

The Determinants of Tourism Demand: The Portuguese Case

Nuno Carlos Leitão

Abstract — This study measures the impact of economic determinants on the international demand for tourist services in Portugal. A panel data set of 15 European countries over the period 1995-2003 is used. We used appropriate panel data techniques of real per capita income, the price index of tourism service, geographical distance on demand for Portugal tourism services. In contrast to previous studies, we used a dynamic panel data to solve the problems of serial correlation and endogeneity. Our estimate of the relative price elasticity of demand for Portugal's is 0.35 in the short run and 0.37 in the long run. The corresponding estimates for income elasticity on demand are 0.402 and 0.391 respectively.

Index Terms — Panel data, Portugal, Tourism demand

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1 INTRODUCTION

The growth and importance of tourism is one of undeniable success stories of the international economy over the last 50 years. In fact, the World Tourism Organisation [1] refers that international tourist arrivals will increase to 1 billion by 2010 and 1.6 billion by 2020. International tourism, often relatively neglected by policymakers should be as an "export" from the host country.

Tourism is particularly relevant for Portugal. Prudent planning of the sector is critical. Capital costs are very high and investment decisions are consequential over a long period. The transaction costs decreased, and tourism contributed to increased international trade.

The tourism demand is explained by income in tourist generating countries, price of tourist services, transport costs and promotional expenditures.

International trade is the most important player in economics. Little mention is made of tourism. Tourism is a significant source of export revenues for any country. It is important policymakers, and economist understand the factors affecting foreign tourism demand. In other words, this export commodity permits explaining international economics.

Unavailability or poor quality of data has been a persistent problem in tourism studies. The majority of studies focus on travel flows among developed countries.

In static panel data models, Pooled OLS, fixed effects (FE) and random effects (RE) estimators have some problems like serial

correlation, heteroskedasticity and endogeneity of some explanatory variables occur.

The solution for these econometric problems was found by Arellano and Bond [2], Arellano and Bover [3] and Blundell and Bond [4,5], who developed the first-differenced GMM (GMM-DIF) estimator and the GMM system (GMM-SYS) estimator. The GMM-SYS estimator is a system containing both first-differenced levels equations. In addition to using instruments in levels for equations in first differences, it uses instruments in first differences for equations levels. The GMM-SYS estimator is an alternative to the standard first-differenced GMM estimator.

In dynamic panel data models, the GMM-SYS estimator eliminates the unobserved specific effects through the equations in differences. The GMM-SYS estimator also controls for the endogeneity of explanatory variables. The validity of instruments is tested using a Sargan test of the over-identifying restrictions and serial correlation. First-order and second-order serial correlation in the first-differenced residuals is tested using m_1 and m_2 statistics by Arellano and Bond [2]. The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (m_2 statistics). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid.

To estimate the dynamic models, we apply the methodology of Blundell and Bond [4,5]. The results presented in this paper are generally consistent with the predictions of the tourism demand.

The central theme of this paper is to apply the new methodology to tourism studies and to show that better results can be achieved using GMM approach, rather than OLS, fixed

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effects or random-effects estimators.

Our study uses a panel between Portugal and European Union (EU) for the period 1995-2003 using fixed effects, and the GMM-System.

We also introduced in this paper the Tobit model to forecast tourism demand. This methodology is important for evaluating and forecasting the policy implications.

The remainder of the paper is organized as follows: section 2 presents the theoretical background; section 3 presents the role of tourism in the economy; in section 4 we reflect about tourism demand estimation; section 5 we formalized the econometrical model; section 6 shows the estimation results; the final section concludes.

There are good reasons for studying the Tourism sector in Portugal.

Firstly, Portugal is a small open economy, and need to create competitive advantages.

Secondly, the Portuguese tourism sector has been considered new paradigm of Portuguese economy. There are recent education programmes (BSc, MSc. and PhD) that study the structural changes in this sector.

Thirdly, the econometric models have been used to test the determinants of tourism demand.

