



# An empirical analysis of the influence of macroeconomic determinants on World tourism demand



Luís Filipe Martins <sup>a, b, \*</sup>, Yi Gan <sup>c</sup>, Alexandra Ferreira-Lopes <sup>d</sup>

<sup>a</sup> ISCTE-IUL, BRU-IUL, Portugal

<sup>b</sup> CIMS-University of Surrey, UK

<sup>c</sup> AJEPC, Portugal

<sup>d</sup> ISCTE-IUL, BRU-IUL, CEFAGE-UBI, Portugal

## HIGHLIGHTS

- We model tourism demand from two perspectives: value (expenditures) and quantity (arrivals).
- We include the most important Macroeconomic determinants (exchange rate, relative prices, and World GDP *per capita*).
- We apply state-of-art econometric methods using a rich panel database of 218 countries observed from 1995 to 2012.
- The World's GDP *per capita* is more relevant when explaining arrivals.
- The relative prices is more important when explaining expenditures, with a unitary elasticity.

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## ABSTRACT

This paper considers three econometric models to determine the relationship between macroeconomic variables and tourism demand. Tourism demand is measured by the inbound visitor's population and also by on-the-ground expenditures. The database is an unbalanced panel of 218 countries over the period 1995–2012. There is evidence that an increase in the World's GDP *per capita*, a depreciation of the national currency, and a decline of relative domestic prices do help boost tourism demand. The World's GDP *per capita* is more important when explaining arrivals, but relative prices become more important when we use expenditures as the proxy for tourism demand. We cannot reject the hypothesis of a relative prices unitary elasticity of expenditures. Additionally, we have partitioned our data by income level and by Continent. Results are robust in the first partition, but less robust in the second, although the main conclusions still hold. Finally, we draw policy implications from our findings.

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## 1. Introduction

As one of the important industries of the tertiary sector, the tourism industry has been developing rapidly in recent decades and contributing greatly to economic growth, especially in tourism-intensive countries. The importance of the macroeconomic

determinants of tourism demand at the world level are the focus of our work. We examine three macroeconomic determinants of tourism demand - the nominal exchange rate, relative prices, and world income *per capita*. We base our choices on the most solid results drawn from earlier literature, which we explain in the next section. We model tourism demand using two proxies - the number and volume of expenditures of inbound tourists, taking into account a panel of 218 countries between 1995 and 2012, allowing us to reach robust conclusions about the importance of these macroeconomic variables as determinants for tourism demand.

\* Corresponding author. Av. das Forças Armadas, 1649-026 Lisbon, Portugal.

E-mail address: [luis.martins@iscte.pt](mailto:luis.martins@iscte.pt) (L.F. Martins).

URL: <http://home.iscte-iul.pt/~lfsm/>

Contrary to most of the literature, we include all three macroeconomic variables in the model, thereby minimizing the potential estimation bias. Also, the variable's definitions are not exactly the ones used so far. The choice to include the nominal exchange rate as a determinant is obvious, since a depreciation of a given currency relative to others (i.e., an increase in the nominal exchange rate) can increase the demand for tourism, as domestic prices become relatively cheaper than import prices. A substantial amount of earlier research focused on analysing the relationship between this variable and tourism demand and found a somewhat robust and positive relationship between the two. We have also chosen to include relative prices, i.e., the ratio of domestic prices over foreign prices (in our case, we have used both the consumer price index of the USA and the one of the Eurozone as proxies for foreign prices) as an important explanatory variable. This variable measures the cost of living in the country in comparison with the USA, so it measures the purchasing power in the country visited. The expected sign of this variable is negative, since the higher the purchasing power of the visited country vis-à-vis the USA or the Eurozone, the lower the probability of having many tourists.

The literature has focused its attention mostly on the consumer price index (CPI) of the country and not much on the comparison between the CPI of the country and that of the rest of the World. We think a comparison of purchasing power is more important for consumer (tourist) decision than a mere introduction of the price level of the country itself. Additionally, in the tourism literature, income or economic growth has been playing an important role, either as a source or as consequence of tourism demand. Since in our work we are dealing with a panel of 218 countries, we consider the World GDP *per capita*, i.e., the average of World income, as one of our determinants for tourism demand, because it reflects the global economic environment and wealth. The expected sign for this variable is positive, since we expect that an increase in average World income increases tourism demand.

