Modelling Inbound International Tourism Demand to India: An Econometric Approach

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The tourism industry generates foreign exchange. The inbound tourism receipts bring the foreign exchange, and it helps to maintain a macroeconomic stabilization in the economy. The role of tourism is important for the economic development of a country. In this background, the present paper aims to investigate the economic factors behind the inbound foreign tourism demand to India using the econometric technique. The data sources used in the present study are secondary in nature. The present study showsthat world per capita income is most dominant factor in explaining the behavior of foreign tourist demand for India. Further, the tourism price in India has negative and significant impact on tourism demand. The results also reveal that the terrorist attack on USA in 2001 had left negative impact on foreign tourism demand.

Keywords: *Tourism demand Model, Bound test, Cointegration, Elasticity.*

1. Introduction

The role of tourism is essential in the economic development of a country. The tourism sector employs a large number of people, both skilled and unskilled. Hotels, travel agencies, transport including airlines get benefits this industry. India is one of the popular tourist destinations in Asia. The first ever tourism policy of India was made in November 1982. The Planning Commission of India mentioned tourism as an industry in June 1982. The 7th fiveyear plan (1985-90) put emphasis on the development of tourism sector by promoting domestic and foreign tourism in India. The Incredible India campaign in 2002 was made to create a distinctive identity for the country. As consequence of the incentives and promotional efforts, the total tourist arrivals increased from 2.38 million in 2002 to 3.45 million in 2004, 5.77 million in 2010, and further 6.96 million in 2013. Tourism has now become a significant industry in India.

There exists a number of empirical studies on international tourism demand for different countries of the world (Algieri, 2006; Dritsakis, 2004; Kliman,1981; Mervar, 2007 etc.).Chaitip et.al. (2008) estimated the international tourist demand for India. But the result was inconsistent with respect to the price variable (exchange rate). The

present paper has made a modest attempt to formulate a suitable tourism demand model for India, and then to quantify the impacts of importantfactors on foreign tourists' inflows using econometric technique.

2. Tourism Demand Model

The tourism model in the present paper is based on the classical economic theory according to which the tourism demand is determined by the level of world per capita income, tourism price in India, and tourism prices in the substitute countries. In addition, one dummy variable has been incorporated in the model to measure the impact of terrorist attack on USA in 2001 on foreign tourist arrivals.

The tourism demand function can be expressed in the following manner:

$FTt = f(Yt,, Pt,, PSt,, DUM0102)$(1);

where: FTt = Numbers of foreign tourist arrivals to India in year t.

Yt = Per capita world income in the year t.

Pt = Tourism price in India in the year t.

PSt = Tourism prices in alternative destination countries in the year t.

D0102 = Dummy variable for 2001-02. It takes the value 1 for 2001-02; and 0 otherwise.

Above equation is expressed in linear form; and then transformed into natural logarithm:

$$LFTt = \alpha + \beta.LYt + \gamma.LPt + \delta.LPSt + \varepsilon.DUM + Ut \quad (2);$$

where, Ut = Error term in the year t. It has been assumed that the error term follows the properties of normality, homoscedasticity (constant variance) and non-autocorrelation (serial independence).

The co-efficient of variables (β, γ and δ) are constants measuring the responsiveness (elasticities) of tourist demand with respect to world per capita income, the domestic tourism price in Indiaand the tourism prices in alternative destination countries respectively; and the expected signs of $\beta > 0$, $\gamma < 0$, and $\delta > 0$ if alternative destination is the substitute country for foreign tourists or $\delta < 0$ if alternative destination is the complementary country for foreign touristscoming to India.

