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AN EMPIRICAL ANALYSIS OF THE INFLUENCE OF EXCHANGE RATE AND PRICES ON TOURISM DEMAND

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Abstract

The World’s tourism industry has been developing for several years. The global economy grows, and more and more people tend to go travelling not only within their own country but also to foreign countries. Thus, it is relevant to investigate the relationship between macroeconomic indicators and the tourism industry. This thesis considers four models to explain the relationship between the economic environment and the tourism demand. The tourism demand is measured by the inbound visitor’s population and the on-the-ground expenditure, and the economic variables include the exchange rate, relative consumer price index, and the World GDP. The database is an unbalanced panel of 218 countries observed over the period 1995-2012. There is some evidence that the World's wealth, a depreciation of national currency and a decline of relative prices do help boosting the number of arrivals and the correspondent expenditure level. In particular, the World's GDP elasticity of real expenditure level *per* visitor is about 0.44. The exchange rate is not always positively related to the dependent variable, which is not consistent to previous research. At the same time, the relative prices are always significant in the models and with the expected negative sign.

Keywords: Tourism demand, exchange rate, relative prices, panel data.
JEL Classification: C23, L83.

Sumário

A indústria mundial de turismo tem vindo a desenvolver-se ao longo dos anos. A economia mundial cresce, graças em parte à globalização, e cada vez mais pessoas tendem a viajar não só no seu espaço geográfico mas também para países estrangeiros. Por estas razões torna-se relevante estudar a relação entre as variáveis macroeconómicas fundamentais e a indústria turística. Esta tese considera quatro modelos para explicar a relação entre o enquadramento económico e a procura de turismo. A procura de turismo é medida pelo número de turistas e as despesas por eles efetuadas, e as variáveis económicas incluem a taxa de câmbio, o índice relativo de preços do consumidor, e o PIB mundial. A base de dados é constituída por um painel *não equilibrado* de 218 países para o período de 1995-2012. Os resultados apontam para a relevância da riqueza mundial, da depreciação da moeda nacional e do declínio nos preços relativos ajudarem a aumentar o número de chegadas e o correspondente nível de despesa por visitante. Em particular, a elasticidade da despesa realizada em turismo em relação ao produto mundial é de cerca de 0.44. A taxa de câmbio nem sempre é positivamente relacionada com as variáveis dependentes, o que não é consistente com os resultados da literatura anterior. Simultaneamente, os preços relativos são sempre significativos nas regressões e com os esperados sinais negativos.

Palavras-chave: Procura de turismo, taxa de câmbio, preços relativos, dados de painel.

Códigos do JEL: C23, L83.

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1. Introduction

There are a variety of factors that have an impact on the demand for tourism. First of all, economic factors have to be taken into account. Income is a critical variable to take in consideration for tourists to make their decision. When there is economic growth, the disposable income of household increases, which encourages people to raise the budget for recreation, and traveling, can be a good mean to relax and explore new environments. Also, the exchange rate and the prices of goods (the inflation rate) in the destination country play important roles. Domestic inflation and domestic currency appreciation in the destination country imply that tourists need to spend more to merely purchase the same goods and services, which weakens the attraction of the destination. With the domestic currency depreciation, more potential visitors are willing to travel. For a specific country or region, there are two types of travelers, namely domestic tourists and inbound tourists. Nowadays the inbound tourism represents an increasing proportion of the whole tourism industry. Compared with the domestic visitors, the inbound visitors are more likely to be influenced by the exchange rate and the inflation rate in the destination.

Nations of immigrants will draw more tourists to come and visit friends, while trade-intensive countries will bring more business visits. In addition, advertising and the purposes of travelling (family visit, business trip, etc.) play considerable roles on selecting destinations. When the government increases the budget for travelling, advertisement, and more information is delivered to the foreign markets, this can certainly elevate the tourism aspiration of that country. Other factors like safety and political environment may have an impact as well. Political turmoil in certain regions would influence the travel plan of tourists, and some countries could even issue alerts to keep their citizens from going to the area.

The tourist arrivals and expenditures are appropriate variables to evaluate the impact of economic factors on the tourism industry. The amount of tourist arrivals to some extent depends on the popularity of the destination; however, it also fluctuates between different years. Moreover, it may have specific trends in several years due to the economic or political environment. The prices have great influence on the on-the-ground expenditure. While changes in prices, will, to some extent, be reflected in the changes in the exchange rate (XR) However, to consider the relative price can

be more effective than the absolute price, since it allows a comparison between the purchasing power of two countries. Consequently, consumer price index (CPI) and Gross domestic product (GDP) should also be analyzed, since both of them also reflect the price level of the destination country.

As one of the important industries of the tertiary sector, the tourism industry has been developing rapidly in the last two decades and contributing significantly for economic growth, especially in tourism-intensive countries. And the demand for tourism continues to rise, since the transports sector has also been significantly developing. Consumers have more means of transportation at their disposal, which are faster and cheaper, allowing them to choose over more destinations. With this growing trend in the travel and tourism industries, governments and companies can take the chance to increase their income, by attracting more customers, if they effectively forecast their demand and allocate resources in a reasonable way.

A great amount of research focused on analyzing the relationship between exchange rate and tourist demand. However, the inflation rate might also affect tourism demand, especially for the inbound recreational visitors and this variable have been neglected by the literature. Additionally, many of the studies so far applied the data for a specific country or continent, which may ignore the heterogeneity among destinations and also World-wide effects However, these studies lack universality, making it difficult to apply their results and conclusions to a larger extent. To increase the scope and reduce the error, this paper is going to analyze data from a bigger scale of countries and regions.

This thesis is structured as follows. In Section 2 we perform a literature review of the works closely related to our topic of study. Section 3 describes the data and Section 4 the methodology. Section 5 analyzes the results from our estimations and Section 6 concludes.

2. Literature Review

There is a consensus in the literature that tourism is one of today's faster growing industries and it plays a significant role on economic growth.

In Harvey *et al.*'s (2013) study, applying the bounds testing approach to cointegration and an error-correction model to a linear-log equation, with data from the World Bank and the International Financial Statistics (IFS) of the International Monetary Fund (IMF) (1995-2010), using variables like the real GDP, annual international tourist arrivals, the nominal exchange rate, and real exchange rate. The empirical evidence from Philippines indicated that not only short run but long run growth will benefit from tourism development. As a member of the BIMP-EAGA (namely Brunei-Indonesia-Malaysia-Philippines - East ASEAN Growth Area), Philippines implemented some measurements to boost economic cooperation, including tourism relations, which contributed to economic development. The same thing happened in Jamaica. By examining the causal relationship between financial development and tourism industry, Ghartey (2013) confirmed that tourism arrivals and expenditure lead to economic growth, by introducing the CPI, the GDP and the tourism arrival (1963-2008) into a VAR model, both in the long and in the short term. In 1986, due to the depreciation of the domestic currency, tourism expenditure ascended, being conducive to more economic growth in the country. The Government also played a fundamental role trying to decrease consumer taxes and hence promoting the consumption of local goods and investment in physical capital to promote the national industry.

The research for Mediterranean countries shows similar results. Dritsakis (2012), using the method of cointegration analysis and data for real GDP *per capita*, real receipts *per capita* and real effective exchange rate in the period of 1980-2007, reveals that tourism development is closely related to GDP in seven Mediterranean countries: Greece, Turkey, Cyprus, Spain, France, Italy, and Tunisia. Besides, not only the economic growth rate, but regional effects should be taken into account. It is more reliable to analyze the situation of the whole region instead of individual countries because of globalization. Furthermore, the author suggests that governments should assist the tourism industry to grow as much as possible. Instead of paying attention to the current situation, policymakers should consider strategies for the the long run. But in a changing period like the financial crisis, specific adjustment should be launched

to meet the emerging demands, rather than keep using the past estimated model.

According to Odhiambo's (2011) statement, with the data for 1980-2008 and the Autoregressive Distributed Lag (ARDL) bounds testing approach, unlike most of the previous research, in Tanzania, tourism development leads to more economic growth in the short term, however, in the long run, growth-led tourism plays the important role. Meanwhile, statistical analysis also indicates that in the short run, there are bidirectional relationships between exchange rate and tourism development, and between exchange rate and economic growth.

