Tourism Taxes: Implications for Tourism Demand in the UK*

Ramesh Durbarry

Abstract
Before one can understand tax implications for the tourism industry, one must understand the sensitivity of tourism demand. Using a recently developed theoretical framework, we model inbound tourism demand in the UK. The results suggest that tourism demand in the UK is very price sensitive and that measures which result in increasing tourism prices will have a significant negative impact on tourist arrivals. It is believed that a reduction in the VAT rate could boost UK’s tourism sector, depending on the extent to which a decrease in taxation is passed on in the form of price reductions. The results also suggest that arrivals from neighboring countries are 98% higher than from distant origins; however, expenditure per capita of the former is 52% lower than the latter. We also found that common language between the origin and the destination increases arrivals 7% more than non-native English-speaking origins.

1. Introduction
Tourism is one of the most flourishing sectors in the world; worldwide international tourism receipts have grown by 12% over the last ten years. Many countries are setting targets in attempts to gain the additional income, foreign currency, employment, and tax revenue that the sector can provide. However, the success of any given country in attracting tourists depends upon its ability to remain competitive. Competitiveness depends on a range of variables, for example hotel prices, exchange rates, transportation costs, which, in turn, are affected by movements in oil prices. It is argued, in particular, that effective prices that tourists pay, relative to those in competing destinations (Dwyer et al., 2000) is a significant and important factor influencing tourism demand. Effective prices are determined by destinations’ own prices, prices in competing destinations, and exchange rate movements. However, government policies can have a significant impact on the effective price. A notable example of such policies is the imposition of taxation on tourism which, *ceteris paribus*, tends to raise prices in the destination relative to its competitors.

Tourism taxes have both advantages and disadvantages. On the one hand, tourism is a relatively easy target for governments that need to raise additional revenue, some of which may be used to provide the infrastructure and other facilities on which tourism depends. Increased revenue can be raised both by raising the rate of taxation and by increasing the number of taxes that are levied on tourism, as has occurred in recent years (World Tourism Organisation, 1998). On the other hand, taxes may have distortionary effects upon the economy and may even result in a lower level of revenue. The latter depends upon the extent to which the taxes are passed on in the form of higher prices and on the price elasticity of demand for tourism in the destination under consideration—see Bird (1992) for more details.

* Durbarry: University of Technology, Mauritius School of Public Sector Policy and Management, La Tour Koenig, Pointe-aux-Sables, Mauritius. Tel: (230) 234 6535; Fax: (230) 234 6219; E-mail: rameshdurbarry@utm.intnet.mu. The author would like to thank Thea Sinclair and one of the referees for useful suggestions.

© 2008 The Author
Journal compilation © 2008 Blackwell Publishing Ltd, 9600 Garsington Road, Oxford, OX4 2DQ, UK and 350 Main St, Malden, MA, 02148, USA
The main thrust of this paper concerns the estimation of the price elasticity of tourism demand for the United Kingdom, using a newly developed theoretical framework, and its implications for tourism taxation. The case of the UK is particularly apposite as the UK government has been considering the case for changing taxation on tourism, and detailed knowledge of the sensitivity of demand to changes in tourism prices is a necessary underpinning for decision making. Moreover, while cross-country studies providing price and income elasticities of tourism demand are common, the number of single country case studies is limited, so that the study of the UK will fill a gap in both the literature and empirical evidence. On theoretical grounds, many of the studies that have investigated the effect of tourism prices on tourist arrivals or expenditure for particular destinations have used ad hoc specifications, for instance Vogt and Wittayakorn (1998), although tests for stationarity and cointegration were carried out.

To derive the elasticity estimates, we make use of the gravity model which has become the workhorse for estimating trade effects. Although the model and studies employing the model have dealt mostly with trading effects of goods, very few have estimated the trading effects of services. In this context, we use the main concept of the gravity model to explain tourist flows between two countries (trade in tourism) and to highlight the factors influencing the demand for tourism, the latter being useful for policy purposes. The main advantage of employing the gravity model is that it is has a strong theoretical framework. The theoretical framework has been discussed by many authors, for example, Anderson (1979), Bergstrand (1985), Feenstra et al. (2001) and Anderson and van Wincoop (2003, AW hereafter). Since the inclusion of prices is an important feature of the gravity model (Bergstand, 1985; Feenstra, 2002; AW), elasticity estimates can be derived. These will reflect the destination’s sensitivity of tourism demand at the macro level as compared to single country studies where elasticities for an individual country are estimated. Hence, for policy purposes, the gravity model is more appropriate. The main disadvantage with the gravity model is that one cannot ascertain which origin is more sensitive than others, for instance, to focus marketing activities. To the best of our knowledge, this will be the first time that this theoretical approach has been applied to the case of international tourism demand.

