in Catalonia and the number of overnight stays in the Catalan region. First, a descriptive study of the different variables that determine tourism demand in Catalonia was carried out. From the available homogeneous data, 45 exogenous monthly variables and 29 quarterly variables were included for each one of the five main visitor markets (see Tables 6 and 8). In addition, an analysis of correlations was carried out. This enabled us to study the degree of linear association between different variables and tourism demand in Catalonia for each visitor country[3].

This methodology enabled us to detect and analyse the characteristics of the factors determining tourism demand in Catalonia. Thus, we could fill the existing gap in studies on tourism demand in this region, and verify the hypotheses that are often taken as valid with no empirical evidence.

Descriptive statistical analysis of tourism demand in Catalonia

This subsection contains a descriptive statistical analysis of the tourists arriving in Catalonia and the number of overnight stays, according to the country of origin (Tables 2 to 5). This analysis is limited to the main five visitor markets. The results of the descriptive statistical analysis are presented both for the original monthly series and for the quarterly series[4]. The year-on-year rate of the series, adjusted for seasonality, was used for both the number of tourists and the overnight stays[5].

The following summary measures were obtained: the arithmetic mean ($\bar{x}$), the median (Me), the first (Q_1) and third quartile s (Q_3) as measurements of position, and the minimum ($Min.$), maximum ($Max.$), the range ($R = Max - Min.$), the standard deviation (σ) and the variation coefficient (CV) as dispersion measures.

18

Table 2. Descriptive analysis of numbers of tourists
(1:1998-7:2005)

	$\bar{x}$	Me	Q_1	Q_3	$Min.$	$Max.$	R	σ	VC
Total	10.11	9.59	5.09	15.54	-12.61	28.05	40.67	8.01	79.18
France	14.86	12.08	-1.92	26.25	-32.55	87.74	120.29	22.94	154.33
UK	15.36	14.17	4.67	23.10	-16.73	76.62	93.35	15.40	100.29
Belgium	9.47	8.02	2.56	15.35	-48.86	87.58	136.44	15.78	166.53
NL	22.29	17.15	-6.99	40.04	-66.99	186.39	253.38	48.43	217.26
Germany	5.49	4.45	-2.44	12.10	-42.06	99.03	141.09	15.61	284.41
Italy	13.46	7.76	-0.58	20.66	-48.53	159.74	208.27	27.14	201.67

Source: Compiled by the author.

Table 3. Descriptive analysis of numbers of tourists
(I:1998-II:2005)

	$\bar{x}$	Me	Q_1	Q_3	$Min.$	$Max.$	R	σ	VC
Total	9.94	9.91	6.89	13.40	-2.58	21.00	23.58	5.87	59.05
France	13.73	12.71	0.39	25.58	-12.97	45.56	58.53	16.23	118.19
UK	15.06	12.35	8.71	19.69	-3.31	43.35	46.66	10.85	72.02
Belgium	8.76	7.81	2.56	16.10	-9.85	29.87	39.72	9.48	108.21
NL	20.57	19.60	-2.04	39.70	-61.66	167.26	228.92	43.81	213.01
Germany	5.15	4.87	0.55	10.94	-23.22	38.34	61.56	12.26	238.19
Italy	12.33	5.97	1.38	21.82	-17.79	71.03	88.82	18.74	152.02

Source: Compiled by the author.

Table 4. Descriptive analysis of overnight stays (1:2002-8:2005)

	$\bar{x}$	Me	Q_1	Q_3	$Min.$	$Max.$	R	σ	VC
Total	10.13	10.12	-0.54	19.23	-15.75	60.50	76.24	14.90	147.11
France	14.11	9.66	-1.35	27.06	-39.52	93.52	133.04	24.08	170.66
UK	18.16	13.33	-0.34	24.76	-51.16	214.26	265.42	37.03	203.88
Belgium	4.63	5.59	-9.16	9.58	-27.54	76.76	104.30	20.60	445.07
NL	10.89	10.30	-10.74	31.55	-30.17	59.56	89.72	25.05	229.90
Germany	6.13	4.37	-3.31	15.84	-28.98	61.20	90.18	16.99	277.17
Italy	19.60	8.93	-6.65	30.58	-34.08	161.92	196.00	43.51	221.99

Source: Compiled by the author.