Sequeira and Campos (2007) investigated the causality between international travelling and economic development. The authors used variables such as the degree of openness, the investment-output ratio, tourist arrivals *per* head of population, tourism receipts in % of exports, black market premium, real GDP, secondary male enrolment, and the government consumption-output ratio for 509 observations, from 1980 to 1999, obtained from the Penn World Tables and the World Bank. Using panel data regression (with fixed or random effect), it can be summarized the following conclusion: that the chosen tourism variables are not closely correlated with the economic boom regardless of tourism-specialized countries or a wider range of other countries. In latter research, Sequeira and Nunes (2008) introduced three variables: secondary years of schooling above 25 years, life expectancy, and international country risk guide, to make further research. The corrected Least Square Dummy Variables (LSDVC) or the fixed Effects (FE) approach and the Generalized Method of Moments (GMM) estimator were used to estimate. Results show that poor countries can profit from specializing in tourism, not only in tourist receipts but also in consumption, which contributes to the development of the economy. On the other hand, small countries are benefiting less from the specialization in the tourism industry.

Dutch disease describes the connection between the economic growth of natural resources and the decline of other export services and commodity. Forsyth *et al.* (2014) investigated whether Australian tourism, as one of the export services, is suffering Dutch disease. Due to the mineral industry strong growth since 2004, the Australian dollar experienced rapid appreciation, which reached an historic peak in 2012. At the same time, this currency appreciation results in the contraction of other tradable goods and services. By analyzing the statistics of mining, tourism, and other industries, we can conclude that the tourism industry was suffering from the Dutch disease. However,

to turn the situation around, some measures can be taken into account. Change the prices by lowering the taxes on tourists, promote the inbound tourism as well as domestic tourism and improve the portfolio of tourism products to make it attractive, should be useful measures for weakening the negative effects.

What shouldn't be neglected is that seasonality has a significant importance for tourism industry and previous research paid less attention to this factor. Espinet *et al.* (2012) filled the blank. Using data from Spanish tour operators brochures for 2002, which included 32 different tourism destinations in 11 countries, 1776 hotels, and 27231 prices, it can be summarized that climate, hotel services, and star rating are important variables of seasonality. Except for the economic elements, policymakers and hotel managers should take seasonality as one of the variable to forecast tourism demand.

Another reason to witness an increase in tourism arrivals is immigration. Seetaram (2009) shows that Australia is considered a country of immigrants. When Australian residents who are from a specific country increase, the amount of tourists from that country ascends, since these kinds of visitors are more sensitive to income than prices.

Leaving aside economic growth and competitiveness considerations, let us focus on the perspectives of visitors and relevant variables that they might take in consideration in their tourism demand function. Taxes are taken into consideration by visitors. Take Greece as an example. Because of the global economy development and higher income, the visitors from all over the World are more willing to travel to Greece while Greece keeps relatively lower prices. Thompson and Thompson (2010) discovered that travelers to Greece are sensitive to airfares but not real exchange rates. The airport taxes are reckoned as user taxes, impeding tourists and reducing the whole tourism revenue. The author suggested that dropping the airport taxes while raising the accommodation or other taxes would be effective to improve the industry income.

The exchange rate and consumer prices are also considered as vital variables of explanation for inbound tourism, and a variety of research is committed to clarify the relationship among them.

Saayman and Saayman (2013) studied the impact of exchange rate volatility on tourism in South Africa. It is assumed that the volatility of the South African Rand, the local currency (the ZAR) has an important impact on both visitors' spending and arrivals only from 2000 onwards, when the South African currency was permitted to

free float. Volatility is modelled using a GARCH model, while the influence thereof on tourism is modelled using an autoregressive distributed lag model (ADL) and a bounds test approach. Using quarterly data for the period between 2003 and 2010 for average spending, tourism arrivals, real gross domestic product, consumer price index, nominal exchange rate of South Africa and the main sources (countries) of intercontinental arrivals, respectively Germany, the UK, Germany, the USA, France, Brazil, and China were used. The author found that increased currency volatility is associated with increase with on-the-ground expenditure in most of the countries, respectively China, Germany, the USA, and Brazil, while Australian tourists tend to take smaller risks, spending less when volatility increases. In terms of Arrivals, most of the countries showed risk aversion behavior at the exception of China. Due to increased currency volatility, arrivals declined. Last but not least, in the long term, spending would be influenced more than arrivals.

Chao *et al.* (2013) examined how currency depreciation affects the prices of Ain inbound tourism, illustrating that the exchange rate has a dominant effect in the amount of tourists that that country receives. Also, the effect of rising domestic price inflation can be passed through to foreigners, via tourists and their consumption while they are staying in the country. Consequently, the depreciation of the domestic currency may harm the revenue of inbound tourism. Currency volatility affects not only the visitor's expenditure but also arrivals, and in the long run the revenues will be influenced even more. Another example using German tourists who travel to Turkey, also showed that exchange rates are significant determinants of tourism demand (De Vita and Kyaw, 2013). The authors collected observations on Turkey's tourist arrivals from Germany from 1996 to 2009, at quarterly frequency, to analyze its relationship with exchange rates (the authors tested alternative exchange rates volatility measures), using Generalized Autoregressive Conditional Heteroscedasticity (GARCH) specification and a variance volatility measure. To sum up, exchange rates are significant determinants of tourism demand. Secondly, the exchange rate and a relative price *proxy* should not enter the tourism demand model separately, but rather be combined as an exchange rate adjusted effective price variable.

Cheng *et al.* (2013a, b) introduced the Structural Vector Autoregressive model (SVAR) to study the relationship between tourism revenues (exports) and tourism spending (imports). This paper illustrates the exchange rate effects on US tourism trade balance, using the SVAR model, using data from 1973 to 2007, for the exchange

rate, tourism exports and imports. There is no evidence of a J-curve behavior (The J-curve behavior means that in the short run, currency depreciation leads to a trade balance deficit, instead of a surplus, like it is expected) of the US tourism trade balance with the US dollar depreciation, and a unit elastic effect hypothesis of US tourism trade balance was raised. Export revenue is finitely sensitive to the exchange rate only.

Lee *et al.* (1996) estimated the demand from inbound tourism expenditures for South Korea from eight tourists-originating countries. The annual time series data is utilized in this study for the period between 1970 and 1989. The income of tourists, prices and other special factors such as political unrest, economic recessions and mega events (e.g., World Expo) are considered as major determinants. The log-log specification is applied, estimated by Ordinary Least Squares (OLS). Income has positive and significant influence while prices have negative and significant impact and the exchange rates have positive signs for all the countries except for the UK. But dummy variables like mega events are generally insignificant.

Smeral (2010) studies the demand for outbound traveling in Australia, Japan, Canada, United States, and the EU-15 countries in a period of recession - 2009 – using fixed prices and exchange rates and forecasts the possible scenario of recovery and discovers that the economic crisis and recession will influence the travel industry. Production and trade suffered from free-fall in 2009 and in the mid-2009 it seemed to come to the end, while the impact on tourism was surprisingly softer than in other industries. The author applied a standard tourism demand model (log-log linear approach) and a General Autoregressive Distributed Lag Model (ADLM), with annual data, using GDP at constant prices, exchange rates, and relative prices, covering the time period of 1977 until 2008 of the countries mentioned above. Surprisingly it is found that with the slight slump, the tourism industry will recover slower than industrial production and foreign trade industry. The domestic travel was influenced less than long distant travel. And it can be predicted that the best case would be stagnation and the worse would be a 2% decrease in 2010.