2 LITERATURE BACKGROUND

The review of the empirical literature on tourism demand by Crouch [6], Witt and Witt[7], Mervan and Payne [8], Carrey [9], and Lim [10] suggests that the tourist demand is measured as in tourist arrivals - departures and tourists receipts as dependent variable. The number of nights spent in the country has also been included, but much less frequently.

For explanatory variables, the empirical models of tourism demand use consumer's income, the price of services, exchange rate, and distance.

Previous empirical studies on tourism as in Carrey[9], and Jud and Joseph[12], or Fuji and Mark[13] have found income to be the most significant variable.

Some studies as in Mervan and Payne[8] incorporate the dynamics of tourism demand for lagged effects on supply constrains. These authors study the demand on tourism for the Croatian Destination. We can refer other studies as in Carey [9] who studied the Caribbean tourism demand, and Payne and Mervan [11] on the demand for Croatian.

3 THE ROLE OF TOURISM IN THE ECONOMY

Porter [14] defends the idea that the competitive advantages of Nations are in sectors. As Porter [14:33] said: "Firms, not nations, compete in international markets".

The competitive advantages of Nations introduce a new paradigm in economics. Porter showed that the role of government is important for determining the competitiveness of Nations.

According to Michael Porter [15] Portuguese economy should be developing a tourism cluster. Porter's study of Portugal showed that tourism cluster was localized in four regions: Algarve, Alentejo, Madeira and Lisbon.

Tourism is the largest service - based industry and, as such, has been partly responsible for the service sector growth.

The paradigm of tourism is explained by economies of scales, and flexibility of supply.

The success of this sector depends on a new concept. Nowadays publicity applications are becoming more necessary. Mass media is used for giving information and influencing the audience target (tourists). In this sector there have been organized activities for attracting their target audiences.

The competitive position of a destination could be explained by factor conditions, quality and suppliers forming the destination. We can speak in three types of tourism: i) Entertainment; ii) Religion and Cultural, iii) Conferences and Workshops.

According to INE- National Institute of Static's in 2003, the entertainment represents 47%, business 18%, religion 18%, conference and workshops 8%, and 10% for others.

This sector creater links with other services. Tourists spend their money in communication, entertainment services, and travel services. This money is an injection into the host country. The cultural, historical economy can reduce transaction costs.

4 TOURISM DEMAND ESTIMATION

Most empirical studies have relied on multivariate regression analysis. A number of methodological issues make this type of analysis problematic. Collinearity among explanatory variables has been common.

In general, the literature of our modelling tourism demand focuses on the determinants, as in transport, price, income in tourism generating countries, and population.

Following Carey [9], and Fuji and Mark[10], we consider that demand for travel exports is equal to:

$$A_{it} = f(Y, P^*, R, T, E) \quad (1)$$

Where:

$$\partial f / \partial Y > 0, \partial P^* R < 0, \partial f / \partial T < 0, \partial f / \partial E > 0$$

and:

- A is the number of tourist arrivals;
- Y is the income in tourist generation countries;
- P is the price of tourist services;
- R is the exchange rate
- T is the transportation costs
- E is the promotional expenditures

5 ECONOMETRIC MODEL

The dependent variable used is the number of arrivals at destination (*i*) from origin (*j*) in year staying in hotels (*A*). Some of explanatory variables are country –specific characteristics. Carey[9], and Mervan and Payne [8] .

The data explanatory variables are sourced from World Bank, World Development Indicators (2005). The source used for dependent variable was INE- National Institute of Statistics.

5.1 Explanatory Variables

The paper uses the following explanatory variables in logs:

- LogGDP is the logarithm of absolute in GDP per capita in tourist countries (PPP, in current international dollars). According to the literature we expected a positive sign. Income in the origin country is the most frequently used explanatory variable. Most researchers have relied on nominal or real (*per capita*) personal, or national income, and GDP or GNP as measures (or proxies) for income in the origin. The studies consider that income is highly significant as a determinant of demand.