Table 5. Descriptive analysis of overnight stays (I:2002-II:2005)

	$\bar{x}$	Me	Q_1	Q_3	$Min.$	$Max.$	R	σ	VC
Total	9.71	10.71	-0.65	17.23	-6.37	35.41	41.78	11.72	120.77
France	12.81	11.10	-2.88	23.16	-11.00	54.22	65.22	19.41	151.47
UK	17.66	12.97	3.11	25.22	-27.67	99.83	127.51	29.39	166.44
Belgium	4.23	-0.68	-6.10	9.81	-20.36	48.90	69.26	17.64	416.72
NL	8.57	7.06	-0.72	17.94	-18.39	37.26	55.65	14.58	170.22
Germany	5.97	6.47	-6.98	18.02	-13.96	25.31	39.27	14.40	241.38
Italy	17.03	8.29	-2.38	46.10	-20.70	61.47	82.17	28.09	164.99

Source: Compiled by the author.

The difference between the arithmetic mean and the median in countries like Italy—for the rate of variation in both the number of tourists and the number of overnight stays—shows that there was strong asymmetry in the distribution of variation rates, in this case towards the lower values of the distribution. These results could be due to outliers[6].

We found less relative dispersion for the monthly data than for the quarterly data. However, the high degree of dispersion in the series of some countries affected the strength of the linear relation between the exogenous variables (external economic factors) and the endogenous variables (rates of tourists and overnight stays). Therefore, an intervention analysis could be carried out on the outliers in the monthly series of tourists and overnight stays in Catalonia.

External macroeconomic factors that determine tourism demand in Catalonia

The homogeneous information available for the main visitor countries and the main macroeconomic factors that determine tourism demand in Catalonia (see Tables 6 and 8) were used to analyse the degree of linear association between the selected dependent variables and tourism demand in Catalonia, by means of a correlations analysis. Tables 7 and 9 show the correlation coefficients for the relationship between each one of the selected exogenous variables and the corresponding endogenous variable (tourists or overnight stays) for each country. Significant correlation coefficients at 5% are indicated in bold.

Table 6. Coding of variables (monthly data)[7]

Code	Variable	Type
1	Crude oil domestic first purchase price	$/barrel
2	Harmonized consumer price index (HICP) for all products	T(1,12)
3	HICP – Transport	T(1,12)
4	HICP - Hotels, cafes and restaurants	T(1,12)
5	Harmonised unemployment (thousands of people)	T(1,12)
6	Harmonised unemployment (rate %)	%
7	Industrial Confidence Indicator	Balance
8	Service Confidence Indicator	Balance
9	Consumer Confidence Indicator	Balance
10	Confidence Indicator for the retail trade sector	Balance
11	Construction Confidence Indicator	Balance
12	Economic Sentiment Indicator	Balance
13	Production trends in recent past *(industry)*	Balance
14	Order books *(industry)*	Balance
15	Export order books *(industry)*	Balance
16	Stocks of finished products *(industry)*	Balance
17	Production expectations for the months ahead *(industry)*	Balance
18	Selling price expectations for the months ahead *(industry)*	Balance
19	Employment expectations for the months ahead *(industry)*	Balance
20	Financial situation of household compared with 12 months ago *(consumer)*	Balance
21	Financial position of household over the next 12 months *(consumer)*	Balance
22	General economic situation over the last 12 months *(consumer))*	Balance
23	General economic situation over the next 12 months *(consumer))*	Balance
24	Cost of living compared with 12 months ago *(consumer)*	Balance
25	Price expectations for the next 12 months *(consumer)*	Balance
26	Unemployment expectations for the next 12 months *(consumer)*	Balance
27	Major purchases at the present time *(consumer)*	Balance
28	Major purchases for the next 12 months *(consumer)*	Balance
29	Savings at the present time *(consumer)*	Balance
30	Savings for the next 12 months *(consumer)*	Balance
31	Present financial situation of household *(consumer)*	Balance
32	Assessment of business climate *(services)*	Balance
33	Evolution of demand in recent months *(services)*	Balance
34	Evolution of demand expected in the months ahead *(services)*	Balance
35	Evolution of employment in recent months *(services)*	Balance
36	Evolution of employment expected in the months ahead *(services)*	Balance
37	Present business (sales) position *(retail trade)*	Balance
38	Present stock *(retail trade)*	Balance
39	Expected orders placed with suppliers during the next 3 months *(retail trade)*	Balance
40	Business trend over the next 6 months *(retail trade)*	Balance
41	Employment expectations over the next 3 months *(retail trade)*	Balance
42	Development of activity compared with the preceding month *(construction)*	Balance
43	Evaluation of order books or production schedules *(construction)*	Balance
44	Employment expectations over the next 3 or 4 months *(construction)*	Balance
45	Price expectations over the next 3 or 4 months *(construction)*	Balance

