Economic Dynamics of Tourism in Nepal: A VECM Approach

BISHNU PRASAD GAUTAM

BISHLESHAN PVT. LTD.

1. January 2014

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Abstract

Tourism has been growing in Nepal. Tourism creates various direct, indirect and induced effects in the economy. This paper is designed to examine the role of tourism development on economic growth in Nepal. The study is based on annual data of gross domestic product, foreign exchange earnings from tourism and real effective exchange rate for the period spanning from 1975 to 2013. It examines the causality and long-run relationships between economic growth and Tourism development in Nepal using co-integration techniques and a Vector Error Correction Model (VECM). The evidence confirms that tourism development causes economic growth in short run in Nepal. The result also indicates the causality runs from both sides i.e. tourism development to economic growth and economic expansion to tourism growth implying for the greater efforts to encourage both the activities in the economy.

Key words: Contribution of tourism, Economic dynamics, Foreign exchange earnings, tourism development, Tourism-led-growth hypothesis, Nepal

JEL Classification: C13, F21, L83, O47

ECONOMIC DYNAMICS OF TOURISM IN NEPAL

■ DR. BISHNU PRASAD GAUTAM

1. INTRODUCTION:

Tourism has been defined as a temporary movement of people to destination(s) away from their usual residence, the activities entered upon during their stay and the facilities developed to provide for their requirements (Gautam, 2008). World tourism has been growing tremendously even exceeding the expectations. Despite occasional shocks, international tourist arrivals have shown virtually uninterrupted growth – from 25 million in 1950, to 278 million in 1980, 528 million in 1995, and 1,035 million in 2012. Not only this, international tourist arrivals worldwide exceeded the 1.0 billion mark for the first time ever in 2012, with 1,035 million tourists crossing borders, up from 995 million in 2011. Similarly, International tourism receipts reached US$ 1,075 billion worldwide in 2012, up from US$ 1,042 billion in 2011 (UNWTO, 2013). In Nepal, despite the belated start of formal tourism, only after the restoration of democracy in 1952, it gained remarkable growth over the years. In 1962, only 6,179 tourists travelled Nepal by air (MOTCA, 2010). It is estimated to be around one million in near future (2013-2014) including the arrivals of foreigners by land. Nowadays, Nepal earns foreign currency equivalent of NRs. 34.21 billions. The sector provides employment for about 20 percent of economically active population and directly contributes around 3.0 percent on gross domestic product (GDP). Tourism has been a dynamic and the fastest growing service industry. It holds an indispensable position among the drives of economic growth of the country and facilitates for the peace and harmony (Ghimire, 2013; Gautam, 2009).

As it has multi-dimensional effect on the economy (Gautam, 2008b), it is believed that tourism has enormous potential to be an engine and dynamo of economic growth in the country. It can provide impetus to other sectors through its backward and forward linkages. It can contribute significantly on the economic growth and development of the country through the utilization of tourism potentials. It generates hard foreign currency for the host country. It has more value-addition comparing with other economic activities. Tourism industry is a service industry and it increases employment to a large number of people in the country. Consequently, it increases the income of the people and also benefits the firms involved in this business. In addition, it increases the government revenue (direct/indirect tax). Tourism sector has distinct link with other sectors of the economy. It eventually helps for the industrial and commercial development as well as conservation of heritage and environment. Recently, tourism

development in Nepal has become more relevant as the state is engaged in drafting a new constitution and transforming every sectors of the economy. Not only this, the economic transformation of the country seems viable through the proper utilization of water resource (hydro power) and tourism potentials of the country. Infact, tourism is one of the pertinent sector of the Nepalese economy with comparative advantage and potential of transforming the economy. Therefore, this paper aims to enumerate the dynamics of tourism development in Nepal through the empirical assessment of its contribution in the economy.

This investigation certainly provides with policy implications; if unidirectional causality is found from tourism growth to economic growth, then every effort should be directed for the tourism development. If the result shows the opposite direction of causality, then every effort should be made for overall economic growth. This, consequently results in the expansion of the tourism industry in the economy. If the relationship is bidirectional between tourism and economic growth then a stride in both sectors would benefit mutually. Finally, if there is no causality between tourism development and economic growth, then tourism led growth hypothesis would be invalid and needs further assessment.

The rest of this paper is organized as follows: Section 2 briefly presents the overview of tourism industry in Nepal by examining the tourist arrival pattern and prospects of tourism development. It briefly discusses the relevant literatures on economic impact of tourism in the third section followed by an empirical analysis for the economic dynamics of tourism in the forth. Fifth section concludes the paper with policy recommendation.