In addition, the impact of prices on the number of tourists is diverse from the departing countries. The demand variation in tourism demand of New Zealand was estimated by Schiff and Becken (2011). The log-log specification was chosen, gives a direct elasticity estimate. Elasticities for not only international visitor arrivals but on-the-ground expenditure *per* arrival are estimated of time series data for each

segment. Analyzing the annual data for arrivals and the consumption from 16 countries (1997-2007), the author concluded that the traditional segments like the USA and Australia were less price sensitive, while the Asian markets are relatively more sensitive to prices. Since the price is one of the critical components for tourists' decision, the inspection of price competitiveness relatively to the exchange rate and internal inflation should be consider. Dwyer and Forsyth (2002) made a comparison of price competitiveness among Australia and 13 chosen destination countries. The article discusses the tourism price competitiveness relative to exchange rate and domestic inflation of the destinations, using Australia as the base case. The appreciation of the exchange rate and inflation rates jointly determine the price competitiveness. With the devaluation of the Australia dollar from 1985 to 1997, all 13 countries raised the price competitiveness compared with Australia. And the countries which kept relatively lower inflation rates greater enlarged their competitive advantage.

In the case of Taiwan, while the effects of relative prices and exchange rate volatility tend to be different, the exchange rate typically has the expected negative impact on tourist arrivals to Taiwan. Whereas exchange rate volatility can have positive or negative effects on tourist arrivals to Taiwan, depending on the source of the international tourists (Chang and Mcaleer, 2012). The authors use daily data on exchange rates and its volatility; arrivals of tourism to Taiwan from Japan, the USA, and the Rest of the World from 1 January 1990 to 31 December 2008. To capture the approximate long-memory properties in the tourist arrivals series, the heterogeneous autoregressive model is applied.

This thesis will also focus on the relationship between exchange rates, relative prices and the number of inbound tourists and tourism revenues, but taking into account a large panel of countries between 1995 and 2012, allowing to reach global conclusions.

3. Data

The data used in this study, which measures tourism demand and the global and domestic economic conditions that can explain it, are introduced in this Section.

To measure tourism demand, we have the number of arrivals and the on-the-ground expenditure level. The amount of inbound visitors and expenditures represent a direct quantification of the demand and both can be influenced by the nominal exchange rate, the relative prices index, and the World GDP. The data of tourism arrivals and expenditure from 1995-2012 were collected from the World Tourism Organization. There are four approaches to compile the tourism arrivals, namely the arrivals of non-resident tourists at national borders (TF), arrivals of non-resident visitors at national borders (VF), arrivals of non-resident tourists in hotels and similar establishments (THS) and arrivals of non-resident tourists in all types of accommodation establishments (TCE). In this paper, the database only applies the VF and TF criteria but not THS and TCE for the sake of effectiveness. The countries, for which VF and TF are not observed, are eliminated.

The exchange rate (XR) is an important independent variable to discuss the correlation with the prices and travelling demand. It basically determines the purchasing power of one currency in respect to another, whereas the expenditure-side real GDP at chained PPPs allows comparison of relative living standards across countries and over time. Also, the population (POP) of the destination country also affects the nominal demand. To a certain extent, it mirrors the size of the country as, for example, the chance of travelling for business and visiting friends and family purpose will be higher. The nominal exchange rate is defined with respect to the US dollar, the dominant currency in the current international monetary system:

$$Exchange\ rate = \frac{national\ currency}{U.S.\ dollar} \qquad [1]$$

The data for the exchange rate (XR), expenditure-side real GDP at chained PPPs (RGDPE), and population (POP) were obtained from the Penn World Tables versions 7.1 and 8.0.

The consumer price index (CPI) measures the price level of a consumer basket of goods and services purchased by households. It is one of several different price

indices calculated by most of the national statistical agencies. A CPI can be used to derive the real value of income and to show changes in real terms. The collected data of CPI is from 1960 to 2012, and its source is the World Bank. Instead of directly using the domestic CPI as a covariate in the model, applying the relative goods prices (RP) with respect to the US price levels would be more effective. That is, an increase of domestic CPI may influence tourism positively if prices abroad rise at a higher rate. Because there isn't such a thing as a "World CPI", we consider the CPI of the US as a proxy for that. Thus, relative prices are defined as:

$$\text{Relative Prices (RP)} = \frac{\text{Domestic CPI}}{\text{USA CPI}} \qquad [2]$$

The World gross domestic product (World GDP, current prices) is also introduced as one of the key determinants of tourism demand because it reflects the global economic environment and wealth. In principle, wealthier populations are more likely to travel abroad and do tourism. The statistics from 1995-2012were gathered from the International Monetary Fund, World Economic Outlook Database.

The data from the World Tourism Organization is the basis for selecting the countries. Only the countries with data for non-resident tourists at national borders (TF) or arrivals of non-resident visitors at national borders (VF) were included in the database. The data of tourism arrivals and expenditure is available from 1995 to 2012, for 216 countries, which are listed in the Appendix. The measurement units of each variable are listed in Table 1 below.

Table 1 - The Variables

POP	Population – in millions
XR	Exchange Rate, National Currency/U.S. Dollars
RGDPE	Expenditure-side real GDP at chained PPPs – U.S. dollars in millions, 2005=100
CPI	Consumer Price Index (2005 = 100)
Expenditure	Tourism expenditure in the country– U.S. dollars in millions
Arrival (TF) or (VF)	Arrivals of non-resident tourists (visitors) at national borders- in thousands
World GDP	World Gross Domestic Product, Current prices– U.S. dollars in billions

4. Methodology

The database involves 218 countries observed over 8 years (1995-2012) and is an unbalanced panel. The analysis involve specifying regression models for tourism arrivals and expenditures as a function of exchange rate (XR), relative prices (RP), and the global gross domestic product (World GDP).

The number of arrivals is modeled by means of a pooled Poisson regression for count data because the number of arrivals is an integer value for all countries and years. The coefficients are estimated and inference is done by maximum likelihood approach.

For the remaining dependent variables, we use panel data regression models, testing for the existence of individual country specific effects and, in the case of its presence, testing for random effects against the fixed effects type. The appropriate estimator is used and related inference procedures undertaken. To account for time-effects, we add a deterministic linear time trend to the models.

In order to select the best model, Redundant Fixed Effects Tests are used to test for cross-section effects, i.e. country effects. The hypotheses are shown below. The significance level is of 0.05. If the result shows evidence that there are country effects, it needs to be examined whether it is fixed country effects or random country effects.

$$\begin{cases} H_0: & \textit{No country effect} \\ H_1: & \textit{Country effect} \end{cases}$$

To specify the type of country effect, we ran the Hausman Test. The hypotheses of the test are displayed below. The significance level is 0.05.

$$\begin{cases} H_0: & \textit{Random effect} \\ H_1: & \textit{Fixed effect} \end{cases}$$

A regression model is poorly specified in its functional form when it does not correctly describe the relationship between the dependent and explanatory variables. Therefore, we model arrivals in levels, capturing absolute variations as a response to a unit variation of the covariates, and we model expenditures in logs so that the model's coefficients are interpreted as point elasticity. In general, taking the logarithm of some variables is enough to correctly describe nonlinear relationships in economics and management. A measure of fit such as the R-squared is also presented in the results.

5. Empirical Results

5.1 Model 1

Four models will be put forward in the following analysis. To start with, arrival is the dependent variable, and exchange rate (XR), relative prices (RP) and the World GDP are the explanatory variables. The linear regression model is given by (Model 1):

$$Arrival_{it} = \beta_0 + \beta_1 XR_{it} + \beta_2 RP_{it} + \beta_3 world\ GDP_{it} + \beta_4 Trend + \varepsilon_{it} \quad [3]$$

Where $Arrival_{it}$ is the dependent variable, β_0 is the intercept, β_1, β_2, β_3 and β_4 are the parameters or coefficients of XR, RP, the World GDP and Trend, respectively, and ε_{it} is the error term. In this thesis, the time effect is considered to be of certain impact on the tourism arrival.

The estimated result is shown in Table 2.