The paper is organized as follows. The next section of the paper will provide the context for the debate about taxation and the price competitiveness of tourism by giving an overview of some of the types and rates of taxation that are levied on tourism in a range of developing and developed countries. The changes in tourism demand that have occurred, over time in the UK, along with the tourism taxes that have been levied, are also discussed. In section 3, we explain why the gravity model is more appropriate than single equation and system equation models to estimate tourism elasticities for a destination. The estimated results for the UK will then be presented. The final sections discuss some policy implications and conclude.

2. Changes in Tourism Demand in the UK

Tourism makes a major contribution to the UK economy. It accounts for 5% of national GDP and 7% of employment, employing 1.78 million people in 125,000 businesses in 1999. Tourism was the largest invisible export, and tourism expenditure in the UK was estimated at £61 billion in the same year (BTA, 2000). Tourists mainly come from the USA, Japan, Australia, and the European states. Figure 1 shows the number of tourist arrivals in 1997 and 1998 for 11 countries that are considered in this study. Together these countries account for around 70% of tourists visiting the UK annually.
Changes in pricing policies, such as taxes, charges, and exchange rates, can have significant effects on the tourism sector. Indeed, the UK’s share of international tourism receipts has deteriorated over the years as shown in Figure 2. It was observed that the decline of the UK’s share began in 1980/81, when the rate of VAT applicable to tourism and other services increased from 8% to 15%. The rate was further increased to 17.5% in May 1981. Since then, there has been a gradual decline in share (BTA, 1998). As shown in Table 1, the UK, along with Denmark and Germany, still applies the standard VAT rates on tourism that are among the highest VAT rates in Europe.

Sterling’s external value is a further factor affecting the tourism sector. Exchange rate is yet another variable in consumers’ decisions to choose particular destinations. The consumer knows how much his/her currency is worth in terms of the visiting country’s currency. It was observed for the UK that in 1987 and 1995 when sterling’s external value was low, an increase in the UK’s share of international receipts occurred. During the period 1995–97, it was also noted that the average expenditure per tourist fell from £495 in 1995 to £475 in 1997. The growth of tourist arrivals in UK between 1997 and 1998 was very low (0.9%) compared with other European destinations, for example, France (7.4%), Spain (8.9%), Portugal (9.6%), Italy (4%), and Germany (4%).

Despite the fact that there has been an increase in the number of visitors to the UK in recent years (see Figure 3), some declines also occurred, for example from France, Germany, and Belgium as from 1998. There has been a noticeable decline in tourism expenditure over recent years from all countries except for the USA and Australia (see Figure 4). In fact the decline in tourism expenditure is much more pronounced than the decline in the number of arrivals. This can be traced by the recent fall in tourist average expenditure per visit from countries such as Australia, Germany, and Ireland. On average, tourists from Australia, Japan, and the USA spend around £700 per visit, while their European counterparts spend around £345. Figure 5 shows that real average spending per visit for most countries has declined over the past years. The recent fall in
Figure 2. UK’s Share of International Tourism Receipts


Figure 3. Tourists Arrivals in the UK, 1982–2000

Source: Compiled using data from Travel Trends (1999).
<table>
<thead>
<tr>
<th>Rates in general</th>
<th>Standard VAT rates on goods and services</th>
<th>Accommodation in hotel</th>
<th>Restaurant Services</th>
<th>Bars and Café Services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Restaurant</td>
<td>Alcoholic beverages</td>
<td>Bars and cafés</td>
<td>Night clubs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Belgium</td>
<td>21</td>
<td>6</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Denmark</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Finland</td>
<td>22</td>
<td>8</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>France</td>
<td>20.6</td>
<td>5.5</td>
<td>20.6</td>
<td>20.6</td>
</tr>
<tr>
<td>Germany</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Greece</td>
<td>18</td>
<td>8</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Ireland</td>
<td>21</td>
<td>12.5</td>
<td>12.5</td>
<td>21</td>
</tr>
<tr>
<td>Italy</td>
<td>20</td>
<td>10</td>
<td>10/20 luxe</td>
<td>10</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>15</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Netherlands</td>
<td>17.5</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Norway</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Portugal</td>
<td>17</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Spain</td>
<td>16</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Sweden</td>
<td>25</td>
<td>12</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Switzerland</td>
<td>6.5</td>
<td>3</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>UK</td>
<td>17.5</td>
<td>17.5</td>
<td>17.5</td>
<td>17.5</td>
</tr>
</tbody>
</table>

these figures could be the result of a combination of high VAT rates and the high external value of sterling, to which tourism expenditure and visits appear sensitive.