2. OVERVIEW OF TOURISM INDUSTRY IN NEPAL

Nepal is famous for its natural beauty. Abundant natural attractions are found everywhere in Nepal from far-East Mechi to far-West Mahakali; from plain terai in the South to the snow-capped Himalayas in the North. Numerous tourist attractions are available everywhere in Nepal including the highest peak of the world - Mount Everest, the birthplace of Gautam Buddha - Lumbini, rich biodiversity and great geographical variations.[1] World famous news channel – CNN has enlisted Everest Region of Nepal as number one destination of the world.[2] Nepal is gradually gaining distinct importance for its natural beauty, exotic places, unique

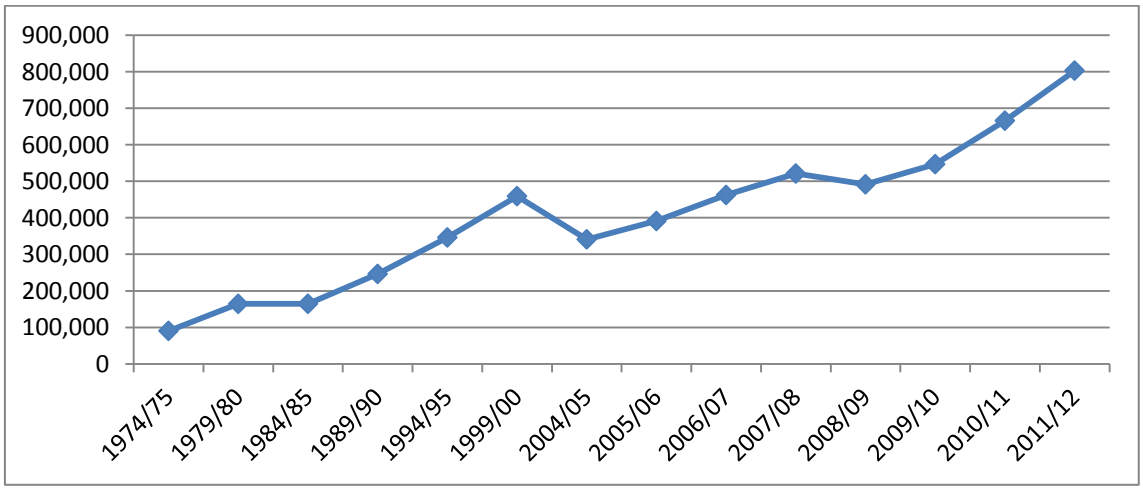
[1] Lonely Planet, the largest travel guide-book and digital media publisher, has included Nepal in its 'Best in Travel 2010' list. source: www.nepalnews.com/ Tuesday, 03 November 2009 20:20.

[2] The Kathmandu Post Jan 2011.

adventure, hospitality and pleasure travelling (Gautam, 2008). Development of tourism in Nepal does not have a long history comparing with some other countries. Though Nepal was opened for the foreigners only after the down of democracy in 1952 A.D., it was famous for the spiritual importance, peace and harmony in ancient times. Many people from various parts of the world used to visit Nepal with various purposes. It was also used as a trade-route between North and South in different periods. A glimpse of historical growth in tourist arrivals is depicted in the figure-1.

Figure-1

Growth in Tourists Arrivals in Nepal



Nepal has various natural attractions, still remaining to be explored and publicized in tourists generating markets. Table 1 depicts the development of tourism in Nepal since 1966. In Fiscal Year 1965/66, only 9,211 foreign tourists (except Indian tourists) had visited the country by air. The number reached to 90,431 in F. Y. 1974/75; 246,361 in 1989/90 and 346,180 in 1994/95. The number reached 477,774 in F. Y 1998/99 registering a tremendous growth. The growth trends in the tourism of Nepal have gained impetus since the early 1990s. However, it slowed down with a major setback in arrival pattern from the year 2000. In F. Y 1999/2000, the number decreased to 459,350 registering a negative growth of 3.9 percent. It has a severe decline during F. Y. 2001/02 registering sharp decline of about 35 percent. Afterwards, it has shown some improvements, started to increase albeit at slower pace. In 2007, it achieved the historical growth in tourist arrivals as the number crossed half a million. The arrival is expected to be at 1.0 million very soon and 2.0 million in 2020. The growth of tourism sector in recent years has been commendable. Hence, the discussion clearly shows that the number of tourists visiting Nepal is gradually increasing over the years.

