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AN ECONOMETRIC MODEL OF TOURISM DEMAND IN INDIA

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ABSTRACT

This case study gives an overview of the tourism demand in India using an econometric model. The study covers the period between 1990 and 2011. Three countries i.e. USA, UK and Canada have been selected, and the choice of the countries is based upon the fact that they together constitute 35% of total tourists arriving in India. The results show a positive relationship between Foreign tourist arrivals and generating country GDP, and a negative relation between foreign tourist arrivals and relative prices.

INTRODUCTION

World Tourism is considered as a significant factor in the economy of many nations. Tourism is the third largest industry of the world after garments and gems-jewellery industry. Various studies and empirical analysis states that there is a direct effect of tourism activity on growth. It increases foreign exchange incomes and employment opportunities, and trigger overall growth. Tourism is a key factor for economic growth especially in the case of developing countries. India has a great ancient Historical and cultural background along with abundant natural wealth which attracts worldwide tourists. As per the Travel and Tourism Competitiveness Report (TTCR) 2009 by the World Economic Forum, India is ranked 11th in the Asia Pacific region and 62nd, moving up three places on the Overall List of the worlds attractive destinations. It is ranked 14th best tourist destination for its natural resources and 24th for its cultural resources, with numbers of natural and cultural world Heritages sites, rich fauna and strong creative industries in the country. Tourism in India is one of the largest service industries, with a contribution of 6.23% to the national GDP and 8.78% of the total employment in India. In 2010, total Foreign Tourist Arrivals (FTA) in India were 5.78 million and India generated about 200 billion US dollars in 2008. The majority of foreign tourists in India come from USA, UK and Canada. There share is around 15.81%, 11.98% and 7.41% respectively.

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In this paper, we modelled Tourist demand function of India from 1990-2011 from various parts of the world namely USA, UK and Canada with a view to understand the contribution of different determinants in explaining the India as an International tourist destination. Taking foreign tourist arrival as dependent variables, this paper tries to find out the effect on tourist demand by taking price competitive index as a proxy for price variable, income per capita of the origin country and business travel spending as explanatory or independent variables. After the introduction in Section 1, the paper is discussed in total of six sections. In section 2 studies which have already modelled tourism demand model are critically reviewed. In section 3 the tourism demand function is formed and data and variables are explained. In section 4 methodology used for working on regression coefficients is explained, followed by the results and conclusion in section five and six.

Literature review

Various studies have been conducted on the factors affecting foreign tourists' arrival or tourism demand function. Michael Brakke (2004) in his study constructed a tourism demand function for US tourists in 85 countries. In his study he has taken number of tourists from US to different countries as dependent variable, and the explanatory variables were income per capita refers to per-capita incomes in the country of origin, the U.S.A, to measure the in-country prices by developing a PCI (price competitive index) which is being adjusted for the effects of exchange rate variations in PPPs, so as to obtain an objective index standard for comparing relative

prices among countries, and then multiply by 100, and another explanatory variable was political variable taken as a proxy measure of political and economic freedoms and stability in the destination country. The model is tested for viable explanatory power by using a joint test of significance for all included independent variables. This study resulted that per-capita America was significant at .01 significance level which explained its extreme statistical importance in the model. The price variable (PCI) which was expected to be negative comes out to be statistically insignificant.The coefficient implies.057 % decrease in number of tourist to a given destination with a 1% increase in competitive price index because PCI of a country's price level relative to the United States, may not entirely capture the true prices of tourism within a given destination. Finally, the political variable has a negative sign. This is expected as it is presumed tourists would choose relatively more stable destinations to less stable ones. The t-statistic of -1.788 implies statistical significance at the .10 level of significance. A coefficient of -.058 implies that tourist arrivals to a given country decrease by 5.8 percent given a one-hundred percent deteriorationof the country's political status.