Although tourism is regarded as an export, it differs from goods exports in the sense that its consumption takes place at the point of production. Taxes, which act as barriers to trade, are perhaps necessary to support and service the tourism industry. Generally, among the taxes in vogue, two categories can be identified: (i) general taxes, for instance import duties, profit and sales tax, and (ii) special taxes mainly on tourist activities such as hotel and restaurant tax, tax on gambling, airport tax, and entry and exit taxes. Table 2 lists some types of taxes that are directly charged to tourists and those that are borne by tourism-related businesses.

In the UK, it is estimated that each day visitors from home and abroad paid some £16 million a day to the Treasury in VAT and excise duties in 1998 (BTA, 2000). Other types of taxes include the Airline Passenger Duty (APD), introduced in the UK in 1994, which is an example of direct tourism charges that exist in the UK. In 1994, the APD was £5 for passengers departing from any UK airport on a domestic flight or a flight elsewhere in the European Union (EU) and £10 on long-haul flights terminating outside the EU. In 1996, the duty was increased by 100%, but it was announced in the Budget for 2000/01 that the duty would be brought back to its original level when introduced in 1994. In particular, on economy flights within the European Economic Area (EEA), the duty was halved from £10 to £5 and the rate for other countries was £20 as from April 2001. Where passengers were not in the lowest class of travel on a flight, the duty was £10 for flights to destinations within the UK and EEA, and £40 for flights to destinations outside the UK or EEA. There are still charges for the issuance

---

![Figure 4. Tourism Expenditure in the UK, 1982–98](image_url)

Source: Compiled using data from Travel Trends (1999).
of a visa, otherwise known as clearance fees, for non-EU nationals (£33 for a single entry visit and £44 for a six-month multiple entry).

It has been argued that successive governments in the UK may have been unaware of how price sensitive the sector is, and that the tourism goose will fly elsewhere when faced with higher VAT and airport taxes (Frewin, 1998). Wanhill (1995) summarizes the findings of the British Tourist Authority VAT Working Group, which found that many operators believe that the markets in which they compete are price sensitive. It is also claimed that high UK VAT rates place tourism businesses at a disadvantage in relation to their European competitors. On the demand side, consumers of tourism services in the UK and from overseas indicated that they regard price as an important variable when choosing a holiday destination and that they perceive the UK as either very expensive or quite expensive as a holiday destination. These findings indicate the

<table>
<thead>
<tr>
<th>Directly charged to tourists</th>
<th>Charged to user businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry/exit taxes, e.g. visa/travel permits</td>
<td>Fuel tax</td>
</tr>
<tr>
<td>Air travel, e.g. air passenger duty</td>
<td>Duties on the import of tourist equipment</td>
</tr>
<tr>
<td>Hotel/accommodation, e.g. bednight tax</td>
<td>Property taxes</td>
</tr>
<tr>
<td>Restaurants, e.g. VAT</td>
<td>Corporation tax</td>
</tr>
<tr>
<td>Consumption tax</td>
<td></td>
</tr>
<tr>
<td>Environmental tax</td>
<td></td>
</tr>
</tbody>
</table>


Figure 5. Real Average Tourism Expenditure in the UK, 1982–98

Source: Compiled using data from ONS and Travel Trends (1999).
importance of knowledge about how tourists respond to changes in prices, taxes, and exchange rates. In this paper we focus on overseas tourists’ visits to the UK. Elasticity estimates for international tourism demand in the UK will be derived and will provide an important measure of the sensitivity of demand to changes in the relative competitiveness of the UK. The reliability of these estimates depends, among other criteria, on the validity of the model and the adequacy of the estimation technique. The next section reviews some of the studies that have been carried out to assess the sensitivity of tourism demand to changes in prices and other variables. The model, specification, and results of our empirical investigation are then discussed.