3. Methodology

Generally, the time series data suffers from the problem of non-stationarity. Inthat case, the application of conventional ordinary least square (OLS) method leads to spurious relation among variables in the model. So, in the present study, the econometric method namely cointegration technique has been applied to measure the long-run equilibrium relation among variables. The most well-known techniques of cointegration test are Engle-Granger residual based test (1987), Johansen-Juselius multivariate test (1990) and so on. However, these tests are not suitable for small sample study. The ARDL (Autoregressive Distributed Lag) based bound test is suitable for small sample studies. This method can be applied even when the variables follow the different orders of integration. In the present study, the ARDL methodology has been adopted (Pesaran and Shin, 1995). Following this approach, the general specification of the model described in the following manner:

$$dLFt = \alpha 0 + \beta 1\, LFt - i + \beta 2\, LYt - 1 + \beta 3\, LPt - 1 + \beta 4\ LPSt - 1 + \sum \gamma 1 d\, LFTt - i + \sum \gamma 2 d\, LYt - i + \sum \gamma 3 d\, LPt - i + \sum \gamma 4\, d\, LPSt - i + \delta\, D0102 + ut \quad (3);$$

where, 'd' represents the variables in difference form. In the above equation, the coefficients 'γs' and 'βs' are constants.

4. Database Analysis

The data sources used in the present paper are secondary in nature. The data on the aggregate foreign tourist arrivals in to India has been collected from India Tourism Statistics - 2013, published by the Ministry of Tourism, Government of India. As the data series on the tourism price in India is not available, it has been proxied by the consumer price index. We have selected four Southeast Asian countries as alternative tourist destinations. They are Indonesia, Malaysia, Singapore and Thailand. The composite tourism price in alternative destinations has been derived by averaging the consumer price indices of these countries, and these are collected from International Financial Statistics, IMF. The per capita income of the world (Y) has been collected from World Development Indicators of the World Bank. The overall sample period for the estimations ranges from 1981 to 2013. All results have been derived using the Micro-fit Computer Software (Pesaran and Pesaran, 2002).

Unit-root Test

As we deal with time series data, the unit root properties have been tested by augmented Dicky-Fuller statistics (ADF). The estimated values of ADF statistics on variables both in level and first difference form has been reported in Table 1. The two variables (LFTt and LPt) are non-stationary in level. However, when make ADF test for the same variables in first difference form, all variables are found to be stationary.

Table 1. ADF-Statistics with Trend for Unit Root Test

Variables	Level/First Difference	95% Critical value for ADF statistics = -3.5615	
LFT_t	Level	-2.1776	I (1)
	First Difference	-4.6025	I (0)
LY_t	Level	-3.8099	I (0)
	First Difference	-4.5378	I (0)
LP_t	Level	-1.9805	I (1)
	First Difference	-3.8682	I (0)
LPS_t	Level	-3.6312	I (0)
	First Difference	-6.0120	I (0)

Note: $I(r)$: r is the order of integration.

5.The Results from Estimations

5.1 Bound Test

In the bound testing approach to cointegration, the null hypothesis assumes that there does not exist any cointegration relation among variables. If the calculated value of F is greater than the upper bound, then the null hypothesis of no-cointegration is rejected. On the other hand, if the tabulated value of F is lower than the lower bound, then the null hypothesis of no-cointegration is accepted. The tabulated values of F-statistics have been reported in Table 2. As the tabulated value of F-statistics (7.350) is greater than the critical values of upper bound for F-statistics even at 1% significant level, it can be easily said that the there exists a long-run relationship between foreign tourism demand and its determinants.

Table. 2: Bounds Test for Cointegration Analysis

Critical Bounds at 1% level	F-statistics
Lower bounds, *I*(0):	2.482
Upper bounds, *I*(1):	3.472
Tabulated F-Statistics: $F(4,19)$= 7.350*	

*Note: The critical values of upper and lower bounds of F-statistics have been extracted from Nayaran, P. K. (2004). Reformulating Critical Values for the Bound F-statistics Approach to Cointegration: An Application to the Tourism Demand Model for Fiji. Discussion Paper, 04(02), Victoria, Australia: Department of Economics, Monash University.

5.2 Estimated Impact of Income and Price Changes on Tourism Demand (Elasticities)

The results for the long run elasticities are reported in Table 3. All the variables have their expected signs; and are statistically significant at 5 per cent level. The results indicate that the aggregate tourism demand is mostly influenced by world per capita income with elasticity of 4.59. This implies that the demand from touristswould increase by 4.59 per cent in response to one per cent increases in world per capita income. On the other hand, one per cent increase in tourism prices in India would reduce tourism demand by 0.9 per cent.