Table: 1

Growth in Tourism

Fiscal Year	Foreign Tourist	Indian Tourist	Total Tourist Arrival	Percent Change
1964/65	9,388	-	9,388	-
1969/70	45,970	-	45,970	-
1974/75	71,563	18,868	90,431	882
1979/80	124,221	40,159	164,380	82
1984/85	107,647	56,899	164,546	0.1
1989/90	198,128	48,233	246,361	50
1994/95	230,158	116,022	346,180	41
1999/00	359,043	100,307	459,350	-3.9
2004/05	262,461	78,640	341,101	-12.1
2005/06	288,087	103,085	391,172	14.7
2006/07	361,382	101,198	462,580	18.3
2007/08	431,289	90,009	521,298	12.7
2008/09	400,249	91,558	491,807	-5.7
2009/10	445,572	101,360	546,932	11.2
2010/11	524,948	141,067	666,015	21.8
2011/12	628,996	174,146	803,142	20.6

Source: Nepal Tourism Statistics (Various issues), Ministry of Tourism and Civil Aviation

Tourism activities such as watching rare-wild animals and birds, nature walk, jungle drive, elephant back riding, canoeing, boating etc can be carried out in national parks and wildlife reserves. Mountain flight, elephant polo, rock-climbing, hot air ballooning, bungy jumping, paragliding, ultra light aircraft, mountain biking are also available. Nepalese customs and traditions can be interesting for the people from western part of the globe. The simple life without modern privileges can be equally interesting for tourists. Rural tourism, eco-tourism, sustainable tourisms are becoming popular. The practice of "Home Stay" has been popular nowadays for both the tourists domestic and foreigners. It is being equally beneficial for the host community.

3. LITERATURE REVIEW

Tourism is a multidisciplinary activity corresponding several industries and creating a variety of impacts. As tourists contribute to sales, profits, jobs, tax revenues and income, the economic benefits and costs reach to virtually everyone in the region or communities. The potential impact of tourism is on growth promotion, job creation and revenue generation. Such type of economic relationship is known as Tourism Led-Growth hypothesis. It treats international tourism as a potential factor for economic growth; so that, tourist spending, as an alternative form of exports, provides the foreign exchange earnings. It is subsequently used to import capital goods to produce goods and services, which in turn leads to economic growth in host countries (Balaguer and Cartavella-Jorda, 2002; Samimi, Sadeghi and Sadeghi, 2011). Tourism may have some costs in the economy and prominent one can be the environment pollution. In addition, other potential costs include seasonal employment; availability of low status jobs; inflation; crime; leakage of revenues and over dependency on tourism etc. (UN ESCAP, 2001)[3]. Nevertheless, positive impact usually overweighs the negative impacts thus it is natural to give priority for the development of tourism in every country.

The potential effects of the tourism industry have been highlighted in various studies. There are a number of techniques to measure the economic impact of tourism as there are various concepts and concerns associated with expanding the economic benefits of tourism (UNESCAP, 2001). These techniques include among others, theoretical concepts, mathematical/statistical models and various software tools. Popular tools and software are: Multiplier model, Input-Output analysis, CGE (Computable General Equilibrium) model and software such as REMI, IMPLAN, BEA RIMS etc. This paper tries to review briefly some of the popular methods as well as empirical literature.

Tourism-led growth hypothesis[4] has been popular in economic literature as it accounts the impact of tourism on economic growth. It has inheritance to export-led growth hypothesis to indicate that an expanding export sector can promote long-term growth by enhancing economy-wide efficiency. It also results in increased capacity utilization and better exploitation of economies of scale. Moreover, literature provides evidence on the role of international tourism in the provision of foreign currency for both developed and developing

[3] Some portion of this part resembles with the article published in Economic Review by the author (Gautam, 2011).

[4] This hypothesis suggests that export expansion can enhance economy-wide efficiency and lead to total factor productivity growth.

countries.[5] The export-led hypothesis has been empirically tested to find out the contribution of tourism on national economy in some countries.

Many researchers attempted to explore the relationship between tourism activity and economic growth empirically in different perspectives applying various econometric methods. We have summarized some studies and undertaken review on some of the relevant studies of interest (refer to Table 2). Pioneers like, Moheb A. Ghali (1976) empirically examined the role of tourism in economic growth of Hawaii using expanded version of growth equation whereas J. Diamond (1977) analyzed the role of tourism in the economic development of Turkey. Later, Balaguer and Cartavella-Jorda (2002) examined the role of tourism in the Spanish long-run economic development using VAR method. They used quarterly data spanning from 1975 to 1997 and Granger Causality Test for the analysis. They found that economic growth has been sensible to persistent expansion of international tourism in Spain.

Table: 2

Summary of Empirical Literature on Economic Impact of Tourism

Author(s)	Country	Analytical Method	Data	Result/conclusion
Wickremasinghe, G. and R. Ihalanayake, (2006)	Sri Lanka	ECM method	1960 - 2000	Significant two-way causal relationship from tourism receipts to the GDP
Kim, H., M. Chen and S. Jang (2006)	Taiwan	Cointegration and Granger causality test	-	Reciprocal relationship between tourism development and economic growth
Khalil, S., M. Kakar and Waliullah (2007)	Pakistan	ECM	1960 - 2005	Economic expansion is necessary for tourism development
Brida, J., E. Carrera and Risso (2008)	Mexico	Toda and Yamamoto causality test and VECM	1980 - 2007	Positive unidirectional causality from tourism expenditure and RER to real GDP
Zortuk, M. (2009)	Turkey	Granger Causality test based on VECM	1990Q1 to 2008Q3	Unidirectional causality from tourism arrivals to economic growth
Kreisha, M. (2010)	Jordan	Granger Causality test	1970 - 2009	Unidirectional link from tourism earnings to economic growth in the long-run
Mirsha, P., B. Himanshu and S. (2011)	India	VECM	1978 - 2009	Long-run unidirectional causality from tourism activities to economic growth and no short-run causality between variables

[5] This hypothesis suggest that if a developing country suffers from a foreign exchange constraint, any export expansion alleviates this constraint and allows more imports of capital and intermediate goods, which leads to higher capital accumulation and thus to higher growth.