Source: Compiled by the author.

Table 7. Analysis of correlations for monthly variables

Code	France		UK		Belgium		NL		Germany		Italy	
	tourists	stays	tourists	stays	tourists	stays	tourists	stays	tourists	stays	tourists	stays
1	**-0.35**	-0.01	-0.01	-0.14	-0.19	-0.04	0.02	0.05	-0.19	**-0.41**	0.10	-0.04
2	-0.15	-0.13	0.09	-0.21	-0.16	-0.22	0.18	0.21	-0.22	-0.12	**-0.30**	-0.15
3	**-0.34**	-0.12	0.17	0.07	-0.06	-0.29	-0.08	0.04	-0.12	-0.24	-0.05	-0.22
4	**0.31**	**0.46**	**-0.28**	**-0.31**	-0.21	-0.14	**0.30**	0.32	0.18	0.28	**-0.30**	-0.08
5	0.08	-0.22	-0.02	**-0.41**	-0.13	**-0.51**	-0.16	-0.28	0.02	**0.47**	-0.02	-0.22
6	-0.15	**-0.49**	0.07	-0.15	0.12	-0.14	-0.02	-0.12	0.13	-0.30	-0.04	0.00
7	**-0.28**	-0.22	0.12	0.13	0.07	0.27	0.18	0.28	-0.22	-0.15	-0.20	0.09
8	-0.16	0.06	0.04	0.20	0.21	0.23	0.06	0.26	-0.16	-0.06	0.12	0.21
9	-0.02	**0.41**	0.10	-0.06	0.00	0.24	0.12	**0.43**	-0.09	**0.33**	**-0.27**	-0.01
10	**-0.42**	-0.25	0.07	**0.35**	-0.04	-0.06	0.12	**0.31**	**-0.28**	-0.22	-0.16	-0.25
11	-0.04	**0.58**	0.07	**0.36**	0.15	0.04	0.18	**0.38**	0.09	0.11	-0.20	-0.26
12	-0.21	0.05	0.11	0.21	0.12	0.27	0.16	**0.44**	-0.17	-0.02	-0.14	0.10
13	**-0.26**	-0.07	0.10	0.17	0.00	0.27	**0.23**	-0.23	-0.08	-0.04	-0.22	0.01
14	-0.21	0.05	0.01	0.02	0.07	0.12	0.20	0.21	**-0.28**	**-0.34**	-0.18	0.08
15	**-0.30**	-0.21	-0.10	-0.06	0.06	0.21	0.20	0.22	**-0.28**	**-0.31**	-0.11	0.09
16	**0.42**	**0.50**	-0.09	-0.20	0.02	-0.26	-0.11	**-0.31**	0.18	0.13	0.09	-0.09
17	**-0.24**	-0.12	0.21	0.20	0.11	**0.40**	0.14	0.24	-0.10	0.13	-0.21	0.05
18	**-0.25**	0.06	0.22	-0.05	-0.07	0.14	0.12	0.10	-0.16	-0.18	-0.14	0.18
19	0.02	**0.52**	0.05	0.14	0.05	0.26	0.13	0.06	**-0.24**	-0.25	**-0.26**	0.03
20	0.23	**0.34**	**-0.24**	**-0.35**	0.03	0.18	0.16	0.30	-0.17	-0.18	-0.20	-0.04
21	0.16	**0.46**	-0.23	**-0.33**	-0.06	**0.38**	0.15	**0.33**	-0.04	0.09	-0.16	-0.01
