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TOURISM EXPANSION AND ECONOMIC DEVELOPMENT: VAR/VECM ANALYSIS AND FORECASTS FOR THE CASE OF INDIA

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ABSTRACT

This study tests for the existence and direction of causality between output growth and tourism expenditure using a trivariate model with real effective exchange rate (REER), analysed as a whole and in sub-categories (i.e. leisure travel and tourism expenditures, LTS and business travel and tourism expenditures, BTS) during the period 1988-2011 for India. For this purpose exhaustive empirical evidence are provided from the application of Phillips-Perron and KPSS unit root tests, Johansen cointegration tests, VAR models with an error-correction term, impulse responses, variance decompositions and forecasts generated from the VAR/VECM models. Results for the aggregated model indicate that all variables return to their long-run equilibrium relationships although this model failed to support the significance of causal links between total tourism expenditure and India's real output. However, the application of the disaggregated model imply strong bidirectional causal links between growth and LTS in the long-run and unidirectional causal links from LTS and BTS to growth suggesting direct impact of tourism on the Indian real output. Finally, forecasts generated for the period 2012-2016 are promising; total tourism expenditure compared to the previous half-decade will grow at a similar pace and optimistic forecasts are generated for the case of LTS, BTS and GDP.

Keywords: Tourism, Economic Growth, Cointegration, Forecasts, India.

INTRODUCTION

The importance of tourism development on economic growth is puzzling academics, scholars and practitioners for years. However, the vast majority of these studies is limited on the empirical investigation and validity of the so-called "Tourism-Led Growth Hypothesis" (TLGH) supporting in most cases direct effect from tourism activity to growth and suggesting that tourism increases foreign exchange income, creates employment opportunities, and therefore triggers overall economic growth. This hypothesis derives directly from the export-led growth hypothesis (ELGH) which states that national economic growth can be generated not only by increasing the amount of labour and capital within the economy, but also by expanding exports. Therefore, on the relationship between tourism (and its components; accommodation, package travel, food and drinks, transport, sporting activities, shopping) and economic growth, although various measures of tourism activity have been employed (e.g. total tourism expenditure, tourism arrivals, international visitor consumption, domestic tourism expenditure) the majority of these studies conclude that tourism is a key factor for economic growth especially for the cases of low income and/or small countries having however different characteristics and causality directions in each case. For example, causal links from tourism development to growth suggest that this country's growth is "tourism-led". However, causal relationships running from GDP to tourism expansion could imply that output growth feeds the further expansion of domestic and international tourism arrivals/expenditures. Finally, bidirectional causal links indicate strong interdependence between a country's growth and tourism development. Such information could be valuable to a country's policy makers in order to discern the necessary strategies and support the development of the domestic tourism industry. Some of the most influential studies on this topic are briefly analysed below. However, it is noteworthy that the vast majority of the tourism empirical literature is concentrated on investigating tourism expansion as a whole (not in sub-categories) and attempts to generate forecasts are extremely limited. However, forecasts could be useful in order to distinguish the dynamics that could be traced from within the sub-categories of tourism development and therefore local governments could focus more on tourism sectors that promote robustly the country's overall economic growth in the mid-term.

Indicatively, Louca (2006) for the case of Cyprus, Noriko and Mototsugu (2007) for the Amami Islands in Japan, Gani (1998) for South Pacific economies and Kim *et al.* (2006) for Taiwan all concluded that significant relationship exists between tourism expenditure and growth. Similarly, (Proença and Soukiazis, 2005) examine the significant impact of tourism for Portuguese regions and Shan and Wilson (2001) study the causality between tourism and trade. Moreover, in their analyses conducted on Turkish economy, Zortuk (2009) and Gunduz and Hatemi (2005) concluded that the increase in tourism income effects economic growth. Brida *et al.* (2009) for the case of Colombia found unidirectional causal links from tourism expenditures to real GDP per capita., while for the case of Greece Kasimati (2011) reports unidirectional causal links from tourism arrivals to GDP and Georgantopoulos (2012) supports the unidirectional causal relationship running from tourism expenditure to real output. In addition, Oh (2005) found that the hypothesis of tourism-led economic growth could not be verified in the case of the Korean economy. The results of Oh's Granger causality test imply the existence of a one-way causal relationship in terms of economics-driven tourism growth. On the other hand, Dritsakis (2004) for Greece, Durbarry (2004) for Mauritius and Balaguer and Cantavella-Jordà (2002) for Spain empirically proved the existence of a bidirectional relationship between the two variables. In addition, Eugenio-Martin and

Morales (2004) confirm the validity of the tourism-led growth hypothesis for low and middle income countries in Latin America while they assert that the situation is different for high income countries. Lee and Chang (2008), containing thirty two selected economies including both OECD countries and non-OECD countries, found that there is a unidirectional relationship from tourism to growth for OECD countries whereas a bidirectional causality relationship exists for non-OECD countries, while Caglayan *et al.* (2012) in their panel data analysis on 135 countries for the period 1995-2008 concluded that there is a unidirectional causality in America, Latin America, Caribbean and World from GDP to tourism revenue. Moreover, for the cases of East Asia, South Asia and Oceania the reverse direction of causality was found from tourism revenue to GDP. Finally, this study failed to trace any causal relationship for the cases of Asia, Middle East and North Africa, Central Asia and Sub Saharan Africa. In this spirit, the central objective of this study is to empirically investigate the causal links between tourism expenditure (TE) and economic growth, as measured by real GDP (RGDP) for a rapidly developing Asian country, India, during the period 1988-2011 in an attempt to analyse but also generate forecasts for the period 2012-2016. Exhaustive evidence from the application of multivariate cointegration with real effective exchange rate, vector auto-regression (VAR) with an error-correction mechanism, causality testing, innovation accounting and variance decomposition are employed. Moreover, forecasts are generated within the framework of the VAR/VEC approach not only at aggregate (i.e. Tourism Expenditure, TE) but also at disaggregate levels (i.e. Leisure Travel and Tourism Spending, LTS and Business Travel and Tourism Spending, BTS).