Gautam, Bishnu Prasad (2011)	Nepal	Cointegration, Granger Causality and ECM	1975 - 2011	Cointegration and bi-directional causality between economic growth and tourism growth
Paudyal, S. (2012)	Nepal	Three stage least square regressions techniques	1975 - 2010	Bi-directional causality between tourism receipts and GDP
Ageli, Mohammed Moosa (2013)	Saudi Arabia	Johansen's co-integration test, Granger Causality test and VECM	1970 - 2012	Positive relationship between tourism spending and economic growth as well as bilateral causality running from Non Oil-GDP to tourism expenditure.
Jayathilake, P.M. Bandula (2013)	Sri Lanka	Cointegration and Causality Analysis	1967 - 2011	Long run relationship between the variables and unidirectional causality running from tourist arrivals to economic growth

Source: Compilation (Gautam, 2013).

Khalil and et.al (2007) examined empirically whether there is a unidirectional or bidirectional causal relation between tourism and economic growth in Pakistan. They used annual time series data for the period from 1960 to 2005 to assess the role of tourism in economic growth. Using the concepts and methods of the co-integration and Granger Causality Test, their study explored the short-term dynamic relations as well as long-run equilibrium conditions. They found the existence of co-integration between tourism and economic growth in Pakistan and concluded that economic expansion is necessary for tourism development.

Brida, Carrera and Risso (2008) attempted to investigate the long-run effect of tourism industry on economic growth in Mexico using Johansen-Juselius co-integration method, the Granger causality test and impulse response functions. The Johansen-Juselius test showed a co-integrated vector between real GDP, tourism spending and real exchange rate whereas the Granger causality test showed unidirectional relationship between tourism spending and RER to the real GDP. They also concluded that a shock in tourism spending can produce a short run as well as a long run positive impact on economic growth.

M. Zortuk (2009) applied the Granger Causality test based on VECM for 1990Q1 to 2008Q3 in Turkey's economy. The analysis investigated the relationship between tourism expansion and economic growth in Turkey using quarterly time series data from 1990:Q1and 2008:Q3. Using Granger Causality Test based on VECM it discovered that unidirectional causality from tourism development to economic development exists between the two variables in Turkey.

Gautam (2011) tried to assess the relationship between tourism receipt and economic expansion. Using the concepts and methods of the unit root test, co-integration, Granger causality test and error correction method, the study has confirmed the short-term dynamics as well as long-run equilibrium. It clearly showed the co-integration between tourism and economic growth in Nepal. In addition, the analysis verified the notion that tourism growth granger causes economic growth and vice versa indicating a bi-directional causality between economic growth and tourism growth.

P. Mirsha, B. Himanshu and S. Mohapatra (2011) analyzed the causality among real GDP, foreign tourist arrivals and foreign exchange earnings in India using VECM for the period spanning from 1978 to 2009. They found that there is a long-run unidirectional causality from tourism activities to economic growth in India. However, they did not find short-run causality between the variables.

Paudyal (2012) examined the impact of tourism and other related macroeconomic variables on the economic growth of Nepal by deriving tourism income multiplier from the Keynesian macroeconomic model. He employed the three stage least square regressions techniques for estimating the value of multiplier. The estimated value of multiplier based on regression results over thirty six year period from 1975 to 2010 was 1.21. The Granger causality tests confirmed the bi-directional impact in the case of tourism receipts and GDP. In addition, tourism receipt was found to have bi-directional relationship with some other variables such as GNI, exports, private consumption and imports.

Mohammed Ageli (2013) investigated the relationship between tourism expenditure and Non- Oil economic growth in Saudi Arabia over the period 1970-2012. Using several time series econometrics techniques including unit root tests, Johansen's co-integration test, Granger Causality test and Vector Error Correction Model, he examined the causal relationship between tourism expenditure and economic growth in the Saudi economy. The findings reveal that there is a bilateral causality and positive long-run relationship running from Non Oil-GDP to tourism expenditure in Saudi Arabia. He concluded that the development of tourism sector thus had a positive impact on the growth of the Saudi economy.