- Population of the country of origin is also included as an explanatory variable, LogPOP. Although it is theoretically incorrect to exclude population. This proxy is important to analyse the impact of population changes. Most of studies do not consider this variable, because population tends to be highly correlated with income (multicollinearity problems). Jud and Joseph [12], or Fuji and Mark [13] found a positive sign.

- Log PR, is the logarithm of price of tourist service. According to the literature, positive sign is expected. This hypothesis indicates that factors other than price are influential in forming choices among regions. This means

that purchases in destination *i* are relatively more expensive for tourists from *j*, which could be due either to a higher inflation rate in the destination compared with the origin.

- LogDIST, is the logarithm of geographical distance between the Portugal and partner country. The cost of transports is important as a policy variable. According to the literature we expected a negative sign.

5.2 Model Specification

$$A_{it} = \beta_0 + \beta_1 X_{it} + \delta t + \eta_i + \varepsilon_{it} \quad (2)$$

Where A_{it} is the number of tourist arrivals, X is a set of explanatory variables. All variables are in the logarithm form; η_{it} is the unobserved time-invariant specific effects; δt captures a common deterministic trend; ε_{it} is a random disturbance assumed to be normal, and identical distributed (IID) with $E(\varepsilon_{it})=0$; $\text{Var}(\varepsilon_{it})=\sigma^2 > 0$.

The model can be rewritten in the following dynamic representation:

$$A_{it} = \rho A_{it-1} + \beta_1 X_{it} - \rho \beta_1 X_{it-1} + \delta t + \eta_i + \varepsilon_{it}$$

6 ESTIMATION RESULTS: STATIC AND DYNAMIC PANEL

Table 1 presents the estimation results using the fixed effects (FE) estimator. The general performance of the model is satisfactory. The explanatory power of the Portuguese tourism demand regression is very high (Adjusted $R^2=0.811$).

TABLE 1
PORTUGAL TOURISM DEMAND
STATIC PANEL REGRESSION: FIXED EFFECTS

Variables	Coefficient
LogGDP	-0.594 (-2.196)**
LogPOP	0.378 (4.231)***
LogPR	0.053 (0.118)
LogDIST	-0.807 (-3.836)***
Adj. R ²	0.811
Observations	125

T-statistics (heteroskedasticity corrected) are in round brackets.

***/*- statistically significant, respectively at the 1% and 10% levels.

The variable LogGDP(Tourist per capita GDP) is statistically significant, but with the wrong sign. As the variables are in the log form, the coefficient of LogGDP gives the elasticity. So, when the tourist per capita decreased 1% the Portuguese demand tourism decreased 0.59%.

As expected, the variable Log POP has a

significant and positive effect on tourism demand.

The coefficient of LogDIST(Distance) is negative as expected. This result confirms the gravitational model and the importance of the neighbourhood.

The dynamic panel data model, presented in table 2 is valid if the estimator is consistent and the instruments are valid. The Sargan test of over-identifying restrictions test validity of instruments used. The first- and second order serial correlation in residuals is tested by M_1 and M_2 statistics. The GMM system estimator is consistent if there is no second-order serial correlation. The Sargan test and M_2 statistic show that the instruments used are valid.

TABLE 2
PORTUGAL TOURISM DEMAND
DYNAMIC PANEL REGRESSION: GMM - SYS

Variables	Coefficient
LogA _{it-1}	0.362 (1.75)*
LogGDP	0.402 (1.82)*
LogGDP _{t-1}	0.391 (1.83)*
LogPOP	-0.043 (-0.491)
Log POP _{t-1}	0.116 (1.77)*
LogPR	0.352 (1.85)*
LogPR _{t-1}	0.370 (1.82)*
LogDIST	-0.843 (-1.04)
C	0.109 (1.73)*
M_1	0.06886 [0.945]
M_2	-0.6610 [0.509]
Wjs	1.597 [0.000] Df=8
Sargan	1.239 [1.000] Df=86
Observations	112
Parameters	16
Individuals	14

The instruments in levels used are: LogA (2,7), LogGDP(2,7), and LogPOP(2,7) for first differences. For levels equations, the instruments used are first differences of all variables lagged t-1.