This study is motivated by a number of factors; first, the published studies dealing with the causal links between tourism expenditure (as a whole and in sub-categories) and economic growth for India are almost non-existent to the best of our knowledge. The only published study dealing with tourism-growth causal relationships for India is that of Mishra *et al.* (2011), which concluded that unidirectional causal links exist from foreign tourist arrivals to growth. To this respect, this study's empirical work robustly enriches the limited existing research work regarding India, since it employs aggregated and disaggregated models focusing its disaggregated analysis on the impact of leisure tourism and business tourism, on the notion that different policies and investments are required in case the first or the second are found to significantly influence the Indian growth. Moreover, this study supports that; (i) tourism expenditure is a stronger indicator than tourist arrivals since tourist arrivals is not a currency-based measure, therefore not presenting direct impact on real output. Therefore, it can only be assumed up to a level that an increase of incoming tourism promotes growth, (ii) assuming that different sub-categories of tourism development may impact significantly or not India's growth, it is interesting to proceed to a disaggregated analysis by dividing total tourism expenditure (TE) to leisure and business spending, in order for policy makers to focus more on the tourism sector that seems to promise higher and more significant growth rates. Second, it enriches the existing literature on tourism economics not only by investigating the causal links between TE (as a whole and sub-categories) and real output but also by generating forecasts for the period 2012-2016 based on the formed VAR/VEC aggregated and disaggregated models. Third, it covers a period which includes some of the most important economic, political and social transformations leading to more globalized and development-oriented Indian economy. According to World Economic Outlook Database (2011), the Indian economy is nominally worth 1.676 trillion USD in 2011; it is the eleventh-largest economy by market exchange rates, and is, at 4.457 trillion USD, the third-largest by purchasing power parity, or PPP. With its average annual GDP growth rate of 5.8% over the past two decades, and reaching 6.1% during the period 2011–2012, India is one of the world's fastest-growing economies. However, India ranks 140th in the world in nominal GDP per capita and 129th in GDP per capita at purchasing power parity.

Until 1991, all Indian governments followed protectionist policies that were influenced by socialist economics. Widespread state intervention and regulation largely walled the economy off from the outside world. The balance of payments crisis in 1991 forced the nation to liberalize its economy; since then, India, moved rapidly towards a free-market system by emphasizing both foreign trade and direct investment inflows. India's recent economic model is largely modernized having as priority the effective implementation of the so-called "growth-oriented policies". Indicatively, India has presented an average economic growth rate of 7.5% during the last few years, and has almost doubled its hourly wage rates during the last decade. Furthermore, more than 431 million residents have left poverty since 1985. India's middle classes are projected to number around 580 million by 2030. Though ranking 51st in global competitiveness, India ranks 17th in financial market sophistication, 24th in the banking sector, 44th in business sophistication, and 39th in innovation, ahead of several advanced economies (The Global Competitiveness Report, 2010-2011). Tourism in India is the largest service industry, 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 and that is expected to increase to 375.5 billion USD by 2018 at a 9.4% annual growth rate. The majority of foreign tourists come from USA and UK (India Tourism Statistics, 2010). According to World Travel and Tourism Council, India will be a tourism hot-spot from 2009 to 2018 having the highest 10-year growth potential and presenting since 2010 a rapidly growing medical tourism sector. The rest of the paper is organized as follows. Section 2 introduces the empirical model, econometric methodology and data sources used in this study. Section 3 presents the results and empirical analysis. Section 4 summarises the main findings and provides the concluding remarks with some policy implications.

DATA ANALYSIS AND METHODOLOGY

This study employs data that consist of annual observations during the period 1988-2011. Tourism expenditure (TE), Business Travel and Tourism Spending (BTS) and Leisure Travel and Tourism

Spending (LTS) data are obtained from World Travel and Tourism Council (WTTC), available online at: http://www.wttc.org/research/economic-data-search-tool; Real Effective Exchange Rate (REER) data are obtained from the World Bank World Development Indicators (WDI) available online at: http: //www.worldbank.org; Real Gross Domestic Product (RGDP) is calculated by dividing nominal GDP by the GDP deflator, both taken from the WDI also. All data sets are transformed into logarithmic returns in order to achieve mean-reverting relationships, and to make econometric testing procedures valid. On the empirical framework of this study, in order to investigate the relationship between tourism expenditure and real output at aggregate level with real effective exchange rate the following model is specified:

$$U = (LRGDP_t, LTE_t, LREER_t) \quad (1)$$

Furthermore, this study employs a disaggregated model by investigating the causal links between real growth, Business Travel and Tourism Spending, Leisure Travel and Tourism Spending and real effective exchange rate. Therefore, the following model is formed:

$$U = (LRGDP_t, LLTS_t, LBTS_t, LREER_t) \quad (2)$$

This study's econometric methodology firstly examines the stationarity properties of the univariate time series. Phillips-Perron (PP) test (Phillips and Perron, 1988) is employed to test the unit roots of the concerned time series variables. It consists of running a regression of the first difference of the series against the series lagged once, lagged difference terms, and optionally, by employing a constant and a time trend. This can be expressed as:

$$\Delta y_t = \alpha_1 y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + x_{it}^{'} \delta + \varepsilon_t \quad (3)$$