In fact, a question still arises whether tourism growth actually caused the economic expansion or, alternatively, the economic expansion caused tourism growth. Some studies clearly found unidirectional causality from tourism to growth whereas others revealed strong bidirectional causality between tourism growth and economic growth. However, there are some

studies (such as; (Oh, C. 2005; Lee C., 2008) for South Korea and Singapore respectively) that found no causality between tourism growth and economic growth. Neither any of the economic impact models nor any of the empirical assessments can capture all dimensions and changes in the tourism industry and its actual contribution in the overall economy. Hence, the choice of suitable model for the specific case requires good judgment and considerable modification in the model. In Nepal, there are very few studies investigating the validity of tourism-led economic growth hypothesis as well as long-run relationships between tourism and economic growth. Despite the recognition of the existence of a causal relationship between tourism expansion and economic growth in Nepal (Gautam, 2011; Paudyal, 2012) it needs to analyze economic dynamics of tourism development in national economy. Hence, this paper aims to examine the relationship between tourism activities and economic growth following tourism led growth hypothesis and analyzes economic dynamics of tourism in Nepal. This paper also enriches the specification of the growth model used by Gautam (2011) adding real effective exchange rate to capture external attributes and real contribution in the economy.

4. DATA SOURCES AND METHOD OF ANALYSIS

This paper utilizes time series data spanning from 1975 to 2012 published in Tourism Statistics of Ministry of Tourism and Civil Aviation and Economic Survey of Ministry of Finance. It follows Balaguer & Cartavella-Jorda (2002) and Brida, Carrera & Risso (2008), model in order to examine the tourism led-growth hypothesis in Nepalese data.

We specify the Vector Auto Regressive (VAR) model in order to test the causality among the variables in Nepalese annual data series during 1975-2013.

$$U = (GDPR + RFXET + REER). \quad \ldots\ldots\ldots\ldots\ldots (1)$$

where, GDPR is level of real GDP at time t, RFXET is the level of real foreign exchange earnings from tourism at time t, RFXET is real effective exchange rate. We tried to assess both short-run and log-run relationship among the variables using Vector Error Correction Method (VECM) and Co-integration Method respectively.

At first, time-series properties should be examined to see if they are stationary or not because non-stationary data contain unit root and makes the regression results spurious. 'Unit root test' has been carried out to each series individually. For this Augmented Dickey-Fuller (ADF) Test was undertaken and Schwarz (SC) information criteria is considered to determine the result.

If the time series data of each of the variables is found to be stationary at level or at first difference, then there may exist a long run relationship between these variables. In other words, if these variables are found to be non-stationary in levels and stationary in first difference I (I), then two series are said to be co-integrated. We confirm this from the unit root test and have applied Johansen Co-integration Test.

For the analysis of annual data in a VAR system, it is recommended to start the analysis for the determination of lag-length criteria (Charemza-Deadman, 1992). Accordingly, we have determined the appropriate lagging time in this study as per the SC criterion. Johansen's methodology takes its starting point in the vector autoregression (VAR) of order p given by

$$\mathbf{y_t} = \boldsymbol{\mu_t} + \mathbf{A_t}\ \ \mathbf{y_{t-1}} + \ldots\ldots\ldots + \mathbf{A_p}\ \ \mathbf{y_{t-p}} + \boldsymbol{\varepsilon_t}\,; \qquad \ldots\ldots\ldots\ldots\ldots \quad (2)$$

where, $\mathbf{y_t}$ is an *n*x1 vector of variables (GDPR, RFXET and REER) that are integrated of order one– commonly denoted I(1) – and $\boldsymbol{\varepsilon_t}$ is an *n*x1 vector of innovations. The matrix $\boldsymbol{\Pi}$ indicates the information about the long-run relationship between the variables. This VAR can be re-written as **:**

$$\Delta\,\mathbf{y_t} = \sum_{i=1}^{p-1} \Gamma_{\mathbf{I}}\,\Delta\,\mathbf{y_{t-i}} + \boldsymbol{\Pi}\mathbf{y_{t-p}} + \boldsymbol{\mu_t} + \boldsymbol{\varepsilon_t} \qquad \ldots\ldots\ldots\ldots\ldots \quad (3)$$

Where, $\boldsymbol{\Pi} = \sum_{i=1}^{p} A_i - I$ and $\boldsymbol{\Gamma_t} = -\sum_{j=i+1}^{p} A_j$

Johansen proposes two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the Π matrix: the trace test and maximum eigenvalue test, as follows:

$$J_{\text{trace}} = -T \sum_{i=r+1}^{n} \ln(1-\lambda_i)$$

$$J_{\max} = -T \ln(1-\lambda_{r+1})$$

Where, *T* is the sample size and $\hat{\lambda}$ is the *i*:th largest canonical correlation. In this test, the null hypothesis of *r* co-integrating vectors is tested against the alternative of *r*+1 co-integrating vectors. Thus, the null hypothesis *r* = 0 is tested against the alternative that *r* = 1 against the alternative *r* = 2, and so forth. The evidence of co-integration requires a mechanism to correct their state using the Vector Error Correction Model (VECM) and hence to formulate the dynamic of the system. Of course, in the short run these variables may be in disequilibria,

with the disturbances being the equilibrating error. According to Engle and Granger, the Error Correction Model can be specified as follows for any two pairs of test variables.