3. Why Gravity Framework to Explain Tourism Demand?

In the literature, most studies that have attempted to model tourism demand have relied on single equation models. Tourism demand has been measured by a host of variables including the total number of visits, arrivals, or tourists, visit per head of the origin’s population, total real expenditure or receipts, and per capita real expenditure (see Sinclair, 1998 for further details). Most of the studies use time series analysis while some have used pooled and cross-sectional data. The models involve regressing the tourism demand variable on a range of variables that are thought to influence demand, for example, income per capita, exchange rates, tourism prices in the destination, tourism prices in substitute destinations, advertising expenditure, transport costs, and dummy variables for one-off events. Some results have indicated the need for careful pricing in certain areas. It has been found, for instance, that the demand elasticities for accommodation are more price sensitive than previously assumed (see for example Arbel and Ravid, 1983; and Fujii et al., 1985).

Single equation specifications have been subject to some criticisms, such as being somewhat ad hoc and lacking an explicit theoretical basis (Sinclair, 1998; Sinclair and Stabler, 1997). With the exception of Syriopoulos (1995), most of the earlier studies have ignored intertemporal relationships between tourism demand and prices that could have been taken into account by the use of dynamic models. Moreover, few studies have undertaken stationarity tests prior to carrying out regressions (for example, Kim and Song, 1998 and Song et al., 2000).

Recent advances in tourism modeling have used a system of equations model, which provides a rigorous theoretical base. The most common form is Deaton and Muellbauer’s (1980) Almost Ideal Demand System (AIDS), which incorporates both the axioms of consumer choice and the stage budgeting process. The approach is used to explain the allocation of tourism expenditure among different countries (see, for instance, Papatheodorou, 1999, and De Mello et al., 2001). Further developments of the model have involved the incorporation of dynamic adjustment to account for habit persistence, adjustment costs, or imperfect information preventing consumers from adjusting fully to equilibrium in every period (for example, Blanciforti and Green, 1983). Anderson and Blundell (1983, 1984) provide a flexible general dynamic structure for an AIDS model that provides both short-run and long-run estimates. Durbarr and Sinclair (2003) have applied this structure to model French tourism demand to derive long-run elasticity estimates. The limitation of the model rests on the large number of observations required for its application and number of destinations that can be included in the system, which is dependent on the time series data available.

In making use of a system of equations, the AIDS model is especially suitable for explaining a country’s outbound tourism demand in particular destinations. The model gives own- and cross-price elasticities, as well as the income elasticity, for destination
countries competing for tourists from a particular origin. These enable the destination countries to locate their position regarding changes in their own pricing policies and those of competing destinations. While most studies have estimated elasticities by modeling outbound tourism, only a few have estimated inbound tourism demand (for example, Kim and Song, 1998, for South Korea, and Kulendran, 1996, for Australia).

If one wants to employ the AIDS model to obtain elasticity estimates for inbound tourism for a destination (say, the UK), then a series of AIDS models has to be estimated for all the origins and the UK included as a destination in all the models. The elasticities pertaining to the UK obtained from each model need then to be averaged to derive an overall Figure for the elasticity of demand for tourism in the UK. This exercise is no doubt time consuming and will be constrained by data availability. Although single equation models may seem more appropriate than the AIDS model, they are ad hoc in nature without a proper theoretical foundation.

To overcome these limitations, the gravity model has been very successful in explaining trade flows. AW showed that previous studies did not have a theoretical foundation, that estimation suffered from omitted variable bias, and that comparative statics analysis is unfounded. In their paper, they manipulate a constant elasticity of substitution expenditure system to derive “an operational gravity model with an elegantly simple form” (p. 174). The model has several advantages for interpreting and estimating trade flows (see Rose and van Wincoop, 2001). AW pointed out that a properly specified gravity model should include a measure of the relative trade resistance, that is, barriers between two countries and all other trading partners. The price indices which are used to reflect the relative trade resistance is referred to as “multilateral resistance”. In our tourism context, this multilateral resistance variable is represented in the model by two sets of prices, which act as barriers to trade between $i$ and $j$ and between other trading partners. One is the destination’s real effective tourism price (defined below), which takes account of the relative price level and exchange rate between the destination and origin. This variable in a way reflects the trade barrier between destination $i$ and origin $j$. The second is the real effective tourism price of competing destinations (defined below), which reflects trade barriers between destination $i$ and other destinations that tourists from origin $j$ are more likely to consider to travel to.