The test for a unit root is conducted on the coefficient of (y_{t-1}) in the regression. If the coefficient is significantly different from zero then the hypothesis that (y) contains a unit root is rejected. Rejection of the null hypothesis implies stationarity. Phillips and Perron's test statistics can be viewed as Dickey–Fuller statistics (Dickey and Fuller, 1979) that have been made robust to serial correlation by using the (Newey and West, 1987a; Newey and West, 1987b) heteroskedasticity - and autocorrelation - consistent covariance matrix estimator. Under the null hypothesis that $\rho = 0$, the PP (Z_t) and (Z_π) statistics have the same asymptotic distributions as the ADF t-statistic and normalized bias statistics. One advantage of the PP tests over the ADF tests is that the PP tests are robust to general forms of heteroskedasticity in the error term u_t. Another advantage is that the user does not have to specify a lag length for the test regression. Where a variable has unit root, it is considered to be non-stationary and can lead to spurious result in time-series regression for this reason an alternative test (Kwiatkowski *et al.*, 1992) also known as the KPSS test could be used to check for stationarity; and, the Ordinary Least Square (OLS) regression test enables us to find out whether there is a long-run causal relationship between the variables. KPSS tests are used for testing a null hypothesis that an observable time series is stationary around a deterministic trend. KPSS-type tests are intended to complement unit root tests, such as the ADF and PP tests. By testing both the unit root hypothesis and the stationarity hypothesis, one can distinguish series that appear to be stationary, series that appear to have a unit root and series for which the data (or the tests) are not sufficiently informative to be sure whether they are stationary (i.e. KPSS) or integrated (i.e. ADF or PP test).

Furthermore, the time series has to be examined for cointegration. Cointegration analysis helps to identify long-run economic relationships between two or several variables and to avoid the risk of spurious regression. Cointegration analysis is important because if two non-stationary variables are cointegrated, a Vector Autoregression (VAR) model in the first difference is miss-specified due to the effect of a common tend. If a cointegration relationship is identified, the model should include residuals from the vectors (lagged one period) in a dynamic Vector Error Correcting Mechanism (VECM) system. In this stage, the Johansen (1988), (Johansen, 1991) cointegration test is utilized to identify a cointegrating relationship among the variables. Within the Johansen multivariate cointegration framework, the following system is estimated:

$$\Delta z_t = \Gamma_1 \Delta z_{t-1} + \ldots + \Gamma_{k-1} \Delta z_{t-k-1} \Pi z_{t-1} + \mu + \varepsilon_t : \qquad t = 1, \ldots, T \qquad (4)$$

Where, Δ is the first difference operator, z' denotes a vector of variables, $\varepsilon_t \sim$ n iid $(0,\sigma^2)$, μ is a drift parameter, and Π is a (p x p) matrix of the form $\Pi = \alpha\beta'$, where α and β are both (p x r) matrices of full rank, with β containing the r cointegrating relationships and α carrying the corresponding adjustment coefficients in each of the r vectors. The Johansen approach can be used to carry out Granger causality tests as well. In the Johansen framework, the first step is the estimation of an unrestricted, closed p-th order VAR in k variables. Johansen (1988) suggested two tests statistics to determine the cointegration rank. The first of these is known as the trace statistic:

$$N\{trace(r_0 / k)\} = -T \sum_{i=r_0+1}^{k} \ln(1 - \hat{\lambda}_i) \qquad (5)$$

Where $\hat{\lambda}_i$ are the estimated eigenvalues $\lambda_1 > \lambda_2 > \lambda_3 > \ldots > \lambda_\kappa$ and r_0 ranges from zero to k-1 depending upon the stage in the sequence. This is the relevant test statistics for the null hypothesis $r \leq r_0$ against the alternative $r \geq r_{o+1}$. The second test statistic is the maximum eigenvalue test known as λ_{max}; we denote it as λ_{max} (r_0). This is closely related to the trace statistic, but arises from changing the alternative hypothesis from $r \geq r_{o+1}$ to $r = r_{o+1}$ The idea is trying to improve the power of the test by limiting the alternative to a cointegration rank which is just by one more than the null hypothesis. The λ_{max} test statistic is:

$$\lambda_{max}(r_0) = - T \text{ in } (1 - \lambda_i) \text{ for } i = r_0 + 1 \qquad (6)$$

The null hypothesis is that there are r cointegrating vectors, against the alternative of r + 1 cointegrating vectors. Johansen and Juselius (1990) indicated that the trace test might lack power relative to the maximum eigenvalue test. Based on the power of the test, the maximum eigenvalue test statistic is often preferred. According to Granger (1969), Y is said to “Granger-cause” X if and only if X is better predicted by using the past values of Y than by not doing so with the past values of X being used in either case. In short, if a scalar Y can help to forecast another scalar X, then we say that Y Granger-causes X. If Y causes X and X does not cause Y, it is said that unidirectional causality exists from Y to X. If Y does not cause X and X does not cause Y, then X and Y are statistically independent. If Y causes X and X causes Y, it is said that feedback exists between X and Y. Essentially, Granger's definition of causality is framed in terms of predictability. To implement the Granger test, a particular autoregressive lag length k (or p) is assumed and Models (7) and (8) are estimated:

$$X_t = \lambda_1 + \sum_{i=1}^{k} a_{1i} X_{t-i} + \sum_{j=1}^{k} b_{1j} Y_{t-j} + \mu_{1t} \quad (7)$$

$$Y_t = \lambda_2 + \sum_{i=1}^{p} a_{2i} X_{t-i} + \sum_{j=1}^{p} b_{2j} Y_{t-j} + \mu_{2t} \quad (8)$$