22	0.18	**0.63**	0.03	-0.20	0.05	0.19	0.12	0.37	-0.12	-0.03	-0.15	0.03
23	0.04	**0.48**	0.12	-0.07	-0.07	**0.45**	0.12	0.29	-0.06	**0.34**	-0.14	0.09
24	-0.04	-0.24	0.08	**0.31**	-0.21	-0.04	**-0.27**	-0.15	0.06	**0.35**	-0.11	-0.05
25	-0.02	-0.19	**-0.26**	-0.03	0.08	0.10	**0.22**	0.26	-0.14	0.28	-0.21	-0.14
26	0.07	**-0.35**	-0.01	0.24	-0.01	-0.08	-0.12	**-0.42**	0.10	**-0.34**	0.18	-0.16
27	0.04	0.28	**-0.30**	-0.12	0.01	0.07	0.09	**0.40**	-0.09	-0.24	-0.05	0.10
28	0.12	-0.02	-0.22	-0.13	-0.11	0.27	0.17	0.28	-0.09	-0.09	0.17	0.03
29	0.18	-0.01	-0.06	-0.02	-0.05	**-0.34**	0.09	-0.05	0.13	0.31	**-0.28**	-0.29
30	0.00	0.14	0.12	0.15	0.15	-0.17	0.06	0.05	-0.13	0.24	**-0.38**	-0.20
31	**-0.26**	-0.12	0.04	**-0.39**	**-0.27**	0.06	0.14	0.10	-0.05	**-0.31**	0.19	0.07
32	-0.14	0.11	-0.04	0.09	**0.24**	0.18	0.16	0.30	-0.19	-0.03	0.03	0.23
33	-0.20	-0.14	0.04	0.18	**0.25**	0.19	-0.22	-0.24	-0.06	-0.13	0.12	0.01
34	-0.09	0.22	0.11	0.27	0.06	0.19	0.18	**0.32**	-0.18	0.05	0.13	0.10
35	-0.01	0.07	-0.06	0.04	0.23	0.02	0.05	0.26	-0.08	-0.07	0.09	0.27
36	0.04	**0.38**	0.03	0.06	0.18	0.18	0.10	**0.33**	**-0.32**	-0.09	-0.07	0.06
37	-0.02	-0.01	0.06	**0.35**	0.01	-0.14	0.11	0.25	-0.21	-0.25	-0.20	-0.10
38	0.04	-0.15	0.08	-0.13	0.10	0.28	-0.04	-0.16	0.17	0.24	0.06	**0.45**
39	-0.11	0.07	0.04	**0.39**	-0.08	0.10	0.18	**0.40**	**-0.33**	-0.10	0.05	-0.02
40	**-0.50**	**-0.37**	0.13	**0.34**	-0.05	0.23	0.16	**0.43**	**-0.32**	-0.04	-0.03	-0.14
41	0.04	0.29	**-0.24**	-0.12	0.09	0.04	0.14	**0.40**	-0.14	-0.10	-0.17	-0.10
42	-0.11	0.22	**0.26**	**0.38**	0.19	0.18	0.20	0.17	0.02	0.05	-0.20	-0.18
43	0.01	**0.68**	0.08	0.29	0.15	0.03	0.16	**0.38**	0.11	0.14	-0.23	**-0.32**
44	-0.12	**0.38**	0.05	**0.37**	0.14	0.04	0.18	**0.36**	0.08	0.07	-0.14	-0.06
45	-0.04	0.28	0.09	0.22	0.11	0.10	0.19	**0.43**	0.03	**0.34**	-0.20	0.03

Source: Compiled by the author.