Table3. Estimated Elasticities using the ARDL Approach

Dependent variable: LTA_t;	Period: 1982-2013.	
Regressors	Elasticity	t-Ratio
Intercept	-28.42	-1.74
LY_t	4.59*	2.15
LP_t	-0.90*	-1.86
LPS_t	1.77*	1.94
Dum	-0.62*	-2.90

@ Note: (1) *: significant at 5 % level; (2) ARDL(1,0,0,0,0) selected based on Schwarz Bayesian Criterion.

The positive estimate of coefficient of tourism price in alternative destinations reveals that the chosen countries are substitute destinations to foreign tourists coming to India. One per cent increase in tourism prices in the substitute destination countries would increase tourism demand by 1.77 per cent.The lower value of own tourism price elasticity (-0.90) suggests that foreign tourists are less responsive to tourism price in India compare to that in substitute destinations (+1.77). The dummy variable carries the expected negative sign; and is statistically significant at 5 per cent level. This implies that the terrorist attack on USA in 2001 had left its adverse impact on tourism demand in India during 2001-02.

5.3 Diagnostic Test

The model has been checked by the several diagnostic tests like serial correlation of error terms, normality of error terms, functional form for the model, and heteroscedasticity of error terms (Table 4).

Table 4. Diagnostic Tests

Test Statistics	Tabulated Test Statistics	Critical values at 1 % level @
A.Functional Form	$F\,(1,21) = 2.170$	8.020
B.Serial Correlation	$CHSQ\,(1) = 2.584$	6.635
C.Normality	$CHSQ\,(2) = 4.466$	9.210
D.Heteroscedasticity	$F\,(1,26) = 0.715$	7.720

@The Critical values have been extracted from Tables A.7 & A.9, S.K. Bhaumik (2015). Principles of Econometrics: A Modern Approach Using Eviews. India: Oxford University Press.

To gauge whether the model is correctly specified or not, we apply the Ramsey (1969) regression equation specification error test. As the tabulated value of F-statistics (2.17) is less than the critical value at 1 per cent level, we can conclude that the prescribed model is well specified. The Lagrange multiplier (LM) test has been applied to test for auto-correlation of the error terms (Godfrey,1978). As the tabulated value of chi-square (2.58) is less than the critical value, the null hypothesis of no auto-correlation is accepted. Further, Jarque-Bera test (1980) has been applied here to test the null hypothesis of normality for the error terms. As the tabulated value of chi-square (4.46) is less than the critical value, the assumption of normality is accepted at 1 per cent significant level. Another assumption regarding error terms was that all have equal variances (homoscedasticity). This assumption has been tested using Goldfeld-Quandt statistics (1965). As the critical value of F statistics is greater than the tabulated value (0.71), the null hypothesis of homoscedasticity is accepted for the error terms.

Conclusions

Tourism is one of the fastest-growing activities in the world. In India, it has been recognized as the sector that can promote and accelerate the socio-economic development of our country, The tourism sector act as a supplier of foreign exchange earnings, foreign direct investment and local employment. From 2002 onwards, a significant increase in foreign tourist inflows has occurred in India. In this background, the present paper attempts to quantify the impacts of economic factors on foreign tourist arrival to India using econometric method. It helps us to estimate the sensitivity of tourism market to different factors like world income, tourism prices etc.

The functional specification of tourism demand model is well defined. The high value of income elasticity of tourism demand reveals that the tourist inflows to India is highly sensitive to world economic conditions. Further, as the tourism demand is elastic with respect to tourism prices in neighboring countries, India need to keep the relatively low level of inflation compare to that in substitute destination countries in order to reap the full economic benefits from international tourism. Finally,the study also shows that the external event like the terrorist attack on USA in 2001 had left significant negative impact on tourism demand.

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