Moreover, a time series with a stable mean value and standard deviation is called a stationary series. If d differences have to be made to produce a stationary process, then it can be defined as integrated of order d. Engle and Granger (1987) state that if several variables are all $I_{(d)}$ series, their linear combination may be cointegrated, that is, their linear combination may be stationary. Although the variables may drift away from equilibrium for a while, economic forces are expected to restore equilibrium. Thus, they tend to move together in the long run irrespective of short run dynamics. The definition of Granger causality is based on the hypothesis that X and Y are stationary or $I_{(0)}$ time series. Therefore, the fundamental Granger method for variables of $I_{(1)}$ cannot be applied. In the absence of a cointegration vector, with $I_{(1)}$ series, valid results in Granger causality testing are obtained by simply first differentiating the VAR model. With cointegration variables, Granger causality will require further inclusion of a VEC term in the stationary model in order to capture the short term deviations of series from their long-term equilibrium path. The VAR in the first difference can be written as:

$$N\left\{\Delta X_t = \lambda_1 + \sum_{i=1}^{k} a_{1i} \Delta X_{t-i} + \sum_{j=1}^{k} b_{1j} \Delta Y_{t-j} + \mu_{1t}\right. \quad (9)$$

$$N\left\{\Delta Y_t = \lambda_2 + \sum_{i=1}^{p} a_{2i} \Delta X_{t-i} + \sum_{j=1}^{p} b_{2j} \Delta Y_{t-j} + \mu_{2t}\right. \quad (10)$$

Finally, innovation accounting analysis is used to trace the dynamic responses of the variables. The impulse response function is based on a moving average representation of the VAR model, and the dynamic responses of one variable to another are evaluated over various horizons. This method ascertains the effects of a shock of an innovation of an endogenous variable on the variables in the VAR. Variance decompositions provides information concerning the relative importance of each innovation towards explaining the behavior of endogenous variables. This study employs the generalized forecast error variance decomposition technique attributed to Koop *et al.* (1996) and

Pesaran and Shin (1998), as results of this method are not sensitive to the ordering of the variables in the VAR model.

EMPIRICAL RESULTS AND ANALYSIS

Table 1 presents the results from the unit root tests. The results based on PP and KPSS approaches imply that the logarithmic forms of the variables under study (i.e. LRGDP, LTE, LLTS and LBTS) are not stationary at conventional levels at any accepted level of significance (i.e. 5% significance level or above). Furthermore, the null hypothesis is not rejected even at first differences presenting similar results with the test at levels. However, when the variables were tested in 2nd differences, both PP and KPSS unit root tests lead to the conclusion that the variables under investigation are integrated of order two i.e. $I_{(2)}$ and therefore present stationary properties. Given these findings, we are allowed to proceed with the cointegration test, since the selected variables appear to have stationarity properties for the case of India.

Table-1. Phillips-Perron and KPSS Unit Root Test Results

Variables	**PP test**	**KPSS test**
LRGDP	(a) 3.0641	(a) 0.7123**
	(b) 0.9720	(b) 0.5186**
	(c) -3.2327**	(c) 0.3224
LTE	(a) -0.4202	(a) 0.6981***
	(b) -1.4331	(b) 0.4733**
	(c) -6.3112***	(c) 0.2781
LREER	(a) -2.4825	(a) 0.4781**
	(b) -2.8164*	(b) 0.5065**
	(c) -12.8287***	(c) 0.3325
LLTS	(a) -0.7907	(a) 0.6707**
	(b) -2.9831*	(b) 0.3841*
	(c) -9.8965***	(c)0.3302
LBTS	(a) -0.1561	(a) 0.6481**
	(b) -4.0038***	(b) 0.1315
	(c) -10.1916***	(c) 0.1241

Note: The variables in log levels are labeled (a), in 1st differences are labeled (b) and in 2nd differences are labeled (c). *, **, *** indicates significance at 10%, 5% and 1% respectively. This note also applies to the subsequent tables.

Tables 2 and 3 provide the results from the application of the Johansen cointegration test in order to investigate if the variables under study are cointegrated. The testing hypothesis is the null of non-cointegration against the alternative that there is a cointegrating relationship. Table 2 tabulates the results for the aggregate model (LRGDP, LTE and LREER) indicating that there is a long-run relationship between the variables, since both the trace and the maximum eigenvalue tests reject the hypothesis of no cointegration at the 5 percent significance level according to critical value (C.V.)

estimates. The results that appear in Table 2 suggest that the number of statistically significant cointegrating vectors is equal to 1. Moreover, the coefficients' estimates in equilibrium relationships, which are essentially the long-run estimated elasticities relative to the logarithmic form of real GDP, suggest that both variables are statistically significant and inelastic to the economic growth of India.

Table-2. Johansen Cointegration Test Results for (LRGDP, LREER and LTE)

Null Hypothesis	Alternative Hypothesis	Test Statistic	P-value
Trace test			
r* = 0	r ≤ 1	58.5299***	0.0007
r = 1	r ≤ 2	22.6522	0.1195
r = 2	r ≤ 3	5.8460	0.4801
Max. eigenvalue test			
r = 0	r = 1	35.8776***	0.0017
r = 1	r = 2	16.8062	0.1140
r = 2	r = 3	5.8460	0.4841
Cointegrating Vector: LRGDP = + 0.5654 LTE*** - 0.5180 LREER***			
[4.6879] [-5.6384]			

Note: * r is the number of cointegrating vectors under the null hypothesis. Figures in brackets are t - statistics. This note also applies to Table 3.

Furthermore, Table 3 presents the results from the application of the disaggregate model (LRGDP, LREER, LLTS and LBTS). These findings also suggest that the number of cointegrated vectors is equal to 1, considering that the accepted level of significance is equal to 5% or above, and that all variables under study remain inelastic to real output of India and strongly significant. Therefore results of the disaggregated model imply that a change of 1% in the values of LLTS or LBTS will lead to a 0.4860% and 0.5179% respectively in India's real output.