Table 2 - The Independent Variables and the Coefficients of Model 1

Independent Variable	β
XR	-0.000230 (-1888.451)
RP	-0.006571 (-33.98658)
World GDP	4.35E-06 (190.9578)
Trend	0.027792 (422.9628)
c	10.47412 (19113.16)

() The z-Statistic value

The specification of the estimated model is given by:

$$Arrival_{it} = 10.47412 - 0.000230 XR_{it} - 0.006571 RP_{it} + 4.35 \times 10^{-6} world\ GDP_{it} + 0.027792 Trend \quad [4]$$

(1) 10.47412 is the intercept[1] of Model 1.

(2) -0.000230 is the expected variation of Arrival per unit change on XR, ceteris paribus, i.e., if all the rest remains constant.

[1] The intercept has no economic meaning in this model.

(3) -0.006571 is the expected variation of Arrival per unit change on RP, ceteris paribus, i.e., if all the rest remains constant.

(4) 4.35E-06 is the expected variation of Arrival per unit change on the World GDP, ceteris paribus, i.e., if all the rest remains constant.

(5) 0.027792 is the expected variation of Arrival per unit change on Trend, ceteris paribus, i.e., if all the rest remains constant.

The R-squared is 0.023653, which means that about 2.3653% of the sample variation of dependent variable is explained by the model.

When the domestic currency depreciates, namely the exchange rate increases, the tourism arrival is expected to rise. On the contrary, the arrival is supposed to decline when an appreciation occurs. Therefore, the coefficient of XR in Model 1 is expected to be positive. However, the coefficient of XR is negative, implying the opposite conclusion that the increasing value of the inland currency brings more visitors. Nevertheless, the coefficient is quite negligible (-0.000230).

As to the reason why the parameter of XR could be negative, meaning that currency depreciation brings even less tourism arrivals, several factors should be taken into account. The causes which lead to the domestic currency devaluation play a significant role.

First of all, in terms of outbound travelling, the factor of safety is of great importance. The war, political unrest and terrorist attack will definitely draw fewer visitors to the destination country of all visit purposes.

Additionally, the performance of the domestic economy partly determines the exchange rate movements. Suffering the rough national economic environment, the exchange rate will tend to descend. With the lower trade connection, it may lower the demand of inbound business travel.

On the other hand, the currency value is not only decided by the domestic economic environment but on a larger scale, representing the status of an economic system, like the Euro currency and European Union. In some countries of the European Union, like Italy and Finland, the Euro has been appreciating over the last decade and at the same time the arrivals kept growing.

Table 3 - The Euro Exchange Rate and Tourism Arrival in Italy and Finland

Year	Euro Exchange Rate	Italy	Finland
2002	1.062551667	39799	2875
2003	0.886034167	39604	2601
2004	0.805365	37071	2840
2005	0.80412	36513	3140
2006	0.797140833	41058	3375
2007	0.7306375	43654	3519
2008	0.682674711	42734	3583
2009	0.71984336	43239	3423
2010	0.755044952	43626	3670
2011	0.719355254	46119	4192

The coefficient of relative prices (RP) is -0.00657, implying that higher relative prices result in lower visit demand. Normally the prices of goods or services in destination are an important element when the potential customers make decisions. Moreover, the price sensitivity is diverse across different groups of tourists. Generally speaking, the middle age people react less to the increase in prices than the young people. And nowadays, more and more young people have the wiliness to travel although they probably have limited budgets. Compared with the middle age group, with also lower income, the youth pay more attention to the prices of hotel, food and also other on-the-ground services. The lower relative prices are, the greater is the attraction for visitors.

The World GDP is another key factor for many industries, including the tourism industry. As the estimated coefficient of the World GDP equals 4.35E-06, it predicts that the World GDP growth is positive for the inbound tourism arrival. A rising World GDP illustrates an economy that is expanding. The healthy economy brings higher income and cuts down the unemployment rate which allows people to increase the consumption for leisure and the travel trade benefits from it. From the database, we observe a World GDP that is continuously developing and a population of arrivals that is going up for most of the countries.

The growing economy also encourages the government and industries to re-invest in order to enlarge the economies of scale. With respect to the tourism

industry, the government will consider infrastructure improvements like the transportation system and landscape construction, which possibly attracts more visitors. The promotion of the destinations abroad is worth to devote. In Forsyth *et al.*'s (2014) work, it is suggested that promotion is one of the effective measurements to bring more visitors.

The reason for introducing the time trend effect in the model is that the tourism demand has been increasing steadily, which can be observed from the data. The parameter value of 0.027792 represents a growing trend effect on arrivals. Per year, there is an average increase of 0.0028 thousands of tourists. Thanks to the continuous growth of global economy, people have more money to spend in leisure. Besides, as the demand of travelling goes up, more companies tend to participate in the tourism industry. A larger amount of players bring about the competition. As a consequence, the price of travelling products falls gradually. Inversely, it appeals to even more customers to consume.

After all, this Model 1 takes Arrival as the dependent variable and exchange rate, relative prices, the World GDP and the trend as explanatory variables but the coefficient of XR has the unexpected sign. To improve knowledge about the tourism demand, we introduce three alternative models.

5.2 Model 2

In Model 2, the population (POP) of the destination countries is introduced into the dependent variable as a normalization factor. The population is one of the indicators that reveal the size of a country. Larger countries, with bigger population, clearly receive a higher amount of visitors. To eliminate the influence of size, the dependent variable becomes Arrival/POP.

$$Arrival_{it} / POP = \beta_0 + \beta_1 XR_{it} + \beta_2 RP_{it} + \beta_3 world\ GDP_{it} + \beta_4 Trend + \alpha_i + \varepsilon_{it} \quad [5]$$

Where β_0 is the intercept, β_1, β_2, β_3 and β_4 are the coefficients of XR, RP, the World GDP and Trend, respectively. For selecting the most appropriate regression model, we run the panel options of no country effect, fixed country effect and random country effect. The Redundant Fixed Effects Tests and the Hausman Test are applied to identify the best model: the Redundant Fixed Effects Tests rejects the null

hypothesis that there is no country effect (Prob.=0.0000) and the Hausman Test confirms that there are fixed effects in Model 2 (Prob.= 0.0022, and a significance level of 0.05). Model 2 with fixed country effect provides the following results..

Table 4 - The Independent Variables and the Coefficients of Model 2

Independent Variable	β	Independent Variable	β
XR	-0.114142 (0.654884)*	XR	-
RP	-4285.714 (-6.849409)	RP	-4074.727 (-7.003018)
World GDP	0.034100 (1.353248)*	World GDP	-
Trend	266.0886 (3.765397)	Trend	352.258 (11.90886)
c	6909.866 (9.758217)	c	7569.763 (16.16486)

() The t-Statistic value

* The significance-value of the t-test is higher than 0.10

As the above results show, the observed t-Statistics for the coefficients associated to the variables XR and World GDP are over the significance level. Hence, these two variables are eliminated and the model is re-estimated (Columns 3 & 4).

Introducing these restrictions, the estimated specification is given by:

$$Arrival_{it} / POP = 7569.763 - 4074.727 RP_{it} + 352.258 Trend + \alpha_i \qquad [6]$$

(1) 7569.763 is the intercept[2] of Model 2.

(2) -4074.72 and 352.258 are the expected variations of Arrival/POP per unit change of RP and Trend, respectively, ceteris paribus.

The R-squared is 0.923848, which means that about 92.3848% of the sample variation of dependent variable is explained by the model. Since the R-square is far beyond 25%, it indicates that this model is well fitted.

The exchange rate and the World GDP are excluded in Model 2. Therefore, the relative prices and the time Trend are the only two determinants. It is although abnormal that the exchange rate and the World GDP are not significant to explain normalized arrivals, which is a weakness of Model 2.

[2] It has no economic meaning.

The Trend, which coefficient equals 352.258, shows that as time goes by the tendency of travelling abroad apparently increases.

The coefficient of the RP is -4074.72, meaning that RP has a negative influence on the dependent variable Arrival/POP. A small rise in the relative prices is going to reduce the mass of tourists. As it has been mentioned before, prices in the destination are an important factor of the travelling plans. Customers, especially the young generation, tend to travel even with a small budget in hands. In order to reduce costs, young people are more willing to stay in the hostel as well as being couch-surfers. It explains the fact that prices are a major concern about the trip. The increased relative prices make the consumers seek an alternative, the domestic destination or other countries.