$$\Delta Y_t = + p_1 Z_{t-1} + \alpha_1 \Delta X_t + U_{1t} \quad \ldots\ldots\ldots \quad (4)$$

$$\Delta X_t = + p_2 Z_{t-1} + ß_1 \Delta Y_t + U_{2t} \quad \ldots\ldots\ldots \quad (5)$$

Statistical significance tests are conducted on each of the lagged Z_t term in Equations (4) and (5). The coefficients of the Z_t reflect the short run disequilibrium in the model. The parameters, p_1 and p_2, are the speed adjustment parameters in equation (4) and (5) when there is a discrepancy from long run equilibrium.

The traditional practice in testing the direction of causation between two variables is the Granger causality test. According to Granger, X causes Y if the past values of X can be used to predict Y more accurately than simply using the past values of Y. In other words, if a past value of X improves the prediction of Y with statistical significance, then we can conclude that X "Granger Causes" Y. The Granger causality test consists of estimating the following equations:

$$Y_t = \beta_0 + \sum_{t=1}^{n} \beta_{1i} Y_{t-i} + \sum_{t=i}^{n} \beta_2 X_{t-1} + U_t \quad \ldots\ldots\ldots \quad (6)$$

$$X_t = \alpha_0 + \sum_{t=1}^{n} \alpha_{1i} X_{t-i} + \sum_{t=i}^{n} \alpha_2 Y_{t-1} + V_t \quad \ldots\ldots\ldots \quad (7)$$

Where U_t and V_t are uncorrelated and white noise error term series. Causality may be determined by estimating Equations 3 and 4 and testing the null hypothesis that $\sum_{i=1}^{n} ß_{1i} = 0$ and $\sum_{i=1}^{n} \alpha_{1i} = 0$ against the alternative hypothesis that $\sum_{i=1}^{n} \beta_{1i} \neq 0$ and $\sum_{i=1}^{n} \alpha_{1i} \neq 0$ for equations (6) and (7) respectively. If the coefficient of α_{1i} is statistically significant but β_{1i} is not statistically significant, then Y is said to have been caused by X (unidirectional). The reverse causality holds if coefficients of β_{1i} are statistically significant while α_{1i} is not. But if both β_{1i} and α_{1i} are statistically significant, then causality runs both ways (bi-directional).

In addition, 'Wald Test' was carried out to find the joint effect of the coefficients of the independent variables and 'Breusch-Godfrey Test (LM) for serial correlation. Similarly, the Breusch-Pagan-Godfrey test of heteroskedasticity and the Jarque-Bera test of normality have been undertaken to confirm that there is no heteroskedasticity and the residuals are normally distributed. Furthermore, the CUSUM test was performed to ensure the stability of the model.

Further Impulse Response Function was also undertaken to inquire the fluctuation in the variable with the shock in initial period and the speed of returning back to its respective position.

5. EMPIRICAL RESULTS AND DISCUSSION

To examine the impact of tourism development on economic growth it is necessary to investigate the relationship between these variables. Hence, the analysis starts with identifying level of integration of each variable used in the model GDPR, RFXET and REER applying Augmented Dickey Fuller (ADF) Test. The results are presented in Table No. 3. The ADF Test confirms that the time series data of the variables are non-stationary in their levels. However these variables are found to be stationary in their first difference.

Table 3: ADF TEST

Variable	ADF (based on SIC)		Decision
	Level	1st Diff.	
GDPR	0.7619 (.9614)	-6.7563 (.0156)	I (1)
RFXET	0.7806 (.9924)	-6.7510 (0.000)	I (1)
REER	+1.6408 (.4519)	-6.4916 (0.000)	I (1)

Note: Critical Values for 1 percent, 5 percent and 10 percent are -3.65, -2.95 and 2.62 respectively. The value inside the parenthesis is probability.

The above analysis confirms that both variables are stationary in their first difference. Hence, we can estimate the long run relationship between the variables using Johansen Co-integration Test. Given the integration of these series in the same order; we can examine whether the series are co-integrated or not in the long run. In order to estimate the long-run relationship between the variables using the Johansen co-integration technique, it is necessary to find the optimal order of the VAR model using lag determining criteria. Once the optimal lag order is determined we can estimate the long-run relationship between variables. Table 4 shows the result of the Johansen co-integration test.