Table 8. Coding of variables (quarterly data)[8]

Code	Variable	Type
1	Gross domestic product at market prices	T(1,4)
2	Final consumption expenditure	T(1,4)
3	Final consumption expenditure: households	T(1,4)
4	Gross fixed capital formation – total	T(1,4)
5	Changes in inventories	
6	Net national income	T(1,4)
7	Net disposable income	T(1,4)
8	Net saving	T(1,4)
9	Final consumption expenditure	T(1,4)
10	Gross capital formation	T(1,4)
11	Gross domestic product at market prices	T(1,4)
12	Final consumption expenditure	T(1,4)
13	Final consumption expenditure – household and NPISH (Net profit institutions serving households)	T(1,4)
14	Gross capital formation	T(1,4)
15	Exports of goods and services	T(1,4)
16	Imports of goods and services	T(1,4)
17	Labour cost index - Total labour cost (Industry and services excluding public administration)	Index
18	Labour cost index - Wages and salaries (Industry and services excluding public administration)	Index
19	Production capacity *(industry)*	Balance
20	Duration of assured production in months *(industry)*	Months
21	New orders in recent past *(industry)*	Balance
22	Export expectations for the months ahead *(industry)*	Balance
23	Capacity utilization *(industry)*	%
24	Competitive position in recent past on the domestic market *(industry)*	Balance
25	Competitive position in recent past on the foreign market inside the EU *(industry)*	Balance
26	Competitive position in recent past outside the EU *(industry)*	Balance
27	Likelihood of buying a car within the next two years *(consumer)*	Balance
28	Plans to purchase or build a home within the next two years *(consumer)*	Balance
29	Likelihood of spending any large sum of money on home improvements *(consumer)*	Balance

Source: Compiled by the author.