The null hypothesis that each coefficient is equal to zero is tested using one-step robust standard error.

T-statistics (heteroskedasticity corrected) are in round brackets.

*- statistically significant, respectively at the 10% level. P-values are in square brackets. Year dummies are included in all specifications (this is equivalent to transforming the variables into deviations from time means, i.e the mean across the fourteen countries for each period).

M_1 and M_2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as $N(0,1)$ under the null hypothesis of no serial correlation (based on the efficient two-step GMM estimator). W is the Wald statistic of joint significance of independent variables (for first-steps, excluding time dummies and the constant term).

Sargan is a test of the over-identifying restrictions, asymptotically distributed as χ^2 under the null of instruments' validity (with two-step estimator).

Comparing the GMM estimates with the fixed effects we note that Distance become

insignificant.

However, the statistical significance and positive sign of the lagged A_{it} variable confirms the hypothesis that the tourism demand has a dynamic nature. According to Witt and Wiit[7] the inclusion of a lagged dependent variable in tourism demand functions express the supply side.

The variable GDP and lagged GDP are statically significant with an expected positive sign. One of the main determinants of tourism demand is the positive impact in Portuguese economy.

As in Carey [9], the logarithm of price of tourist service (Log PR) is a positive effect on tourism demand. This result means that purchases in Portugal destination are relatively more expensive for tourists.

These results suggest that more research is needed to improve the dynamic specification, including other proxies.

6.1 Tobit model

In table 3 we can observe the results of tobit model. The general performance of the model is according to the expected sign.

The variable LogGDP (Tourist per capita GDP) is statistically significant, but with a wrong sign.

As expected, the variable Log POP has a significant and positive effect on tourism demand.

The coefficient of LogDIST (Distance) confirms a negative sign. This result is according to the empirical studies as in Carrey [9], and Jud and Joseph[12], or Fuji and Mark[13].

TABLE 3
PORTUGAL TOURISM DEMAND
TOBIT MODEL

Variables	Coefficient
LogGDP	-1.096 (-3.240)***
LogPOP	0.300 (5.268)***
LogPR	1.145 (1.534)
LogDIST	-0.955 (-4.133)***
C	8.155 (2.723)***
SIGMA	0.537 (15.811)***
Observations	125
Log likelihood	-99.6729

T-statistics (heteroskedasticity corrected) are in round brackets.

***/*- statistically significant, respectively at the 1% and 10% levels.

7 CONCLUSIONS

The objective of this study was to analyze the determinants of Portuguese tourism demand.

The tourism presents a dynamic nature. In order to understand this phenomenon in the paper we build an econometrical dynamic model. The dynamic results confirm this hypothesis. The lagged tourism demand presents an expected positive sign.

Other lagged explanatory variables as GDP per capita tourist countries, Population, and the price of tourist service are also statistically significant. These results prove that dynamic nature of tourism demand and suggest that a dynamic approach is needed in order to understand better the demand tourism determinants. In the static model we find empirical evidence for the effect of some economic variables on Portuguese tourism demand: population, and geographical distance.

The high growth rate in the number of international arrivals in recent years indicates the opportunities that Portugal has to develop as a tourist destination.

Tourism in the age of globalisation needs more specialization and a new paradigm should be defined.

Some policy implications could be referred in order to obtain competitiveness in this sector.

The development of tourism must be sustainable; we can mention four important factors which are culture, environment, politics and government involvement. The government involvement should be concentrated in two areas: conjectural and structural policy. This sector needs more modernization, human capital, and investigation. This study has some limitations. In the future, we need to include other control variables: language, cultural and religions similarity, human capital. This paper suggests a refinement of usual measurement of the dependent variable in tourism demand studies. Tourism that is not staying in hotels is omitted.

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