A study by B Seetanah, T D Juwaheer, et.al(2011) constructed tourism demand function for Mauritius.The study has taken Tourism infrastructure, income of tourists, distance, and relative prices(CPI of destination country adjusted by US exchange rate) as an important determinant of tourism demand function. They took the panel data on tourist arrivals into Mauritius from 1985-2006 from Europe and USA, Asia and Africa, with a view to understand the contribution of different determinants in explaining the success of the island as an international tourism destination. This paper used panel data estimation techniques and finds that the infrastructure has been contributing positively to tourist arrivals, particularly from Europe/America and Asia. Moreover relative prices matter for tourists from Asia and Africa but not for tourists from Europe and America. Distance showed negative coefficient for all the countries which indicated that tourists prefer shorter to longer journeys so as to minimize travel discomfort. The positive coefficients on income in country of origin suggest that tourists' arrival increased by much more from Europe/America (1.84%) and Asia (1.51%) than from America (0.51%) as a result of 1% increase in income in these respective regions.

Tourism development has become an important target for most governments, especially in the case of developing countries. There is a common belief that tourism can promote long-run economic growth. A Paper by Samimi, Somaye, *et al*., (2011) investigates the causality and long-run relationships between economic growth and Tourism development in developing countries using P-VAR approach during 1995-2008. The findings reveal that there is a bilateral causality and positive long-run relationship between economic growth and Tourism development. On the other words, the tourism-led growth hypothesis is confirmed along with the fact that the output level which relates to economic well-being and level of development is important in attracting tourist. VikasGautam and Suresh (2012) aimed in examining the casual relationship between these two variables at disaggregate bilateral level using the bilateral trade and tourist arrival data of India with Canada, USA, UK, France, Switzerland, Netherland, France, Germany and Italy for the period 1994 January to 2008 December. Unit root tests results shows that the tourist arrival and trade data for UK, USA, Canada, Italy and Switzerland are stationary.The Granger Causality results indicate the presence of bidirectional causal relationship between trade and Tourist arrivals in case of USA, Canada and Italy, while no significant causality is running between bilateral trade and tourist arrivals in case of Switzerland and UK.

From the above empirical literatures we have seen that income per capita of the host country always have a positive relationship with the foreign tourists arrivals which showed income as an important determinant in determining the demand for foreign tourists. Secondly, they have shown relative prices or price competitive index is having a negative impact. Thus, with an increase in the relative price level foreign tourists arrivals declined though it is insignificant in some cases. Further, there is a causal relationship between international trade and international tourism in India with most of the countries. Our paper is trying to analyze the impact of all these variables together in the context of India by seeing that what motivates foreign tourists from USA, UK, and Canada being the highest percentage of FTAs in India to travel here. We are trying to construct a tourism demand function for India.

Variables and Data

According to consumer maximization theory, individuals will choose destinations based on an optimization of utility, faced with income and budgetary limitations. Destinations cannot be packaged attractively and sold at the local markets: tourism choices by definition, account for the willingness of consumers to travel to, and live temporarily in, a given destination. Thus scene, climate prejudices, cultural attraction and many others attributes will affect consumer choices in along with prices but as it is difficult to quantify many of these variables so many variables cannot be used for estimation of demand model. (Michael brake, 2004).

The general international tourism demand model typically estimated is:

$FTA_{ij} = f(Y_j, TC_{ij}, RP_{ij}, ER_{ij}, TS_i)$

where:

FTA_{ij} = foreign tourist arriving from origin country j to destination i

Y_j = national income of origin j;

TC_{ij} =transportation cost between destination i and origin j;

RP_{ij} = relative prices, the ratio of prices in destination i to prices in origin j;

ER_{ij} = exchange rate, measured as units of destination i's currency per unit of origin j's currency;

TS_i= Tourism spending done by people coming into destination country for purpose of leisure or business.