Bergstrand (1985) also provides a rationale for including price variables in the gravity model and has a direct approach to estimate the model. He developed a “generalized” gravity equation which is a reduced form from a partial equilibrium sub-system of a general equilibrium trade model with nationally differentiated products. From the “generalized” gravity equation, the conventional form can be obtained by assuming perfect substitutability of goods internationally in production and consumption, perfect commodity arbitrage, zero tariffs, and zero transport costs. These assumptions are, indeed, strong and have been criticized by many (for example, Isard, 1977, and Kravis and Lipsey, 1984), so that the generalized gravity equation would appear to be more appropriate.

Using also the underlying principle of including price variables in the gravity model following AW to account for “multilateral resistance”, the gravity model takes the following general form for modeling inbound tourism demand in the UK:

$$X_{UKj} = f(y_{UK}, y_j, P_{UKj}, P_k, d_{ij}, \delta_j),$$

where $X_{UKj}$ is tourist flows from origin country $j$ to the UK, $y_{UK}$ and $y_j$ are real per capita GDP for the UK and $j$, $d_{ij}$ is the distance between the UK and $j$, $P_{UKj}$ is the real effective tourism price in the UK, $P_k$ is the real effective tourism price of competing (substitute)
destinations, and $\delta_i$ is a set of dummy variables to account for trade relations between $i$ and $j$, common currency, language, contiguity, etc.

Gravity models with the theoretical underpinnings described above have yet to be applied in the field of tourism. The theoretical foundation of the model suggested by Bergstrand (1985) and AW can in some way explain international tourism demand for a destination. The basic idea behind traveling for tourism purposes is that places are different and are unique; hence destinations are not perfectly substitutable. Prior to the estimation, the model is specified in the context of tourism and some econometric issues are outlined below.

4. Model Specification, Estimation, and Results

Model Specification

In this section we first explain and define the variables that will be used to estimate the gravity model described in (1) above, the model is then specified in the tourism context for estimation purposes.

As stated above, tourism demand has been defined by a host of variables. For the present study we use tourist arrivals, total (real) expenditure, and real expenditure per capita variables to explain tourism demand. $y_{UK}$ and $y_j$ are the real per capita GDP for the UK and origin country $j$, respectively. Following Rose and van Wincoop (2001), we also make use of the combined per capita GDPs of the countries as a variant for the income variable defined as the log product of real per capita GDP ($\ln \text{comby}_{it}$).

$d_{ij}$ in this context represents the “cost of traveling” from origin $j$ to the UK. This variable is not easily quantifiable as the costs involved could include air fares, taxes, costs of obtaining visa, and other transport costs or traveling time in terms of hours. Most studies using the gravity model make use of the distance between the two countries; however, in our context this may not be reliable as the variable cannot account for changes in the cost of traveling over time. Also, with the emergence of low-cost carriers, such as Ryanair and EasyJet, airfares within the same region have become cheaper than scheduled airlines, and in many instances the fares are independent of the distance between two countries within the same region. To overcome these shortcomings, we make use of two dummy variables. The first dummy variable is used to differentiate between origins which are in Europe (and hence closer to the UK) and those which are non-European (and are hence more distant from the UK). We define this variable as $\text{Europe}$, taking a value of 1 for origins in Europe and zero for origins not in Europe. The second dummy variable is used to account for common language between the origin and the destination. It is believed that countries with the same native-speaking language will generate more tourism activities with each other. We, hence, define this variable as $\text{language}$, taking a value of 1 if the language between the origin and destination is the same and zero if they are not.

Concerning the price variables, because tourism prices are practically non-existent, the consumer price index is commonly used instead (this is a commonly accepted measure in the tourism literature, see the AIDS studies cited above). Hence, we define $\ln p_{UKt}$, the (log) real effective price of tourism in the UK as:

$$
\ln p_{UKt} = \ln \left[ \frac{\text{CPI}_{UKt} \times E_{\text{base}}}{\text{CPI}_{j} \times E_{j}} \right],
$$

where $\text{CPI}_{UK}$ and $\text{CPI}_{j}$ are the consumer price index in the UK and origin $j$, respectively. $E_j$ is the price of $j$’s currency unit in terms of sterling (i.e. £/jth currency unit) and $E_{\text{base}}$.
is the exchange rate of $j$ in the base year. This price variable gives the relative price of tourism and influences the decision of tourists whether to travel to the UK as a destination or to stay at home. It also characterizes the cost of living between the two countries. It is expected that appreciation of the destination’s currency will lead to a fall in demand for tourism. The way the exchange rate is defined implies that an increase in the exchange rate is equivalent to a depreciation of sterling.