Table-3. Johansen Cointegration Test Results for (LRGDP, LREER, LLTS and LBTS)

Null Hypothesis	Alternative Hypothesis	Test Statistic	P-value
Trace test			
r* = 0	r ≤ 1	72.4681***	0.0005
r = 1	r ≤ 2	33.6033*	0.0621
r = 2	r ≤ 3	17.5227	0.0862
Max. eigenvalue test			
r = 0	r = 1	31.8648**	0.0183
r = 1	r = 2	21.0805*	0.0733
r = 2	r = 3	14.7234*	0.0756
Cointegrating Vector: LRGDP = - 0.0719LREER** + 0.4860 LLTS*** + 0.5179LBTS***			
[-2.0577] [16.6257] [24.0048]			

After determining that the logarithms of the variables are cointegrated for both cases of the aggregated and disaggregated models, estimation of VAR model arises that includes a mechanism of an error-correction (VECM). In such a case, the long-run cointegration relationships are of the following forms:

$$\Delta LRGDP = lagged(\Delta LTE_t, \Delta LREER_t) + \lambda u_{t-1} + V_t \qquad (11)$$

$$\Delta LRGDP = lagged(\Delta LBTS_t, \Delta LLTS_t, \Delta LBTS) + \lambda u_{t-1} + V_t \qquad (12)$$

Where, (Δ) is reported to differences of the variables, (u_{t-1}) are the estimated residuals from the cointegrating equation (i.e. long-run relationship), (λ) is the short-run parameter and (V_t) is the white noise disturbance term. Table 4 reports the results from the application of the aggregated VAR/VECM model. Assuming there is indeed only one cointegrating relationship, the empirical evidence suggest that the error correction term (ECT) is strongly significant for the case of LTE implying that all variables return to the long-run equilibrium whenever there is a deviation from their cointegrating relationship, although this model failed to support long-run relationships between TE and RGDP. Moreover, the estimated coefficient of error-correction term in the LTE equation has also a negative sign, which confirms not only that there is no problem in the long-run equilibrium relation between the independent and dependent variables in 1% level of significance, but also that the value of the speed of adjustment (-0.6851) for India shows the rate of convergence to the equilibrium state per year. Precisely, the speed of adjustment of any disequilibrium towards a long-run equilibrium is that about 68.51% of the disequilibrium if LTE is corrected each year. However, results indicate no causal links between TE and RGDP in the short-run, failing to support the significance of the tourism-growth nexus for the case of India in the short-run. These findings are partly in line with previous results of Mishra *et al.* (2011) for India, which also failed to support significant short-run dynamics between TE and Indian RGDP. Both studies result lead to a consensus although Mishra's study used as tourism proxy foreign tourist arrivals while this study employs total tourism expenditure.

Table-4. Granger Causality Results based on VECM for (LRGDP, LREER and LTE)

	Sources of Causation			
	Short run			**Long run**
Dependent Variable	**ΔLRGDP**	**ΔLREER**	**ΔLTE**	**ECT**
ΔLRGDP	-	0.3864 (1.5468)	0.0528 (0.2293)	-0.2649 (-0.5664)
ΔLREER	-0.6695 (-1.2570)	-	-0.6017 (-3.8882)***	-0.8079 (-1.2839)
ΔLTE	1.2733 (1.0128)	-0.0119 (-0.0355)	-	-0.6851 (5.3675)***

Note: ECT is the error-correction term. Figures in parentheses are t-statistics. This note also applies to Table 5.

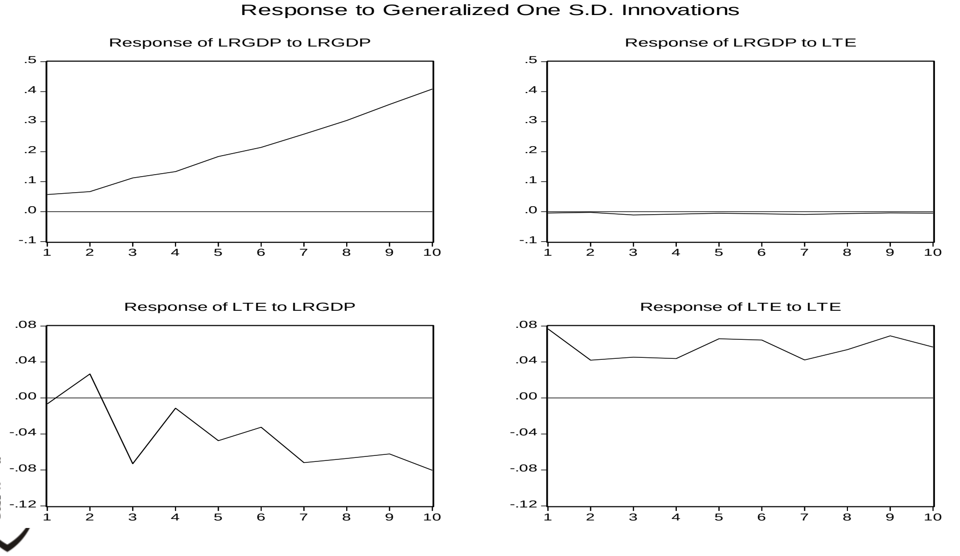
However, evidence tabulated in Table 5 which produced from the application of the disaggregated model lead to different conclusions; The ECTs' for the cases of RGDP and leisure travel and tourism spending (LTS) appear strongly significant, supporting that all variables return to their long-run equilibrium. Moreover, bidirectional causal links appear significant between real output and leisure travel and tourism spending in the long-run. Interesting results are also reported for the short-run dynamics between the variables, since both leisure travel and tourism spending and business travel and tourism spending (BTS) granger-cause Indian real output. Therefore, investigating tourism expenditure in sub-categories for India short-run causalities can be traced, although the aggregate model failed to support such a case.