If the country has the lowest distinguished attraction, the customers may easily find another replacement. In other words, the country itself has a great effect on the tourist receipts.

With respect to the estimated fixed country effect, a positive value means that the specific country characteristics bring itself more arrivals than the average country while a negative value points out to a country that obtains fewer tourists because of its individual effect. It can be seen that the country effects have huge differences. The highest value is 157086.6, by Macao China, whereas the lowest amount is -8438.783 from Mali. 33 countries, out of the 149, have positive estimated effects, which mean that their specificities help attract more sightseers. The top and bottom 20 countries in terms of country effects are listed in the appendix with its correspondent values.

To be more specific, several important countries are now selected as to study them individually. In the first case, Portugal has a high value of 5171.703 country effect. It means that Portugal has considerable unique attractions for travelers. Portugal, one of the Schengen States, offers free access for tourists who have visa from other Schengen Countries. The Schengen Visa for visitors usually last for at least 90 days, allowing visitors to explore more than one country at a time. With this policy, the whole Schengen area is definitely a tourism destination. Although some countries are attractive to customers for specific purposes, being in the Schengen area increase the possibility to exploring the neighboring countries as well. Also, Portugal is in the Eurozone, so visitors do not have to exchange currency if they are also from

the Eurozone. As a matter of fact, not only Portugal but other countries in both Schengen area and Eurozone like Greece (5858.866), France (5761.763) and Spain (5276.227) benefit from these policies. Besides, compared with some other European countries, the price of commodities in Portugal is relatively lower, which is good news for tourists. The climate is another reason that appeals to the customers. Summer is the peak season for traveling in Europe and Portugal is in particular popular for the nice temperatures, sunshine and the beaches. The unique historic environment is also attractive to some visitors. All that brings larger customer receipts.

Another interesting case is China, which has a relatively low value for the country effect — -5713.62 besides being negative. There are several major issues leading to this circumstance. Mainland China has comparatively strict control of entering the country. Considering the size and the population of China, it is usually assumed to have a bigger number of visit demands. However, reality is in an opposite way. The second reason for less tourism demand is language. As a country with 1.3 billion populations, only a small proportion of the population can speak English, not to mention other languages with fewer users. Relatively speaking, it might bring convenience for the travelers. Moreover, the cultural differences could be another major concern. Some visitors are interested in the eastern culture which drives them the desire to explore eastern countries, while some others feel strange about the culture. Moreover, the customers who are willing to know more about the culture, visit the neighboring countries like South Korea and Japan which share the similar culture but it is easier to get the visa. Last but not least, the less promotion of the tourism product and the tourist attractions may reduce the demand.

The Model 2 has the obvious limitation that the important determinants, XR and World GDP, are excluded which makes little economic sense.

5.3 Model 3

In the next regression model, the expenditure of inbound tourists is now the dependent variable. Here, (Expenditure/Arrival)/CPI measures real expenditures per tourist (the average spending that a tourist does in the country in real terms). To estimate the covariate's elasticity of real expenditure level per visitor, we take the logarithm of both dependent and explanatory variables.

$$\log\left[\left(Expenditure / Arrival\right) / CPI\right]_{it} = \beta_0 + \beta_1 \log XR_{it} + \beta_2 \log RP_{it} + \beta_3 \log world\ GDP_{it} + \beta_4 Trend + \alpha_i + \varepsilon_{it} \quad [7]$$

Where log[(Expenditure/Arrival)/CPI] is the dependent variable, β_0 is the intercept, β_1, β_2, β_3 and β_4 are the coefficients of log XR, log RP, log World GDP and Trend, respectively. The estimation results are in Table 4. According to the value of the t-Statistic, the log XR is not significant. Hence, we removed this variable and re-estimated the model. Besides, from the results of the Redundant Fixed Effects Test and the Hausman Test, we conclude that the random effects model is the best specification.

Table 5 - The Independent Variables and the Coefficients of Model 3

Independent Variable	β	Independent Variable	β
Log XR	0.006488 (0.276502)*	Log XR	-
Log RP	-0.957229 (-34.08797)	Log RP	-0.964790 (-45.16918）
Log World GDP	0.444793 (3.399547)	Log World GDP	0.441231 (3.450727)
Trend	-0.027786 (-3.387446)	Trend	-0.028232 (-3.513634)
c	-9.550369 (-7.089047)	c	-9.478391 (-7.286592)

() The t-Statistic value

* The significance-value of the t-test is higher than 0.10

Given the estimated coefficients, the specification of the model is given by:

$$\log\left[\left(Expenditure / Arrival\right) / CPI\right]_{it} = -9.478391 - 0.964790 \log RP_{it} + 0.441231 \log world\ GDP_{it} - 0.028232 Trend + \alpha_i \quad [8]$$

(1) -9.478391 is the intercept[3] of Model 3.

(2) -0.964790% is the expected variation (ceteris paribus) in [(Expenditure/Arrival)/CPI] per 1% variation in RP.

(3) 0.441230% is the expected variation (ceteris paribus) in [(Expenditure/Arrival)/CPI] per 1% variation in the World GDP.

(4) -2.8232% is the expected variation (ceteris paribus) in [(Expenditure/Arrival)/CPI] per year.

[3] No economic meaning.

The R-squared is 584781, which means that about 58.4781% of the sample variation of dependent variable is explained by the model. The R-squared is higher than 25%, implying that the model is reasonable for the database.

The World GDP does positively impact the real expenditures per tourist (elasticity of 0.44). There is no doubt that expanding the global economy boosts the consumption and the tourism industry will benefit from it.

As is shown above, the slighter negative effect in Trend (-2.8232%) is out of expectation, after controlling for the global economic growth. Excluding the inflation effect, it seems that consumers are supposed to have larger tourism consumption than before. To the contrary, the estimation speaks in an opposite way. Before, when travelling was not as popular, there were fewer players in the market. With less intensive competition, the prices would possibly be unreasonable. Also, the tourism customers in early years were those who earned a relatively high income or who were mostly from the developed regions. Relatively speaking, they are less sensitive to price changes. But since the expanding promotion of the tourism industry, it is now the trend that more and more people among different ages and social classes are attracted by the idea of sightseeing. The customer's group becomes bigger, including low income individuals like the young generation and this makes expenditures per capita drop. The expanding market also brought new players. The economies of scale contribute to lower the price. To acquire more customers, the prices of the products and services are cut down which lessen the cost of traveling. The new current of DIY tour, other than joining the tourist group, requires less product portfolio that contains fancy accommodation or attentive services. The semi-self-service products which charge less have been marketed. At the same time, the lower purchasing power of the new customers of this industry reduced the average expenditure as time passed.

When it comes to customers like students or the low income households, they pay higher attention to the relative prices. As a consequence, the relative prices seem to be a major factor for the visitors' purchasing level. In this model, each percent change in relative prices brings quite negative influence (-0.964790%) on the per capita consumption of inbound visitors. In fact, the hypothesis of a relative prices unitary elasticity of real expenditure level per visitor cannot be excluded from this model.

The limitation of Model 3 is that the variable log XR is eliminated from the model, although its coefficient has the expected sign. Maybe, it is because the exchange rate is endogenous to the relative prices formation, i.e., the XR is one of the critical factors for explaining RP.

5.4 Model 4

In the last model (Model 4), we take (Expenditure/CPI)/RGDPE as the dependent variable and keep the log specification. This variable stands for real expenditures in terms of real national GDP which measures the importance of the receipts of tourism for the wealth of an economy at each year.

$$\log\left[\left(Expenditure/CPI\right)/RGDPE\right]_{it} = \beta_0 + \beta_1 \log XR_{it} + \beta_2 \log RP_{it} + \beta_3 \log world\ GDP_{it} + \beta_4 Trend + \alpha_i + \varepsilon_{it} \quad [9]$$

The Redundant Fixed Effects Test and the Hausman Test were also computed to identify whether the fixed effect estimation or the random effect one is the appropriate one. Both p-values are equal to zero and, thus, the fixed effects estimator is the chosen one.