Table 4: Johnson's Co-integration Test

Lags interval (in first differences) 1 to 1

Null Hypothesis	Eigen-value	λ_{1max}	Critical Value 5%	λ_2 Trace	Critical Value 5%
r = 0	0.4682	22.736*	21.13	32.075*	29.79
r ≤ 1	0.1681	6.625	14.26	9.339	15.49
r ≤ 2	0.0726	2.714	3.84	2.714	3.841

Variables in the co-integrating vectors: GDPR, RFXET and REER

** denotes rejection of the hypothesis at the 5% level.*

Both Max-eigenvalue and Trace test indicates 1 co-integrating relationship at 5% significance level.

The actual maximum Eigen value statistics λmax, rejects the null hypothesis that there is no co-integration between the variables, i.e. r = 0 at the 95 percent confidence level. In favor of the alternative hypothesis that there is at least one co-integrating vector i.e. r = 1. Both the Trace Statistic and Max-Eigen Statistic from the Johansen Co-integration test indicated one co-integrating equation confirming a long-run association between the variables. However, the long-run co-integrated model of Johansen co-integration test further shows that RFXET and REER have a weak association in the long-run.

After confirmation of the co-integration between the variables, we follow the 'Vector Error-Correction Model (VECM) mechanism to correct their state. The main purpose of this procedure is to determine the short-run dynamics between the variables. The VECM is given[6] as:

$$\Delta Y = -0.138Z_{t-1}+22384.47-0.301\Delta Y_{t-1}-0.364\Delta Y_{t-2}-115.382\Delta XR_{t-1}+89.439\Delta XR_{t-2}-2.300\Delta XF_{t-1}+1.684\Delta XF_{t-2} \ldots (4)$$

(-5.352)* (6.682)* (-1.784)*** (-2.171)** (-0.729) (-0.699) (4.392)* (3.975)*

R-Square: 0.66 Adj. R-squared: 0.58 F-statistic: 7.98

*Note: Values in the parentheses are t values and *,** and *** indicate 1%, 5%, and 10% level of significance respectively.*

Taking GDPR as the dependent variable and the RFXET and REER as the independent variables, the result of the VECM model indicates that there is short run causality between the

[6] Only the best model is illustrated here excluding other two models which do not show the significant result.

variables. The coefficients of both the RFXET(-1) and RFXET(-2) are individually significant and showed the clear impact on GDPR. In contrast, the coefficients of both the REER(-1) and REER(-2) are individually not significant and hence showed a weak relationship. However, there is no long run causality running from RFXET and REER to GDPR. In such a case the sign of the Zt term gives an indication of the causality and indicates that REER and RFXET have no influence on GDPR in the long-run. The R2 value is 66.6 percent, F statistic is 7.98 percent and the DW stat is 1.96 percent. All these values indicate that the model is good fit.

The Breusch-Godfrey serial correlation LM test shows that the model is not suffering from any serial correlation problem. Similarly, the Breusch-Pagan-Godfrey test of heteroskedasticity and the Jarque-Bera test of normality also show that there is no heteroskedasticity and the residuals are normally distributed. Furthermore, the CUSUM test at 5 percent level ensures the stability of the model. All the statistical diagnostic tests guarantee that the VECM model is statistically fit. The summary of the result if there is no long-run causality running from REER and RFXET to GDPR, but there is short-run causality running from RFXET to GDPR.

The VECM result needs to be reinterpreted using Granger Causality Test. Granger Causality is a co-integrated system and is applied to find out the impact and direction of causality between the variables of interest. Table 5 summarizes the results of estimation of Equations (6) and (7).

Table 5: Granger Causality Tests

Sample: 1975 2013

Null Hypothesis:	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
RFXET does not Granger Cause GDPR	0.21005 (0.6496)	0.38370 (0.6844)	3.07011 (0.0434)	2.98792 (0.0373)	2.0245 (0.1129)
GDPR does not Granger Cause RFXET	8.46375 (0.0063)	3.94976 (0.0293)	2.02196 (0.1328)	1.82453 (0.1544)	2.2888 (0.0793)

The value outside the parenthesis is F-Statistic and inside the parenthesis is probability.