Dependent variable

The amount of tourism demand can easily be represented by the number of foreign tourists' arrivals (FTA) in India from USA (FTAUS), UK (FTAUK) and Canada (FTACAN). The number of foreign tourists' arrivals (FTA) in India from these

three specific countries is obtained from Indian tourism statistics (ITS) from 1990-2011. According to consumer demand theory, three broad categories of determinants explain demand for a given commodity: socio-economic and demographic factors, qualitative factors, price factors. In turn, these determinants can be broken down into specific factors directly applicable to tourism demand as follows:

Price variable

Transport costs and the in-country costs are the two components considered by foreign tourists while deciding travel options. Transport costs through air, land and sea vary differently at different point of time. Hence, because of unable to access the adequate data, transport costs is removed from the model of tourism demand and past works by authors have also shown that the transport costs do not appear as significant determinant in tourism demand (Sinclair 1998). In-country costs are the expenses at the destination country which includes accommodations, food, drink, tour services, souvenirs, and entertainment, among many others. The expenses of travellers may vary within the destinations. Therefore a particular representative of all these expenditures in the form of a tourism price index which includes well defined basket of goods consumed by tourists isn't available. Therefore, Price Competitive Index (PCI) is being taken to measure international in-country prices. For this, overall price of an economy is being taken. So, to calculate it we have taken Purchasing Power Parity (PPP) of India with respect to all three countries, which indicate the levels of expenditure required in different countries to consume the same general basket of goods and services. One must adjust for the effects of exchange rate variations in PPPs to complete the price competitive index (PCI). So, to compare the relative prices of the countries we have calculated PCI for all the three countries with help of :

PCI= (PPP/exchange rate)*100

The PPP has been taken from the site http:/www.oecd.org/std/ppp/ and the exchange rate has been taken from the site of world bankand named as PCIUSA, PCIUK, and PCICAN

Income variable

Socio-economic explanatory variables like income reflect changes in tourists' patterns. Income which is (incpercapita), in this analysis, refers to per-capita incomes in the country of origin, the USA (incpercapitaUSA), UK (incpercapitaUK) and Canada (incpercapitacan). According to

In case of USA it has been seen that their incomes has been increasing from past two decades, which explains much of the increase in American tourist departures in India which can be one of the reason for highest no. of FTAs from USA in India. It is obtained from the Indian Tourism Statistics (ITS).

BTS (business travel and tourism spending)

BTS is the tourists coming for the purpose of business in India and their contribution done to the tourism sector from USA, UK and Canada. With this variable there is another variable LTS (leisure travel and tourism spending) but that variable was not significant for all 4 countries. Data for BTS is obtained from World Travel and Tourism Council (WTTC) website.

MATERIALS AND METHODS

For checking the stationary properties of the study variables we have used the Augmented Dickey Fuller (hereafter, ADF) test to test for the unit root. In the tests the null hypothesis is that, the series is non stationary (possess a unit root) and if the calculated value exceeds the critical value. The null hypothesis may be rejected implying the stationary characteristics of the data series. The data if found to be non stationary would be transformed using first difference, second difference, log transformation, taking lags whatever transformation helps in making our variables stationary. Also after doing the appropriate transformation a check is made for heteroscadasticity using Breuch pagan test where log of square of the residual is regressed with the independent variables to see are they significant and if they are found significant then hetroscadasticity is removed. Also after correcting heteroscadasticity to test for serial correlation is checked using Durbin Watson statistic and if the value of Durbin Watson are significantly far from value of 2 (.i.e out of range of 1.6-2.4) , then Cochrane orcutt –prais Winston transformation is used to correct for serial correlation and final model is formed with variables that come out to be significant. After framing the model test was done to test for cointegration between foreign tourist arrival and relative prices and then between foreign tourist arrival and income per capita for US.

There is evidence for a cointegrating relationship if:

- The unit-root hypothesis is not rejected for the individual variables.
- The unit-root hypothesis is rejected for the residuals (uhat) from the cointegrating regression.