We model tourism demand, our variable of interest, from two perspectives - value and quantity. From the value perspective we use on-the-ground expenditures. From the quantity perspective we use arrivals to the destination country as our variable. Besides distinguishing the determinants for tourism value and quantity, we use a log-log model specification so that the measurement units of the macroeconomic variables will not matter in ranking the importance of these in explaining tourism demand. Based on panel methods for count (Poisson regression) and real-valued data, we conclude that the World GDP *per capita* is more significant when explaining arrivals and relative prices are more important when we use expenditures as the proxy for tourism demand. The application of count and real-valued data in panel models is also new in the literature.

Additionally, many of the studies so far applied the data for a specific country, region, or small group of countries, which may ignore the heterogeneity amongst destinations and also World-wide effects. As a result, these studies lack universality, making it difficult to apply their findings and conclusions to a wider extent. To increase the scope of the literature, our work analyses a panel of 218 economies spread throughout all Continents, thus covering the entire world. Our micro panel covers the period between 1995 and 2012 and it is found that the number of arrivals grew 1.2% *per year* whereas relative expenditures declined at a rate of about 2% *per year*.

Finally, we have also partitioned our data by income level and by Continent to check whether the relative importance of each macroeconomic variable is indifferent to these two world features. Results are robust in the first partition, but less robust in the second, although the main conclusions still hold. Quite interesting, the results suggest that world income is important to high income

countries and relative prices to low and middle income countries and that relative prices have a much lower impact in Europe, when compared to other continents.

This work is structured as follows. In Section 2 we perform a literature review of the works closely related to our topic of study and that motivates the choice we make for the macroeconomic variables. We also review the literature on the relationship between tourism demand and income level and between tourism demand and Continents. Section 3 describes the empirical approach, i.e., data and methodology, Section 4 discusses the results, and Section 5 analyses two extensions: income levels and Continents. Finally, Section 6 concludes.

## 2. Literature review

In this section we analyse the most important literature related with the macroeconomic determinants, which we use in our study as explanatory variables for tourism demand. Additionally, we also review the literature on the relationship between tourism demand and income level and between tourism demand and Continents.

Literature about modelling the determinants of tourism demand and specifying its elasticities', and also forecasting has been prolific. The bulk of research on these topics have justified several surveys that rely on the meta-analysis method, namely Crouch (1992, 1995), Lim (1997, 1999), and Peng, Song, Crouch, and Witt (2015).

Lim (1997) performs a meta-analysis review on 100 studies and their characteristics: decade of publication, type of data (annual, cross-section, pooled, other), sample sizes (observations), model specifications (log-linear, linear, both linear and log-linear, system of equations, other, none), types of dependent (tourist arrivals, tourist expenditures, travel exports and imports, length of stay, nights spent at tourist accommodation, other) and explanatory variables used (income, relative prices, transportation costs, exchange rates, trend, among others), and the number of explanatory variables used in the estimations. The author finds that most of the empirical studies have been done in the 1980's, used annual data with few observations, and used log-linear single equations. Tourist arrivals and expenditures are the most commonly used dependent variables, and the most used independent variables are income, relative prices, and transportation costs, followed by the exchange rates and the trend.

Crouch (1992) performs a meta-analysis on the effect of income and prices on international tourism demand for 44 studies. The author studies the reasons (methodological and substantive, such as the method used, the variables included, the type of data, the time period, countries analysed) why the estimations for the elasticities for income and prices can vary in the literature. Although the volatility in the estimations for income demand elasticities can be explained by the differences between the several studies, volatility in the price elasticities cannot be explained by the variables mentioned, although the definition of price seems to matter. Crouch (1995) analyses 80 papers and considers the variability on demand elasticities (income, prices, exchange rates, etc.) relative to the origin and destination countries (pairs of countries) used in the 80 works. The country of origin and country of destination have a great impact on elasticities, so regional variation is significant.

Using a meta-analysis of 70 articles, Lim (1999) studies the findings for the relationship between income, relative prices, and transportation costs (the most commonly used explanatory variables defined in her 1997 study) and tourism demand. The percentage of studies that reveal a sign contrary to economic theory are lower - 2.8%, 6.2%, and 8.3% - for income, transportation costs, and prices, respectively. Results for the income and prices variables appear to be more robust than results for transportation costs. However, size effects are strongly significant, which reveals the

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