The variable $\ln p_{kt}$, the (log) real effective tourism price of competing destinations to the UK, is defined as:

$$\ln p_{kt} = \ln \left( \sum_{\kappa} x_{kt} \left( \frac{\text{CPI}_\kappa \times E_{\kappa t}}{E_{\kappa \text{base}}} \right) \right),$$

where $x_{kt}$ is a weight and is the proportion of tourists visiting destinations $\kappa$ from country $j$ in time period $t$, where $\kappa = 1, \ldots, 5$ excluding the UK (we use only five destinations as in most cases the top five countries accounted for more than 60% of tourist outflows).

The general specification of the gravity model takes the following (in log form):

$$\ln \ln \ln \ln \ln X_{yjyt} = \alpha_1 + \alpha_2 \ln y_{UKt} + \alpha_3 \ln y_{jt} + \alpha_4 \ln p_{UKjt} + \alpha_5 \ln p_{kt} + \alpha_6 \text{Europe}_{ij} + \alpha_7 \text{Language}_{ij} + u_{ijt},$$

where $\ln$ is natural logarithm and $u_{ijt}$ is an error term. The model is estimated using panel data which allows us to control for unobservable individual effects. When estimating such a model, the specific effects can be treated as random variables (random effects approach) or fixed parameters (fixed effects approach). The choice of the approach rests on whether the independent variables are correlated or not with the error term; if they are, then random effect coefficients could be biased. The Hausman’s (1978) chi-squared statistics can be used to infer whether the Generalised Least Squares (GLS) estimator is an appropriate alternative to the Least Squares Dummy Variable (LSDV) estimator (see Greene, 1993, or Judge, et al., 1985).

To estimate the UK’s international inbound tourism, the sample included eleven main origin countries which account for more than 70% of total tourist arrivals in the UK. These countries were Australia, Belgium, France, Germany, Irish Republic, Italy, Japan, Netherlands, Spain, Switzerland, and the USA. The period of study was from 1968 to 1998. Data for tourist arrivals and expenditure were obtained from Business Monitor MQ6, Overseas Travel and Tourism (1970–93) and Travel Trends (1994–98). Those for gross domestic product, population, and consumer price indices were obtained from the International Financial Statistics CD-ROM.

**Estimation and Results**

Table 3 reports the estimates of the above model. We estimate two variants of model (2) as discussed above and we use log tourist flows ($\ln \text{arrivals}$ in columns 1 and 2), log tourist real expenditure ($\ln \text{rexp}$ in columns 3 and 4) and log real expenditure per capita ($\ln \text{rexpcap}$ in columns 5 and 6) in turn as dependent variable to measure tourism demand. Based on Hausman’s test, we present the results from either using the fixed effects approach (FE) or the random effects approach (RE). It is worth pointing out that the estimated coefficients are very similar for both fixed effect and random effect
Table 3. Panel Estimation Results of the Gravity Model