Table 6 - The Independent Variables and the Coefficients of Model 4

Independent Variable	β
Log XR	0.084954 (2.545303)
Log RP	-0.968491 (-34.46579)
Log World GDP	0.825538 (7.334117)
Trend	-0.024524 (-3.489682)
c	-17.55934 (-14.91417)

() The t-Statistic value

The estimated model is as follows:

$$\log\left[\left(Expenditure/CPI\right)/RGDPE\right]_{it} = -17.55934 + 0.084954 \log XR_{it} - 0.968491 \log RP_{it} + 0.825538 \log world\ GDP_{it} - 0.024524 Trend + \alpha_i \quad [10]$$

(1) -17.55934 is the intercept[4] of Model 4.

(2) 0.084954%, -0.968491%, and 0.825538% are the expected variation (ceteris paribus) in [(Expenditure/RGDPE)/CPI] per 1% variation in XR, RP, and World GDP, respectively.

(3) -2.4524% is the expected variation (ceteris paribus) in [(Expenditure/RGDPE)/CPI] per year

The R-squared is 0.929557, which means that about 92.9557% of the sample variation of dependent variable is explained by the model. This model is appropriate for analyzing the database.

The coefficient 0.084954 means that each percent change of XR has a positive effect on the real expenditures in terms of real GDP, which is consistent to our established assumption. As we defined the exchange rate as domestic currency divided by the U.S. dollar, the increase in the exchange rate implies that the national currency is depreciating which probably motivate the boost of real expenditures on the ground. This value for the elasticity is quite small in absolute terms, albeit statistically significant. That is, the nominal exchange rate influences expenditures per unit of national income but not expenditures per tourist.

Likewise, the World GDP can intensively push up the expenditure of tourism real consumption in terms of the domestic GDP. The value of 0.825538 is the estimated effect on the dependent variable which is very close to unitary and unquestionably much larger than the one in Model 3 (real expenditures per tourist). In this case, it can be concluded that the global economic environment is of a significant importance for tourism and, consequently, for the economy as a whole.

In contrast, the time Trend variable evidences that real expenditure on the real GDP has been dropping at an average rate of 2.44% per year, after controlling for exchange rates, relative prices and World's wealth. The reason for this fact can be that the new customer group like the young generation and the low income households are more sensitive to cost efficiency while the fierce competition in the tourism market force the industry participants to slash the prices.

[4] It has no economic meaning.

Last but not least, and confirming the result for Model 3, the relative prices' (RP) elasticity on the dependent variable is essentially unitary: The level of expenditures responds at the same rate as the change of relative prices. It implies that the consumers do care about prices when they purchase goods or services in the destination.

From the fixed effects estimation procedure, we can obtain the various individual country effects. The 20 countries with the highest and the lowest values are listed in the appendix 2.2. The maximum amount is for Macao China (3.419781) while the minimum is -4.987698 (Guinea). In terms of China, the effect equals -1.264216. In other words, specific factors of China passively affect the proportion of the real consumption of the foreign visitors into the domestic real GDP. According to the previous research, the economic growth most likely comes from the intensive-productivity department and for the developing countries like China, which is not a tourism depending country, the tourism industry plays a marginally part in the overall economy. Also, tourism is not a productivity demanding industry and then it contributes less to the economic development. (Romer, 1990 and Sequeira and Campos, 2007) On the other hand, Portugal (1.215045) is proved to have clear individual advantages to boost the proportion of inbound consumption in terms of the real GDP. To a certain extent, tourism is one of the pillar industries of Portugal. With the promotion and the relatively low commodity price, it motivates the inbound consumption.

In short, this model seems to be our preferred one, since all of the estimated variables have significant coefficients with the expected signs, which is somehow consistent to some published research.

6. Conclusions

This paper investigates the influence of the exchange rate and the inflation rate on the tourism industry, namely inbound number of visitors and tourism expenditures for a large selection of countries, between 1995 and 2012.

We have estimated four models. The first model estimated the relationship, using a Poisson regression between Arrivals and exchange rate, the World GDP, and relative prices, and also using a trend. In the model, the exchange rate is negatively related to the dependent variable, which is not consistent to previous research. By setting the data as a panel, we build the following three models. Model two is built having Arrivals divided by the population as the dependent variable and the same independent variables as in the first model. However, with the fixed effects estimation, the exchange rate and the World GDP are excluded because they lack significance, which is the weakness of this model. It can be concluded that only the relative prices and the trend have impact on the arrivals *per head* of population. In the models 3 and Model 4 we took the logarithm and use as the dependent variable the log of (Expenditure/Arrival)/CPI, and as independent variables we used the logarithm of the exchange rates, the relative prices, the World GDP, and the trend, using the random effects estimation. However, the logarithm of the exchange rate was eliminated and the logarithm of the relative prices had negative elasticity on the real expenditure *per* arrival. The log trend has only a slight impact and the log of the World GDP can positively influence the dependent variable. With the growth of World economy, expenditure allocated to leisure travelling may increase. Younger customers and low-income households are also more sensitive to price changes. Again, the disadvantage of Model 3 is the elimination of the exchange rate. In our last model we applied (Expenditure/CPI)/RGDPE as the dependent variable with the same explanatory variables as in Model 3, using the fixed effects estimation. All the variables are significant and with the expected sign. Both the exchange rate and the World GDP have a positive influence and the relative prices and the trend a negative one.

There are two main limitations in our research: (1) the inclusion of the exchange rates in the estimations is sometimes inconsistent with the results found in previous literature, (2) the larger scale of countries reduces the practical sense for individual countries or regions. As we studied the data from a wide range of countries, the

disturbance would be increase, and the model may not fit well the specific circumstance of one particular country or region. Further research can investigate the endogenous relationship with other determinants. Additionally we can classify the countries into sub-groups by geographic or economic reasons and make specific estimations.

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Appendix

1. The Panel

	POP	XR	RGDPE	CPI	Expenditure	Arrival
AFGHANISTAN	1995-2010	1995-2010		2004-2012	2008-2012	
ALBANIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
ALGERIA	1995-2010	1995-2010		1995-2012	2005-2012	1995-2012
AMERICAN SAMOA						1995-2001&2005-2012
ANDORRA						1999-2012
ANGOLA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
ANGUILLA						1995-2012
ANTIGUA AND BARBUDA	1995-2011	1995-2011	1995-2011	1998-2012	1995-2012	1995-2012
ARGENTINA	1995-2011	1995-2011	1995-2011	1995-2007	1995-2012	1995-2012
ARMENIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
ARUBA				1995-2012	1995-2012	1995-2012
AUSTRALIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
AUSTRIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	
AZERBAIJAN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
BAHAMAS	1995-2011	1995-2011	1995-2011		1995-2012	1995-2012
BAHRAIN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
BANGLADESH	1995-2011	1995-2011	1995-2011	1995-2012	2002-2006&2009-2012	1995-2010
BARBADOS	1995-2011	1995-2011	1995-2011	1995-2012	1995-2010	1995-2012
BELARUS	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
BELGIUM	1995-2011	1995-2011	1995-2011	1995-2012	2001-2012	

BELIZE	1995-2011	1995-2011	1995-2011	1995-2012	1996-1998	1995-2012
BENIN	1995-2011	1995-2011	1995-2011	1995-2012	1996-2012	1995-2012
BERMUDA	1995-2011	1995-2011	1995-2011		2011-2012	1995-2012
BHUTAN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
BOLIVIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
BONAIRE						1995-2010
BOSNIA AND HERZEGOVINA	1995-2011	1995-2011	1995-2011	2005-2012	1998-2012	
BOTSWANA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2010
BRAZIL	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
BRITISH VIRGIN ISLANDS					1995-2012	1995-2012
BRUNEI DARUSSALAM	1995-2011	1995-2011	1995-2011	1995-2012		1995-2003&2005-2007
BULGARIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
BURKINA FASO	1995-2011	1995-2011	1995-2011	1995-2012	2000-2010	
BURUNDI	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2010
CAMBODIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
CAMEROON	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	2006-2012
CANADA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
CAPE VERDE	1995-2011	1995-2011	1995-2011		1995-2012	1995-2012
CAYMAN ISLANDS					1995-2011	1995-2012
CENTRAL AFRICAN REPUBLIC	1995-2011	1995-2011	1995-2011	1995-2012	1995-2010	1995-2010
CHAD	1995-2011	1995-2011	1995-2011		1995-2002	2006-2012
CHILE	1995-2011	1995-2011	1995-2011	2009-2012	1995-2012	1995-2012
CHINA	1995-2011	1995-2011	1995-2011	1995-2012	1997-2012	1995-2012

COLOMBIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
COMOROS	1995-2011	1995-2011	1995-2011	2000-2012	1995-2012	1995-2012
CONGO	1995-2011	1995-2011	1995-2011	1995-2010	1995-1996&1999-2004	2010-2012
COOK ISLANDS					1995-2010	1995-2012
COSTA RICA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
COTE D'IVOIRE				1995-2012	1995-2010	2007-2012
CROATIA	1995-2011	1995-2011	1995-2011	1995-2012	1999-2012	
CUBA	1995-2010	1995-2010			1995-2012	1995-2012
CURAÇAO					1995-2012	1995-2012
CYPRUS	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
CZECH REPUBLIC	1995-2011	1995-2011	1995-2011	1995-2012	2002-2012	2003-2012
DEMOCRATIC REPUBLIC OF THE CONGO	1995-2011	1995-2011	1995-2011	1995-2012		1995-2011
DENMARK	1995-2011	1995-2011	1995-2011	1995-2012		
DJIBOUTI	1995-2011	1995-2011	1995-2011	2000-2012		
DOMINICA	1995-2011	1995-2011	1995-2011	1995-2012		1995-2012
DOMINICAN REPUBLIC	1995-2011	1995-2011	1995-2011	1995-2012		1995-2012
ECUADOR	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
EGYPT	1995-2011	1995-2011	1995-2011		1995-2012	1995-2012
EL SALVADOR	1995-2011	1995-2011	1995-2011	1995-2012	1995-1996&1999-2012	1995-2012
EQUATORIAL GUINEA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2001	
ERITREA	1995-2010	1995-2010			1995-2009	1995-2011
ESTONIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
ETHIOPIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
FIJI	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
FINLAND	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1998-2012

FRANCE	1995-2011	1995-2011	1995-2011	1995-2012	1995-1996&1999-2012	1995-2012
FRENCH GUIANA					1998-1999&2001-2002&2005&2007	1998-1999&2001-2002&2005&2007&2009
FRENCH POLYNESIA					1995-1999&2002-2005	1995-2012
GABON	1995-2011	1995-2011	1995-2011	1995-2012	1995-2005	1995-2005
GAMBIA	1995-2010	1995-2010			1996-1997&2003-2012	1995-2012
GEORGIA	1995-2011	1995-2011	1995-2011	1995-2012	1997-2012	1995-2012
GERMANY	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	
GHANA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2010
GREECE	1995-2011	1995-2011	1995-2011	1995-2012	1995-1997&1999-2012	1995-2012
GRENADA	1995-2011	1995-2011	1995-2011	1995-2012		1995-2012
GUADELOUPE					1995-2000&2005-2011	1995-2001&2003-2011
GUAM						1995-2012
GUATEMALA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2003&2008-2011	1995-2012
GUINEA	1995-2011	1995-2011	1995-2011	2004-2012	1995-2001&2007-2012	1996-2007
GUINEA-BISSAU	1995-2011	1995-2011	1995-2011	1995-2012	2003-2004&2010	2001&2005-2007
GUYANA	1995-2010	1995-2010		1995-2012	1996-2003	1995-2012
HAITI	1995-2010	1995-2010		1995-2012		1995-2012
HONDURAS	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
HONG KONG, CHINA	1995-2011	1995-2011	1995-2011	1995-2012	1998-2012	1995-2012
HUNGARY	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	2004-2012
ICELAND	1995-2011	1995-2011	1995-2011	1995-2012	1995-2008	1995-2012
INDIA	1995-2011	1995-2011	1995-2011	1995-2012	2000-2008&2012	1995-2012
INDONESIA	1995-2011	1995-2011	1995-2011	1995-2012	2002-2012	1995-2012
IRAN, ISLAMIC REPUBLIC OF	1995-2010	1995-2010		1995-2012	1995-2011	1995-2012
IRAQ	1995-2011	1995-2011	1995-2011	1995-2011	2005-2012	1995-2001&2008-2010
IRELAND	1995-2011	1995-2011	1995-2011	1995-2012	1995-1997&1999-2012	1995-2012

ISRAEL	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
ITALY	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
JAMAICA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2011	1995-2012
JAPAN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
JORDAN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
KAZAKHSTAN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	2000-2012
KENYA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2010
KIRIBATI	1995-2010	1995-2010			1995-2001&2005-2009	1995-2012
KOREA, REPUBLIC OF	1995-2011	1995-2011	1995-2011		1995-2012	1995-2012
KUWAIT	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
KYRGYZSTAN	1995-2011	1995-2011	1995-2011		1998-2012	2008-2012
LAO PEOPLE'S DEMOCRATIC REPUBLIC	1995-2011	1995-2011	1995-2011	1995-2012	1995-1999&2001-2012	1995-2012
LATVIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
LEBANON	1995-2011	1995-2011	1995-2011	2008-2010&2012	1995-2001&2003-2012	1995-2012
LESOTHO	1995-2011	1995-2011	1995-2011	1995-1996&1999-2012	1995-1999	1995-2012
LIBERIA	1995-2011	1995-2011	1995-2011	2001-2012		
LIBYA	1995-2010	1995-2010		1995-2012	1995-2010	1995-2003
LITHUANIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
LUXEMBOURG	1995-2011	1995-2011	1995-2011	1995-2012	2002-2004	
MACAO, CHINA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
MADAGASCAR	1995-2011	1995-2011	1995-2011	1995-2012	1995-2010	1995-2012
MALAWI	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2011
MALAYSIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2009	1995-2012
MALDIVES	1995-2011	1995-2011	1995-2011	2006-2012	2011-2012	1995-2012
MALI	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	2008-2012

MALTA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
MARSHALL ISLANDS	1995-2010	1995-2010			1995-2010	1995-2012
MARTINIQUE					1995-2012	1995-2012
MAURITANIA	1995-2011	1995-2011	1995-2011	1995-2012		1999-2000
MAURITIUS	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
MEXICO	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
MICRONESIA, FEDERATED STATES OF					1997-2011	1996-2008
MONGOLIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
MONTENEGRO	1995-2011	1995-2011	1995-2011		2005-2011	2007-2012
MONTSERRAT						1995-2012
MOROCCO	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
MOZAMBIQUE	1995-2011	1995-2011	1995-2011	1995-2012	2002-2012	2001-2012
MYANMAR				1995-2012	1995-2011	1995-2012
NAMIBIA	1995-2011	1995-2011	1995-2011	2002-2012	2000-2011	1995-2012
NEPAL	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
NETHERLANDS	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	
NEW CALEDONIA						1995-2012
NEW ZEALAND	1995-2011	1995-2011	1995-2011	1995-2012		1995-2012
NICARAGUA	1995-2010	1995-2010		1999-2012	1995-1999	1995-2012
NIGER	1995-2011	1995-2011	1995-2011	1995-2012	1996-1997&2002-2011	1999-2011
NIGERIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
NIUE					1995-1998&2003-2010	1995-2012
NORTHERN MARIANA ISLANDS						1995-2011
NORWAY	1995-2011	1995-2011	1995-2011	1995-2012	1995-2011	1995-2011
OMAN	1995-2011	1995-2011	1995-2011	2000-2012	1998-2012	2001-2009
PAKISTAN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012