RESULTS

After running ADF test it was found tourist arriving from US, UK and Canada were non stationary so first difference was used as the transformation.

$$FTA = \alpha + \beta_1 \quad BTS + \quad PCI + \quad Incmepercapita + e$$

Final model formed consists of three variables mainly price competitive index (PCI), business contribution to tourism sector, income per capita of a person residing in original country. Results found were almost similar in all countries that income per capita had a positive relation with foreign tourist arriving in India for all three countries and had been found to be significant. Same was the case with business contribution to tourism sector and was significant in all three countries. Price competitive index as expected had a negative relation with foreign trade arrivals but was found to be significant in USA and Canada but not in UK. Now let us study 3 cases individually:

USA

Regression results:

Cochrane-Orcutt, using observations 1992-2011 (T = 20)
Dependent variable: d_FTAUSA

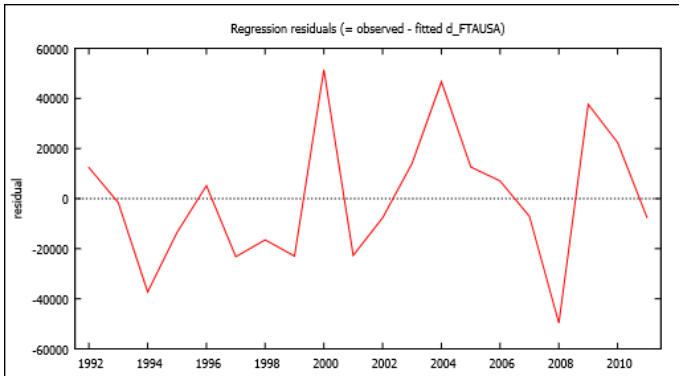
	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	-37082.4	30586.8	-1.2124	0.24297	
d_PCIUSA	-9054.18	3228.61	-2.8044	0.01273	**
d_BTS	115871	56705.9	2.0434	0.05784	*
d_incpercapitaUS	16.3456	8.41067	1.9434	0.06977	*

Statistics based on the rho-differenced data:

R-squared	0.582742	Adjusted R-squared	0.504506
F(3, 16)	8.758884	P-value(F)	0.001144
Rho	-0.054729	Durbin-Watson	2.093275

R square was not very high as already been mentioned that it is difficult to model variables affecting tourist arrivals. There was no heteroscadasticity but data suffered from problem of serial correlation so Prais Winston transformation was used to correct it.

Residual plot of USA



Cointegration results

When testing for cointegration between income per capita and FTA_USA. First condition for cointegration was met that the unit root hypothesis was not rejected for individual observations but the second condition was not met and unit root hypothesis for residuals was also not rejected which led to no co integration between both variables. Here are the results:

```
Cointegrating regression -
OLS, using observations 1990-2011 (T = 22)
Dependent variable: FTAUSA

                coefficient   std. error   t-ratio    p-value
  ------------------------------------------------------------
  incpercapitaUS    13.2305      1.07877     12.26    4.87e-011 ***

Mean dependent var   432552.3   S.D. dependent var   286549.7
Sum squared resid    7.16e+11   S.E. of regression   184586.7
R-squared            0.877492   Adjusted R-squared   0.877492
Log-likelihood      -297.4742   Akaike criterion     596.9483
Schwarz criterion    598.0394   Hannan-Quinn         597.2054
rho                  0.983051   Durbin-Watson        0.056488
```

Testing for a unit root in ũ

Augmented Dickey-Fuller test for ũ including one lag of (1-L) ũ (max was 1) sample size 20 unit-root null hypothesis: a = 1 estimated value of (a - 1): -0.0118876 test statistic: tau_nc(2) = -0.20309 asymptotic p-value 0.9104

So p value was greater than significance level therefore hypothesis was not rejected and we could conclude there was no cointegration between foreign tourist arrival and per capita income in case of USA. Similar was the case with other variables in USA as well as in Canada and UK so results of cointegration were not included.