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln arrivals</td>
<td>ln arrivals</td>
<td>ln rexp</td>
<td>ln rexp</td>
<td>ln rexcap</td>
<td>ln rexcap</td>
<td></td>
</tr>
<tr>
<td>ln y_{UK_t}</td>
<td>-0.254</td>
<td>-0.559</td>
<td>-0.282</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.166)</td>
<td>(0.135)***</td>
<td>(0.076)***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln y_j</td>
<td>0.803</td>
<td>1.039</td>
<td>0.211</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.555)***</td>
<td>(0.128)***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln p_{UK_t}</td>
<td>-2.043</td>
<td>-2.305</td>
<td>-1.496</td>
<td>-1.531</td>
<td>-1.522</td>
<td></td>
</tr>
<tr>
<td>(0.358)***</td>
<td>(0.393)***</td>
<td>(0.294)***</td>
<td>(0.309)***</td>
<td>(0.083)***</td>
<td>(0.089)***</td>
<td></td>
</tr>
<tr>
<td>ln p_k</td>
<td>0.580</td>
<td>0.547</td>
<td>1.123</td>
<td>1.068</td>
<td>0.443</td>
<td>0.036</td>
</tr>
<tr>
<td>(0.182)***</td>
<td>(0.194)***</td>
<td>(0.151)***</td>
<td>(0.152)***</td>
<td>(0.165)***</td>
<td>(0.181)***</td>
<td></td>
</tr>
<tr>
<td>Europe_{it}</td>
<td>0.687</td>
<td>0.676</td>
<td>-0.059</td>
<td>-0.026</td>
<td>-0.738</td>
<td>0.732</td>
</tr>
<tr>
<td>(0.099)***</td>
<td>(0.106)***</td>
<td>(0.082)***</td>
<td>(0.083)***</td>
<td>(0.046)***</td>
<td>(0.049)***</td>
<td></td>
</tr>
<tr>
<td>Language_{it}</td>
<td>0.183</td>
<td>0.188</td>
<td>0.246</td>
<td>0.253</td>
<td>0.064</td>
<td>0.066</td>
</tr>
<tr>
<td>(0.077)***</td>
<td>(0.081)***</td>
<td>(0.064)***</td>
<td>(0.064)***</td>
<td>(0.035)*</td>
<td>(0.037)***</td>
<td></td>
</tr>
<tr>
<td>ln combin_y_{it}</td>
<td>0.734</td>
<td>0.734</td>
<td>0.924</td>
<td>0.924</td>
<td>0.199</td>
<td>0.019</td>
</tr>
<tr>
<td>(0.168)***</td>
<td>(0.168)***</td>
<td>(0.132)***</td>
<td>(0.132)***</td>
<td>(0.078)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLS Adj. $R^2$</td>
<td>0.403</td>
<td>0.383</td>
<td>0.518</td>
<td>0.464</td>
<td>0.549</td>
<td>0.534</td>
</tr>
<tr>
<td>LM Test</td>
<td>6.48***</td>
<td>4.30**</td>
<td>3.57*</td>
<td>223.45***</td>
<td>6.58***</td>
<td>4.92**</td>
</tr>
<tr>
<td>Hausman Test [prob. value]</td>
<td>2.96</td>
<td>10.07*</td>
<td>1.01</td>
<td>44.00***</td>
<td>1.46</td>
<td>9.75*</td>
</tr>
<tr>
<td></td>
<td>0.814</td>
<td>0.073</td>
<td>0.978</td>
<td>0.000</td>
<td>0.962</td>
<td>0.083</td>
</tr>
<tr>
<td>Approach Used</td>
<td>RE</td>
<td>FE</td>
<td>RE</td>
<td>FE</td>
<td>RE</td>
<td>FE</td>
</tr>
<tr>
<td>N</td>
<td>341</td>
<td>341</td>
<td>341</td>
<td>341</td>
<td>341</td>
<td>341</td>
</tr>
</tbody>
</table>

**Note:** "***", "**", and "*" imply significant at the 1%, 5%, and 10% levels, respectively. Standard errors are given in parentheses and the values in [ ] are the probability value for the Hausman’s chi-squared statistics. The OLS $R^2$ is reported as an approximation of the “goodness of fit”. RE = random effects; FE = fixed effects. Note that in using the Feasible GLS, the $R^2$ no longer has its usual interpretation (see Judge et al., 1985, p. 31).
estimations. The Lagrange Multiplier (LM) tests suggest that individual effects are present in all cases and favor either the FE or RE model over the classical regression model.

The parameter of interest is $\alpha_4$, that is, the coefficient on $\ln p_{UKjt}$. In all the cases the estimated coefficient is highly significant and greater than 1 (in absolute terms) indicating that tourism demand is elastic. In columns 1 and 2, the estimated coefficient on $\ln p_{UKjt}$ is $-0.043$ and $-2.305$, respectively, implying that if tourism prices increase by 1% in the UK, tourist arrivals will fall by around 2%, *ceteris paribus*. This implies that tourism demand for the UK is price elastic, hence very sensitive to price changes. Any attempt to increase price, either intentionally, e.g. through taxes, or unintentionally, e.g. through exchange rate appreciation, will cause a fall in tourist arrivals. The other price variable, $\ln p_{kt}$, although significant, is less than 1, indicating that a 1% increase in the real effective tourism price of competing destinations will increase UK’s tourist arrivals by around 0.6%, *ceteris paribus*. The variable accounting for “distance” in the model supports the hypothesis that neighboring countries tend to trade more than distant countries. The estimates from columns 1 and 2 tend to suggest that UK neighboring countries had an effect of increasing tourist arrivals of around 98%. The coefficient on the dummy variable *Language* indicates that English-speaking countries has increased tourist arrivals by around 20% more than non-English-speaking origins, *ceteris paribus*.