PALAU	1995-2010	1995-2010			1998-2012	1995-2012
PANAMA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
PAPUA NEW GUINEA	1995-2010	1995-2010		1995-2012	2003-2008&2010-2012	1995-2012
PARAGUAY	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
PERU	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
PHILIPPINES	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
POLAND	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
PORTUGAL	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2007
PUERTO RICO	1995-2010	1995-2010			1995-2012	1995-2012
QATAR	1995-2011	1995-2011	1995-2011	1995-2012	2011-2012	2012
REPUBLIC OF MOLDOVA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
REUNION					1995-2012	1995-2012
ROMANIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
RUSSIAN FEDERATION	1995-2011	1995-2011	1995-2011	1995-2012	2001-2012	1995-2012
RWANDA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2001&2005-2012	2006-2012
SABA						1995-2010
SAINT KITTS AND NEVIS				1995-2012		1995-2012
SAINT LUCIA	1995-2011	1995-2011	1995-2011	1995-2012		1995-2012
SAINT VINCENT AND THE GRENADINES						1995-2012
SAMOA	1995-2010	1995-2010		1995-2012	1995-1999&2004-2012	1995-2012
SAN MARINO				2003-2012		
SAO TOME AND PRINCIPE	1995-2011	1995-2011	1995-2011	1996-2012		1995-2011
SAUDI ARABIA	1995-2011	1995-2011	1995-2011	1995-2012	2003&2007-2012	2000-2012
SENEGAL	1995-2011	1995-2011	1995-2011	1995-2012	1995-2010	2003-2011
SERBIA	1995-2011	1995-2011	1995-2011	1995-2012	2002-2012	

SEYCHELLES	1995-2010	1995-2010		1995-2012	1995-2012	1995-2012
SIERRA LEONE	1995-2011	1995-2011	1995-2011	2006-2012		1995-2012
SINGAPORE	1995-2011	1995-2011	1995-2011	1995-2012		1995-2012
SINT EUSTATIUS						1995-2010
SINT MAARTEN					2007-2012	1995-2012
SLOVAKIA	1995-2010	1995-2010			1995-2012	2003-2012
SLOVENIA	1995-2011	1995-2011	1995-2011		1995-2012	1995-2012
SOLOMON ISLANDS	1995-2010	1995-2010		1995-2011	1995-2011	1995-1998&2000&2003-2012
SOUTH AFRICA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
SPAIN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
SRI LANKA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
SUDAN	1995-2011	1995-2011	1995-2011	1995-2012		1995-2011
SURINAME	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
SWAZILAND	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
SWEDEN	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	2001-2003&2011-2012
SWITZERLAND	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	
SYRIAN ARAB REPUBLIC	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	
TAJIKISTAN	1995-2011	1995-2011	1995-2011	2000-2012	2002-2012	2008-2012
THAILAND	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA	1995-2011	1995-2011	1995-2011	1995-2011	1996-2012	
TIMOR-LESTE	1995-2010	1995-2010		2002-2012		2006-2012
TOGO	1995-2011	1995-2011	1995-2011	1995-2012	1998-2010	
TONGA	1995-2010	1995-2010		1995-2012	2004=2005&2007-2012	1995-2012
TRINIDAD AND	1995-2010	1995-2010		1995-2012	1995-2011	1995-2011

TOBAGO						
TUNISIA	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
TURKEY	1995-2011	1995-2011	1995-2011	1995-2012	2005-2012	1995-2012
TURKMENISTAN	1995-2011	1995-2011	1995-2011		1996-1997	1995-1998&2000-2007
TURKS AND CAICOS ISLANDS					1995-2002	1995-2012
TUVALU						1995-2011
UGANDA	1995-2011	1995-2011	1995-2011	1995-2012	2001-2012	1995-2012
UKRAINE	1995-2011	1995-2011	1995-2011	1995-2012	1996-2012	1995-2012
UNITED ARAB EMIRATES	1995-2010	1995-2010		2008-2011	1995-2010	
UNITED KINGDOM	1995-2011	1995-2011	1995-2011	1995-2012	1995-2012	1995-2012
UNITED REPUBLIC OF TANZANIA					1997-2012	1995-2012
UNITED STATES OF AMERICA					1995-2012	1995-2012
UNITED STATES VIRGIN ISLANDS					1995-2010	1995-2012
URUGUAY	1995-2011	1995-2011	1995-2011	1995-2012	1995-1998&2000-2012	1995-2012
UZBEKISTAN	1995-2011	1995-2011	1995-2011		1996-2004	1995-2010
VANUATU	1995-2010	1995-2010		1995-2012	1998-2012	1995-2012
VENEZUELA	1995-2011	1995-2011	1995-2011		1995-2012	1995-2012
VIET NAM	1995-2011	1995-2011	1995-2011	1995-2012	2003-2012	1995-2012
YEMEN	1995-2011	1995-2011	1995-2011		2010-1011	1995-2012
ZAMBIA	1995-2011	1995-2011	1995-2011	1995-2012		1995-2012
ZIMBABWE	1995-2011	1995-2011	1995-2011	1995-2005	1995-2012	1995-2012

2. The Estimated Country Fixed Effects

2.1 Model 2

Last 20 country	Effect	Top 20 country	Effect	Country	Effect
MALI	-8438.783	MACAO, CHINA	157086.6	PORTUGAL	5171.703
CHAD	-8228.67	CONGO	78628.53	CHINA	-5713.62
CAMEROON	-7938.702	BAHRAIN	61540.71		
CHILE	-7568.921	BAHAMAS	43051.23		
ANGOLA	-7522.904	CYPRUS	25720.69		
SIERRA LEONE	-7477.187	HONG KONG, CHINA	24479.47		
INDONESIA	-7416.778	MALTA	23265.23		
BELARUS	-7400.305	ANTIGUA AND BARBUDA	21993.99		
ZIMBABWE	-7378.975	BRUNEI DARUSSALAM	20365.66		
VIET NAM	-7320.613	MALDIVES	15686.97		
TIMOR-LESTE	-7300.437	BARBADOS	13403.5		
IRAQ	-7157.938	SEYCHELLES	11093.91		
IRAN, ISLAMIC REPUBLIC OF	-7121.109	SAINT LUCIA	10773.71		
LAO PEOPLE'S DEMOCRATIC REPUBLIC	-7069.926	IRELAND	10385.3		
ZAMBIA	-7056.611	SINGAPORE	9988.455		
SENEGAL	-6943.15	KUWAIT	7717.647		
HAITI	-6908.456	GREECE	5858.866		
COMOROS	-6826.207	FRANCE	5761.763		
REPUBLIC OF MOLDOVA	-6790.083	ICELAND	5743.408		
GUINEA	-6777.073	GRENADA	5683.237		

2.2 Model 4

Last 20 country	Effect	Top 20 country	Effect	Country	Effect
GUINEA	-4.987698	MACAO, CHINA	3.419781	PORTUGAL	1.215045
BANGLADESH	-3.843422	MALDIVES	3.188457	CHINA	-1.264216
BURUNDI	-3.690324	BAHAMAS	3.057317		
TAJIKISTAN	-2.743174	CYPRUS	2.44761		
NIGERIA	-2.314069	BARBADOS	2.444672		
CENTRAL AFRICAN REPUBLIC	-2.174263	FIJI	2.322916		
BELARUS	-2.08541	MALTA	2.29984		
PAKISTAN	-2.064339	LUXEMBOURG	2.295822		
JAPAN	-2.03375	JAMAICA	2.012166		
INDIA	-1.971982	BELIZE	2.00455		
BRAZIL	-1.90841	JORDAN	1.968517		
GUINEA-BISSAU	-1.842049	BAHRAIN	1.963699		
ANGOLA	-1.741992	MONTENEGRO	1.952348		
BURKINA FASO	-1.659045	EL SALVADOR	1.856981		
CHAD	-1.636349	CROATIA	1.837523		
IRAQ	-1.618575	MAURITIUS	1.664322		
CONGO	-1.444637	AUSTRIA	1.616717		
INDONESIA	-1.426919	LEBANON	1.492723		
PARAGUAY	-1.372117	ESTONIA	1.441202		
COLOMBIA	-1.361406	HONG KONG, CHINA	1.361551		