UK

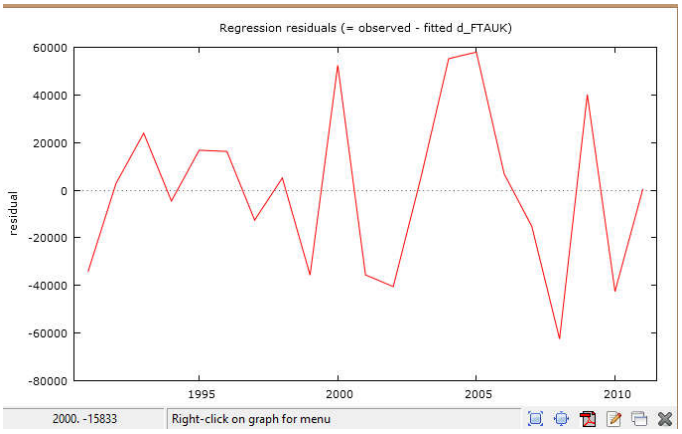
Regression results:
Dependent variable: d_FTAUK

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	-53246.9	40785.4	-1.3055	0.20910	
d_PCIUK	-10852.8	9421.69	-1.1519	0.26531	
d_incpercapUK	6.08649	2.97996	2.0425	0.05693	*
d_BTS	156190	79154.7	1.9732	0.06495	*

R-squared	0.400657	Adjusted R-squared	0.294891
F(3, 17)	3.788133	P-value(F)	0.030077
Rho	-0.102061	Durbin-Watson	2.154861

Foreign tourist arriving from UK had a very low R square also results were insignificant for PCI. Although the residuals were more or less stationary but model setup was not supported by the data from UK. Data was free from the problems of heteroscadasticity and serial correlation.

Residual plot of UK



Canada

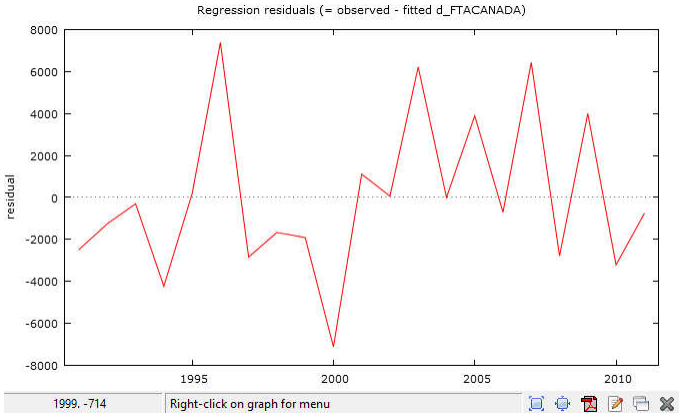
Regression results:

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	-9762.94	4627.41	-2.1098	0.05098	*
d_incpercapcan	2.07745	0.371397	5.5936	0.00004	***
d_PCIcan	-1536.7	454.955	-3.3777	0.00384	***
d_BTS	33742.9	9315.4	3.6223	0.00229	***
d1	14935.6	4347.94	3.4351	0.00340	***

R-squared	0.845229	Adjusted R-squared	0.806537
F(4, 16)	21.84468	P-value(F)	2.56e-06
Rho	-0.174583	Durbin-Watson	2.324127

Results were confirmed in model of Canada and it supported the variables as all variables were significant but the residuals were not stationary so a dummy variable was included in 2004 (although no particular reason related to any terrorist activity was found in this year). There was no evidence for heteroscadasticity and serial correlation.

Residual plot of Canada



Conclusion

This study provided an elaborated picture of an econometric model of tourism demand in India on the basis of some new variables. Though the tourism demand model is difficult to formulate as it contains qualitative factor too but an attempt made here for its formulation helps in finding few noteworthy results. Income per capita had a positive relation with foreign tourist arriving in India for all three countries so there are more tourists arriving in India when a country is experiencing growth. The spending of people who come to India for purpose of business also had a positive relation with foreign tourist arriving to India.

Price competitive index as expected had a negative relation with foreign trade arrivals but was found to be significant in USA and Canada but not in UK so in spite of this non significant coefficient in one country our model provides satisfying results.

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