Table-5. Granger Causality Results based on VECM for (LRGDP, LREER, LLTS and LBTS)

	Sources of Causation				
	Short run				Long run
Dependent Variable	**ΔLRGDP**	**ΔLREER**	**ΔLLTS**	**ΔLBTS**	**ECT**
ΔLRGDP	-	0.3444 (2.9391)***	0.1811 (2.2999)**	0.3497 (3.5891)***	-0.9123 (-4.7853)***
ΔLREER	1.0535 (2.0249)**	-	-0.0788 (-0.6296)	-0.2665 (-1.4210)	-0.5999 (-2.0524)**
ΔLLTS	0.1724 (0.1771)	0.0131 (0.0393)	-	-0.2165 (-0.7798)	0.6950 (2.1367)**
ΔLBTS	0.7733 (0.6795)	-0.3005 (-0.7693)	-0.1462 (-0.5572)	-	0.2343 (0.3688)

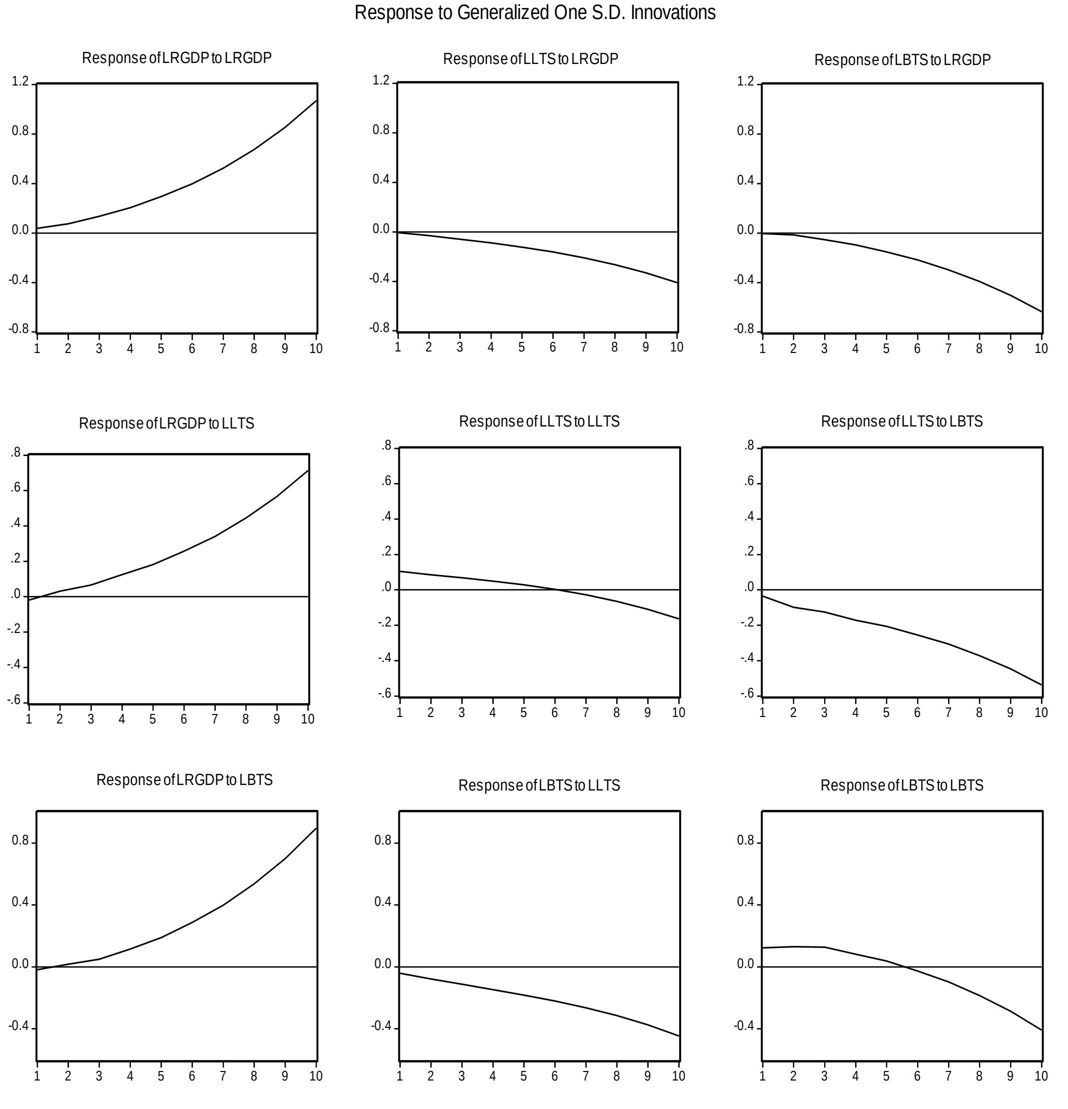
After determining the directions of causality from the application of the VAR/VEC aggregate and disaggregate models, Figure 1 shows how a shock to one variable affects another variable and how long the effect lasts. For this purpose, this study employs the generalised impulse responses following Koop *et al.* (1996) and Pesaran and Shin (1998) innovative studies. Impulse responses of the variables are illustrated for a ten year period. These graphs support the findings derived from the VAR/VEC aggregate model indicating for the case of India that an unexpected shock to total tourism expenditure leads to almost no change in the behaviour of RGDP. Moreover, an unexpected shock to RGDP leads to a non-specific trend in total tourism expenditure.