Table 9. Analysis of correlations for quarterly variables

Code	France		UK		Belgium			NL		Germany		Italy	
	tourists	stays	tourists	stays	tourists	stays		tourists	stays	tourists	stays	tourists	stays
1	-0.18	0.03	0.09	**0.78**	0.39	0.17		0.17	0.16	-0.07	0.21	-0.07	0.34
2	0.10	0.39	0.05	0.46	0.29	0.10	-	0.09	0.38	-0.07	-0.29	-0.31	-0.06
3	0.04	0.46	0.06	0.27	0.23	0.01		0.00	**0.54**	-0.12	**-0.56**	-0.21	-0.05
4	**-0.42**	**-0.66**	-0.37	-0.17	0.17	-0.19		0.23	0.05	-0.08	-0.38	0.04	0.17
5	0.05	-0.29	-0.03	0.24	**0.52**	0.29		-	-	0.05	-0.02	0.05	-0.23
6	-0.33	-0.31	-0.25	-0.05	0.25	0.12		-	-	0.38	0.24	0.03	0.48
7	-0.30	-0.26	-0.24	-0.04	0.24	0.06		-	-	0.35	0.21	0.10	0.52
8	-0.24	-0.42	**-0.46**	-0.26	**0.47**	0.14		-	-	0.31	0.32	0.49	0.25
9	-0.08	0.42	-0.14	0.02	-0.05	0.05		0.01	0.39	-0.07	-0.40	-0.33	0.22
10	**-0.52**	-0.25	-0.15	0.14	0.36	-0.17		0.16	-0.15	-0.09	-0.27	0.02	-0.20
11	0.09	**0.61**	0.09	-0.40	**-0.50**	0.20		0.00	0.28	0.18	0.28	-0.02	0.38
12	-0.24	0.46	0.01	-0.40	**-0.46**	-0.06		0.05	0.36	-0.23	-0.20	-0.22	0.40
13	-0.31	-0.11	0.08	0.13	-0.31	0.03		0.06	0.19	-0.39	-0.02	-0.38	0.08
14	-0.14	0.23	0.32	0.04	0.23	-0.19		0.13	**0.60**	-0.45	-0.46	-0.10	-0.13
15	**-0.49**	-0.11	-0.11	**-0.54**	-0.05	-0.20		0.04	-0.18	-0.27	-0.41	-0.01	0.00
16	**-0.52**	-0.23	-0.09	-0.31	-0.01	-0.26		0.09	-0.11	-0.36	**-0.54**	-0.12	-0.07
17	-0.19	-0.23	0.13	**0.75**	-0.29	-0.79		0.09	-0.19	-0.08	-0.16	0.02	0.16
18	-0.17	-0.23	-	-	-0.35	-0.68		0.09	-0.18	-0.06	-0.16	0.01	0.16
19	0.21	-0.22	0.07	0.12	-0.15	-0.11	-	0.16	-0.25	0.19	0.17	0.12	-0.32
20	0.09	0.07	0.15	-0.01	0.05	-0.11		0.23	0.03	-0.48	0.48	-0.31	-0.18
21	-0.36	-0.05	-0.07	0.36	0.20	0.39		0.30	0.27	0.02	0.09	0.10	0.13
22	**-0.49**	-0.35	0.27	0.10	0.24	0.44		0.24	0.50	-0.02	-0.10	-0.10	-0.05
23	0.08	0.43	-0.30	-0.34	0.10	0.04		0.24	**0.70**	-0.15	0.01	-0.32	0.06
24	-0.01	0.47	0.05	0.10	-0.03	0.06		0.45	0.45	-0.31	-0.29	-0.15	0.41
25	-0.04	0.01	0.12	0.19	-0.03	0.06		0.28	0.38	-0.19	0.04	-0.43	-0.26
26	-0.02	0.46	**-0.37**	-0.11	-0.15	-0.35		0.13	0.42	-0.18	0.01	-0.44	-0.29
27	0.28	0.40	-0.17	-0.28	-0.08	-0.38		0.17	**0.75**	0.13	0.27	-0.31	0.00
28	**-0.49**	-0.43	-0.17	0.05	0.24	-0.36		0.11	0.55	-0.16	0.22	-0.14	0.14
29	-0.27	0.08	0.06	0.26	-0.28	-0.27		0.21	0.47	0.00	-0.16	-0.31	-0.08

Source: Compiled by the author.

As expected, the sign of the correlations between the overnight stays and the corresponding exogenous variables usually coincides with that of the correlations obtained using the number of tourists. When the signs do not coincide there usually is a weak linear association. Tables 7 and 9 show how the correlations between overnight stays and the corresponding exogenous variables are higher than those obtained using the variation rate for the number of tourists. In addition, the correlations obtained using quarterly data are higher overall than those obtained with the monthly data. These results indicate that quarterly data on overnight stays should be used as a proxy of tourism demand when specifying and estimating a model of aggregate tourism demand for Catalonia.

CONCLUSIONS

The aim of this study was to detect the external macroeconomic factors that determine tourism demand in Catalonia and analyse their relationship, given that there is a lack of applied studies on Catalonia in the literature. The study focuses on first destinations and uses the number of tourists and overnight stays as proxies of tourism demand in Catalonia. However, from a conceptual perspective and from the results of the empirical analysis, the variable of overnight stays was shown to be more appropriate for approximating tourism demand in Catalonia.