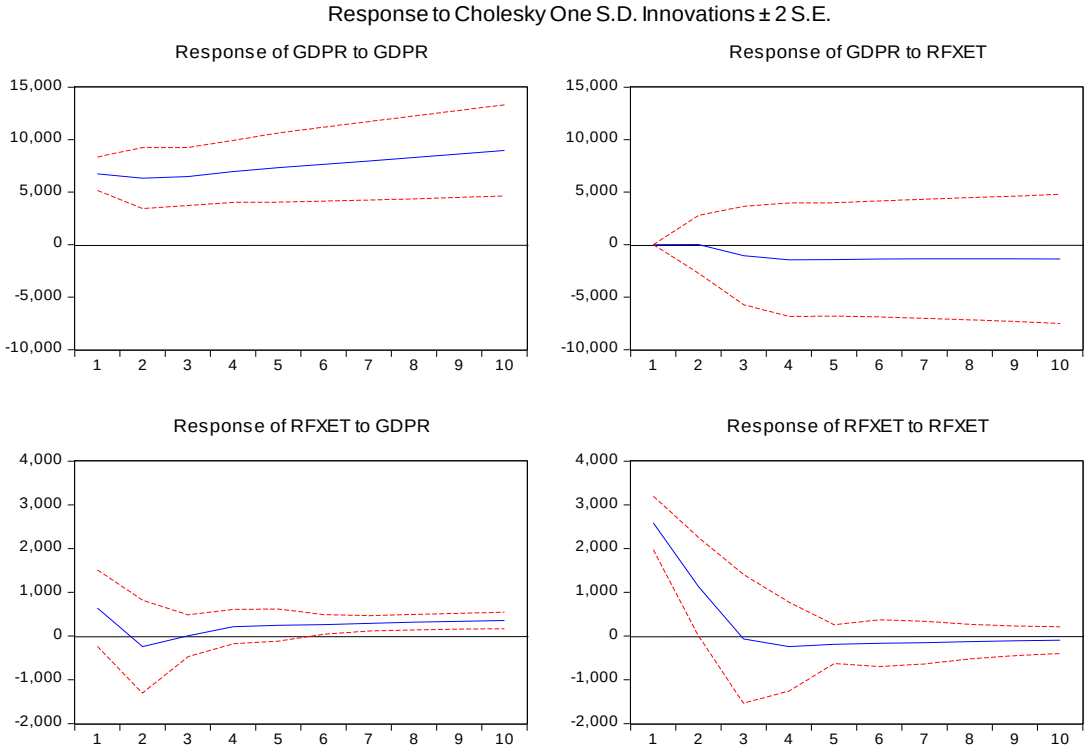
Note: The relationship with REER is droppd in above analysis because of insignificance result.

Wald coefficient test was carried out to find the joint effect of the coefficients of the independent variables. The Wald coefficient test of the coefficients of RFXET(-3) and RFXET(-4) shows that they jointly cause the GDP whereas the Wald coefficient test of the coefficient of REER(-1) and REER(-2) shows that they jointly do not cause the GDP. However,

the result also indicates that these is a short-run causality running from GDPR to RFXET with the lag of one and two. It clearly shows there is a positive bidirectional causality running from tourism earning to GDP and vice versa implying that tourism development causes economic expansion and economic activities enhance tourism expansion in the country.

We also apply impulse responce function with ten lags. The result of the impulse response shows that when a positive shock of one S.D. is applied to the GDPR, the GDPR decreases but remains positive initially but it increases eventually after 3 periods. Similarly, the result further shows that the effect of positive shock in REER leads GDPR to go down after 1 period and will remain negative till 10 periods exhibiting a negative association between GDPR and REER, i.e. when REER goes up GDPR will reacting negatively. Similarly, the result shows that response of RFXET to GDPR becomes negative after 1 period. All the results of impulse response is shown in the Figure 2.

Figure 2: Impulse Response Function



5. CONCLUSION AND POLICY IMPLICATION

This paper studies the impact of foreign exchange earnings from the tourism industry on economic growth in Nepal using annual time-series data for the period 1975-2013. Using the concepts and methods of the unit root test, co-integration, Granger causality test and vector error correction method, the study confirms that there exists a short-term dynamic relationship

between tourism income and GDP. The estimation of the main model suggests that there is a positive relationship between tourism income and economic growth. However it showed a weak relationship between tourism income and economic growth in the long-run and insignificant relationship between real exchange rate and GDP. This can be attributed to the fact that despite the huge potentials of tourism growth, the actual amount of tourism income is very small and its share in national economy is small (less than 3.0 percent).

In addition, the evidence seems to verify the notion that tourism growth granger causes economic growth and vice versa indicating a bi-directional causality between economic growth and tourism growth. It is clear that tourism growth increases economic activities and economic growth also facilitates for the expansion of tourism activities in the country. In the other words, the tourism-led growth hypothesis is confirmed. This means that economic well being and level of development is important in promoting tourism in the country. The findings are consistent with the results of various studies reviewed and presented in Table 2. The study thus asks for the conducive policy to address tourism and economic activities in national agenda. Tourism income will diversify the revenue income and reduce its dependency on foreign loans and assistance.

Geographical situation, bio-diversity, religious harmony, cultural and historical importance have proved that there is enormous tourism potential for the development of tourism in the country and so is the potential for achieving economic benefits. However, tourism is not a panacea; it has some potential costs. There are some pertinent issues and challenges, for example, infrastructure financing, climate changes; competitiveness of tourism, diversification of tourism activities (exotic places, unbeaten paths, hidden societies, adventure, etc) and achieving socio-economic transformation from tourism. In the meantime, it is great to have a long term vision in Nepalese tourism – "Tourism Vision 2020" in order to streamline tourism development policies and plans in an integrated manner.

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