Figure-1. Impulse Responses between (LRGDP and LTE)



On the other hand, Figure 2 illustrates that when unexpected shocks to LTS and LBTS both lead to a jump in real GDP of India which continues to grow during the ten-year period with almost identical behavior. Moreover, an unexpected shock to real output leads to similar downward trends LTS and BTS, supporting the evidence from the disaggregated VAR/VEC model, which traced long-run and short-run causal relationships between sub-categories of tourism expenditure and India's real output.

Figure-2. Impulse Responses between (LRGDP, LLTS and LBTS)



The next level of this study's analysis is tabulated in Table 6, which presents the estimates for the variance decomposition of the aggregate model (LRGDP, LREER and LTE). The evidence indicates that LTE explains little of the future variation of LRGDP and that this weak explanatory variable remains during the period under research reaching only 0.40% at the end of the forecasting period. However, real output explains a considerable percentage of the LTE's future variation from year 5 (31.99%) until the end of the 10-year period. Moreover, although presenting a drop-off in year 6 the explanatory power of LRGDP increases significantly from year 7 and climbs to 47.12% by the tenth year. Put another way, 10 years into the future real output explains almost the same of LTE's future variation that LTE alone.

Table-6. Variance Decompositions for Model (LRGDP, LREER and LTE)

Period	Standard Error	LRGDP	LREER	LTE
Variance decomposition for LRGDP				
1	0.0571	100.000	0.0000	0.0000
5	0.2696	98.7068	1.1210	0.1721
10	0.7616	98.4793	1.1119	0.4087
Variance decomposition for LTE				
1	0.0768	0.7304	0.0000	99.2695
5	0.1626	31.9911	11.0505	56.9584
10	0.2502	47.1253	6.3729	46.5018

In table 7 with respect to LRGDP, Leisure Travel and Tourism Spending accounts only for the 6.46% percentage of real output's future variability in year 5 showing minimal results. However, as the period widens this explanatory power strengthens reaching the satisfying percentage of 22.53% by the tenth year. Further analysis shows that although LBTS presents weak explanatory power from year 1, it increases significantly reaching 17.40% in year 5 and 28.33% by year 10. Moreover, real output accounts for a considerable 33.15% of LLTS's future variability, which levels-up to 54.17% by the end of the 10-year period. Finally, as it relates to LBTS, the explanatory power of RGDP although very weak in year 1, it robustly increases to 33.86% by year 5 and further elevates reaching 63.29% in year 10. Thus, variance decomposition method provides evidence suggesting that economic growth has forecasting properties for tourism development in both the total tourism expenditure and in sub-categories (i.e. LLTS and LBTS) and vice versa.

Table-7. Variance Decompositions for Model (LRGDP, LREER, LLTS and LBTS)

Period	Standard Error	LRGDP	LREER	LLTS	LBTS
Variance decomposition for LRGDP					
1	0.0368	100.000	0.0000	0.0000	0.0000
5	0.4716	68.9121	7.2324	6.4550	17.4004
10	2.1603	62.4480	10.1685	22.5341	28.3301
Variance decomposition for LLTS					
1	0.0586	3.2754	2.6261	94.0983	0.0000
5	0.2238	33.1475	8.2230	19.1434	39.4860
10	0.3597	54.1724	11.5493	1.8626	32.4158
Variance decomposition for LBTS					

1	0.1050	2.0570	0.0014	14.3386	83.6030
5	0.4046	33.8620	1.1393	39.4535	25.5453
10	1.5283	63.2921	8.1277	14.2165	14.3637

The presentation and analysis of the empirical results ends by providing forecasts, which generated using the aggregated and disaggregated VAR models generating forecasts for the Indian total tourism expenditure and sub-categories of tourism spending respectively. This study also attempts to forecast India's real output. The forecast horizon is 5 years (2012-2016) and results are tabulated in Table 8 (in bill. USD) and Table 9 (in percentage growth).

The forecasts of total tourism expenditure suggest that it will grow at an annual average rate of 5.11%. This is remarkably similar to a corresponding rate of 5.8% in the previous 5-year period (2007-2011). In other words, this study's forecasts suggest that the annual rate of tourism expenditure will continue to steadily increase until 2016. Furthermore, findings from this model indicate that RGDP will grow by 8.79% on average until 2016 almost half rate considering the 14.67% average growth that India presented during the period (2007-2011).

Furthermore, an examination of the forecasts for the two-sector model suggest that LTS and BTS will grow at average annual rates of 28.96% and 15.63% respectively for the period under forecast, presenting impressive increase in comparison to 8.79% and -0.86% average growth that these tourism proxies recorded during the previous period. Moreover, this model predicts that real output will grow at 8.47% on average, which is in line with the aggregated VAR model's estimations and also supports the results from our long-run cointegrating vector for this model (tabulated in Table 3), which suggests the inelastic behaviour of real output to a possible change in LTS and BTS.

An attempt to interpret these forecasts highlights that both models imply that real output will continue to grow however at a slower pace than the period 2007-2011. Nevertheless, these signs are encouraging since they imply that India will continue to present overall economic development despite the negative climate that the global financial crisis still imposes in several mature and developing economies. Total tourism expenditure presents a steady growth on average compared to the period 2007-2011, showing signs of continuous development and implies that India has significant potential in this sector as a whole and therefore tourism industry can become a key driver of growth supporting the country's efforts towards long-term stability and prosperity. This thesis is strongly supported by the impressive growth rates that LTS and BTS forecasts present (28.96% and 15.63% respectively) compared to the 8.79% and -0.86% which recorded the previous period. These results strongly encourage India to attract not only leisure tourists but business tourists also, although in the recent past such a trend was not reported.