First we collected the available homogenous statistical information for the main five visitor markets in order to carry out an analysis of correlations between the group of factors that explain tourism demand in Catalonia and the year-on-year variation rates in the seasonally adjusted series of tourists and overnight stays. We found that final consumption expenditure and expected activity in the retail sector have a notable effect on aggregate demand. However, we can state that tourism demand in Catalonia varies according to the visitor market. Therefore, it is important to differentiate between an aggregate model of demand for the total number of tourists, and specific models for each one of the countries analysed.

The overnight stays of foreign tourists in Catalonia mainly had a higher degree of linear association with the macroeconomic factors. Therefore, we confirmed that the variable overnight stays gives a better approximation of tourism demand in Catalonia than the number of tourists arriving from the visitor markets.

To model tourism demand, we also suggest including dichotomous variables or dummies, as they enable us to incorporate events that have historical series with an insufficient number of observations. This is the case of series related to the influence of low cost airlines on tourism demand in Catalonia; the effect of major events; trade fairs, etc.

In accordance with Buisán (1997), we consider that variations in demand should be studied by means of a function that includes all of the factors that have an effect on demand. Such factors are not only economic. Although data are not always available for many of these factors, particularly at regional level, deeper knowledge of tourism demand could help to detect and act effectively on the different requirements for improving existing offerings and adapting them to the demands of current and potential clients who are increasing well-informed and demanding.

REFERENCES

Anderson, O. (1952). The business test of the IFO-Institute for economic research, Munich, and its theoretical model, *Revue de l'Institut International de Statistique*, Vol. 20, pp.1-17.

Buisán, A. (1997). Exportaciones de turismo y competitividad, *Revista de Economía Aplicada*, Vol. 5, pp.65-81.

Bull, A. (1994). La economía del sector turístico. Madrid, Alianza Editorial.

Claveria, O., Pons, E. and Suriñach, J. (2006). Quantification of expectations. Are they useful for forecasting inflation? *Economic Issues*, Vol. 11, pp.19-38.

Claveria, O., Pons, E. & Ramos, R. (2007). Business and consumer expectations and macroeconomic forecasts. *International Journal of Forecasting*, Vol. 23, pp.47-69.

Crouch, G.I. (1994b). The Study of International Tourism Demand: A Review of Findings. *Journal of Travel Research*, Vol. 33, pp.12-23.

De Rus, G. and León, C. (1997). Economía del turismo. Un panorama. *Revista de Economía Aplicada*, Vol. 5, pp.71-109.

Figuerola, M. (1992). *Teoría económica del turismo.* Madrid, Alianza Editorial.

Figuerola, M. (1996). Experiencias cuantitativas en el análisis económico del turismo. *Estudios Turísticos*, Vol. 129, pp.37-58.

Garín-Muñoz, T. & Amaral, T.P. (2000). An econometric model for international tourism flows to Spain. *Applied Economics Letters*, Vol. 7, pp.525-29.

Gerakis, A.S. (1965). Effects of exchange-rate devaluations and revaluations on receipts from tourism. *International Monetary Fund Staff Papers*, Vol. 12, pp.365-84.

González P. and Moral, P. (1995). An analysis of the international tourism demand in Spain. *International Journal of Forecasting*, Vol. 11, pp.233-251.

Ledesma-Rodríguez, F.J., Navarro-Ibáñez, M. & Pérez-Rodríguez, J.V. (2001). Panel data and tourism: a case study of Tenerife. *Tourism Economics*, Vol. 7, pp.75-88.

Lim, C. (1997). Review of international tourism demand models. *Annals of Tourism Research*, Vol. 24, pp.835-849.

Morley, C.L. (1994). Experimental destination choice analysis. *Annals of Tourism Research*, Vol. 21, pp.315-328.

O'Hagan, J.W. & Harrison, M.J. (1984). Market shares of US tourist expenditure in Europe: an econometric analysis. *Applied Economics*, Vol. 16, pp.919-931.