When the dependent variable is either total expenditure or expenditure per capita (columns 3–6), we notice that the coefficient on $\ln p_{UKjt}$ is around 1.5 to 2. This implies that if UK’s real effective tourism price increase by 1%, total real expenditure of tourism will fall by around 1.5 to 2%, *ceteris paribus*. Accordingly, the price elasticity of demand is around 2.5 to 3. It is interesting to note that visitors from countries neighboring the UK tend to spend around 52% less than those from distant origins (columns 5 and 6). This is quite understandable as tourists traveling from far away would stay longer (and hence spend more) in a destination than tourists who live relatively closer to the destination. It is also observed that the language variable has a positive effect on expenditure and that, although the impact is small, English-speaking tourists tend to spend around 7% more than non-English-speaking tourists (columns 5 and 6).

Overall, the results tend to suggest that the demand for tourism in the UK is sensitive to price changes in the UK. Any attempt to increase tourism prices, say, by introducing or increasing taxes on tourism, will have a significant negative effect on tourist arrivals in the UK. Exchange rate appreciation of sterling will also have a similar impact on tourist arrivals. However, the UK can gain more if barriers to trade in tourism are reduced or removed, especially if these savings are passed on as reductions in tourism prices. The results also indicate that countries neighboring the UK have increased tourism arrivals relative to distant origins. On the other hand, expenditure per capita from non-European origins is higher than European origins, implying that tourists traveling from distant countries tend to spend more. The results thus have implications for policymakers in relation to decisions which might affect tourism prices, and for promotion authorities for marketing activities.

5. Conclusions

Tourism is regarded as one of the foremost sources of income, employment, foreign exchange earnings, and tax revenue in many countries. Taxes on tourism increase government revenue but at the same time reduce the destination’s competitiveness. A range of taxes is levied and their impact can be measured through their effect on prices. Taxes have the effect of increasing the prices of goods and services but do not guaran-
tee an increase in total revenue. The amount of extra fiscal revenue from the introduction of a new tax or increase of an existing tax will depend on the tourists’ response to the price effects of the taxes, which is important to assess for policy purposes. The potential for deriving fiscal revenue from tourism is enormous, especially when the scope for levying taxes on residents is limited. From a political point of view, taxing tourism is seen as the least disruptive means of securing government revenue. This is because tourists are seldom voters in the place that they visit. Tourists are almost certain that they will be taxed in one way or the other in any destination, but the level of taxation can influence tourism flows and expenditure. Evidence from past studies tends to suggest that tourism is sensitive to changes in price (taxes) and exchange rates.

While the AIDS model and single equation models have limitations, we have used a well-defined framework with solid theoretical foundations to model inbound tourism demand in the UK. This model, developed recently by Anderson and van Wincoop (2003), is built on the fundamentals of utility maximization. Prices and income, which are important determinants of tourism demand, are present in the model, the former reflecting “multilateral resistance” effects. In the tourism context, the model enables a destination to assess its competitive position at the macro level, and can also measure gains/losses from trading with countries where free trade agreements exist, with countries using a common currency, with countries speaking the same native language, and so on. The results for the UK suggest that international tourism demand in the UK is price elastic and sensitive to price (tax) changes. This would imply that any percentage increase in tourism price will result in a more than proportionate fall in tourist arrivals, also in total real expenditure and real expenditure per capita as well. The model used is indeed very attractive to model inbound tourism demand for regions as well for individual destinations.

References


Notes

1. We are grateful to one of the referees who suggested that we consider language in our model.
2. Since tourist arrivals is in logarithmic terms, the impact of the dummy variable Europe is calculated as \( \exp(0.687) - 1 = 0.987 \) and \( \exp(0.766) - 1 = 0.966 \). See Halvorsen and Palmquist (1980).
3. If \( p \) and \( q \) are price and quantity respectively, if \( \ln q = \alpha + \beta \ln p \), then price elasticity of demand is \( \beta \). However, if \( \ln pq = \alpha + \beta \ln p \), then price elasticity of demand is \( \beta - 1 \).