Table-8. Forecasts of (RGDP, TE, LTS and BTS) in bill. USD

	VAR (LRGDP, LREER and LTE)		VAR (LRGDP, LREER, LLTS and LBTS)		
Year	TE	RGDP	LTS	BTS	RGDP
2012	17,3976	279,9184	15,4183	5,3151	298,9343
2013	18,7968	301,2504	20,8356	6,6594	331,8683
2014	17,2795	321,7822	31,7958	8,0743	352,5077
2015	19,4063	352,2047	39,5589	9,7782	384,8350
2016	20,9930	392,4936	41,0173	9,2761	413,6470

Table-9. Forecasts of (RGDP, TE, LTS and BTS) in (%) Growth

	Growth (%)				
	VAR (LRGDP, LREER and LTE)		VAR (LRGDP, LREER, LLTS and LBTS)		
Year	TE	RGDP	LTS	BTS	RGDP
2012	-	-	-	-	-
2013	8.0427	7.6208	35.1355	25.2916	11.0171
2014	-8.0722	6.8155	52.6031	21.2454	6.2192
2015	12.3082	9.4544	24.4152	21.1040	9.1707
2016	8.1763	11.4391	3.6868	-5.1352	7.4868
Av.Growth	5.1137	8.8324	28.9602	15.6265	8.4735

CONCLUDING REMARKS AND POLICY IMPLICATIONS

This study focuses on the dynamics between tourism and economic growth for a rapidly developing Asian economy, India, during the period from 1988 to 2011 by utilizing the cointegration methodology in order not only to test the significance of tourism industry as a whole and in sub-categories in the Indian economic development but also to provide forecasts documenting the great potential that the country enjoys in the tourism sector. To assess these relationships at aggregate level a trivariate model is formed consisting of total tourism expenditure (TE) and real output (RGDP) with real effective exchange rate (REER). Furthermore, in order to investigate the impact of leisure and business tourism in the real output of India, a disaggregated model was employed by assuming two significant sources of tourism; leisure travel and tourism spending (LTS) and business travel and tourism spending (BTS). Therefore, a second model was developed, which treats LTS, BTS, RGDP and REER as separate inputs. Within the VAR/VECM framework, multivariate cointegration techniques and innovation accounting were employed. The study provided exhaustive empirical evidence from the application of unit root tests (PP and KPSS), Johansen cointegration test, VAR model with an error-correction mechanism, impulse responses, variance decomposition and finally forecasts for real output and total tourism expenditure (and its sub-categories; LTS and BTS).

To summarize, results from the PP and KPSS unit root tests indicated that all variables are integrated of order two and therefore present stationary properties. Furthermore, Johansen cointegration test supports the existence of a cointegration between tourism expenditure (in total and broken sectors) and real GDP. So, the variables employed in both aggregated and disaggregated models share a long run equilibrium relationship although they may be in disequilibrium in the short-run. Moreover, VAR/VECM models where constructed testing the causal links for tourism expenditure as a whole and in sub-categories. VAR analysis for the aggregate model indicated that in the long-run all variables return to their long-run equilibrium relationships. However, this model failed to support directions of causality between total tourism expenditures and Indian growth. On the other hand, disaggregated VECM model robustly supported bidirectional causal links between India's real GDP and LTS in the long-run, while in the short-run strong unidirectional causal links from LTS and BTS to real output were documented.

These findings were further supported from the application of impulse responses, since graphs for the total tourism expenditure model found no significant response from TE or RGDP to an unexpected shock impelled to each other, while the impulse responses analysis for the disaggregated model supported the VAR/VEC findings illustrating almost identical responses of LTS, BTS and real GDP to respective unexpected shocks. Variance decomposition method for the aggregate model supported only a satisfying explanatory power of RGDP over TE, while for the disaggregated model verified that LTS and BTS interpret a significant percentage of real output's future variation and vice versa.

Finally, forecasts based on VAR/VEC models for the period 2012-2016 indicated that total tourism expenditure will continue to grow at the same percentage (on average) as did the previous 5-year period (2007-2011). Moreover, forecasts for real output show positive growth rates, however half the rates achieved the previous period. The most impressive forecasts were generated for LTS and BTS which show to grow with by far higher rates than the previous period, indicating the significant potential that India has in the tourism industry.

The Government of India has already focused on boosting tourism industry including incentives for promoting private investment especially through various forms of income tax exemptions, interest subsidies and reduced import duty while the Ministry of Tourism has already realized efficient marketing campaigns for tourism in the recent past. India's significant potentials in the tourism industry is robustly supported by the country's geographical location which promotes India as a historical and cultural centre capable of attracting tourists from around the world not only for leisure activities (such as rural tourism, cruise tourism, coastal tourism) but also for business tourism activities (such as business conferences and forums). The present study presented exhaustive empirical evidence indicating these potentials and generating promising forecast for both tourism sub-categories.

However, several constraints still remain to be treated with priority, although during the last decade Government efforts managed to transform India into a rapidly developing and more globalized capitalistic economy. Focusing on the tourism industry, this study proposes that more efforts should be concentrated on the means of security issues, transportation and communication accompanied with a generous increase of touristic campaign budget for promotional purposes. Moreover, the Government should continue to increase tax incentives especially to the hotels, airlines and other various other tourism-related industries taking advantage of the high growth rates that India demonstrates and the optimistic prospects that the Markets share at present for the country's potential. Finally, considering the increasing interest of investors and tourists on environmental issues, India should develop "eco-tourism attitude". Such a strategy is expected to have multiple positive effects not only in enhancing tourism demand and helping the country to preserve and sustain its rich natural and cultural environments but also indirect positive effects will emerge from protecting and continuously supporting the country's various tourism sectors and the nation's industrialization process as a whole.

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