Padilla, R. (1988). La demanda de servicios turísticos en España. *Investigaciones Económicas*, Vol. 12, pp.133-157.

Smith, S. (1995). *Tourism Analysis*. London, Longman.

Uysal M. & Crompton J.L. (1985). An overview of approaches used to forecast tourism demand. *Journal of Travel Research*, Vol. 23, pp.7-15.

Witt. S.F. & Martin, C.A. (1987). Econometric models for forecasting international tourism demand. *Journal of Travel Research*, Vol. 25, pp.23-30.

Witt, S.F. & Witt, C.A. (1995). Forecasting tourism demand: A review of empirical research. *International Journal of Forecasting*, Vol. 11, pp.447-475.

ENDNOTES

1. Source: Institute of Tourism Studies (IET).
2. Belgium and the Netherlands are treated as one visitor market.
3. We estimated a regression model for each of the countries included in the study, obtaining very poor results except for Germany. Models were specified for quarterly overnight stays using the significant correlated economic factors as dependent variables.
4. Monthly data was converted to quarterly data, as many of the economic variables are only available for quarterly periods.
5. The strong seasonal component observed in the graphic analysis indicated that it was essential to seasonally adjust the series. Overall, the series of tourists and overnight stays by country had different evolutions for France, the United Kingdom and the other visitor countries. The evolution of the series for countries such as France, Germany and Belgium was similar to that of the total number of tourists and overnight stays in Catalonia. In contrast, the evolution of series for countries such as the United Kingdom, Ireland and the Netherlands was different to the total, and showed a high degree of variability. Despite the different evolutions observed between the countries, there was a strong seasonal component in the series for all of the visitor markets. This marked behaviour led us to work with seasonally adjusted series. The series were deseasonalised by means of the Tramo-Seats programme. Adjusted series could then be used to obtain the corresponding year-on-year variation rates.
6. Outliers were observed for some countries Particularly in Germany, Ireland, Italy, the Netherlands and the Nordic Countries in terms of the number of tourists arriving in Catalonia; and Ireland and the United Kingdom, in terms of the overnight stays in Catalonia and notably increased the variability of the series.
7. All of the variables, except 1, 2 3 and 4, were seasonally adjusted from their source of origin. The variables 1 to 4 were not deseasonalised, either because they had no seasonal components or because seasonality was corrected when the year-on-year variation rate was applied. The variables 2 to 4 are indices (1996=100). The variable balance was taken as the percentage of surveyed individuals who expected an increase in the variable minus the percentage of surveyed individuals who expected a decrease. As shown by Anderson (1952), the balance is comparable to a variation rate. See Claveria et al. (2006) for a description of a conversion method of balances into a quantitative measure of agents' expectations and Claveria et al. (2007).for their usefulness with forecasting purposes. The quantitative information comes from the Department of Energy of the US and the European Central

Bank and the balances from the harmonised opinion polls published by the European Commission, including the following: industrial survey; consumer survey; services survey; retail trade survey and construction survey.

8. All of the variables except 17 and 18 have been seasonally adjusted. The variables 1 to 1 were measured in millions of € from 1.1.1999 (ECUs until 31.12.1998). The variables 11 to 16 are indices (1995=100), based on national currency. The variables 17 and 18 are indices (2000=100). The variables 1 to 5 were measured in constant prices of 1995. The quantitative information comes from the European Central Bank and the balances from the harmonised opinion polls published by the European Commission, including the industrial survey and the consumer survey.

Oscar Claveria (oclaveria@ub.edu) is a research fellow at the Research Institute of Applied Economics (IREA) and assistant professor in the Department of Econometrics at the University of Barcelona. Diagonal, 690. E-08034 Barcelona (Spain).

Jordi Datzira (jordi.datzira@ddservices.eu) is a external lecturer at several universities in Europe and a senior consultant and director of Datzira Development Services (DDS). Princesa, 31, 3er. E-08003 Barcelona (Spain).