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Effects of Tourism on Economic Development of Nepal

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Abstract

This paper attempts to deal with the role and impact of tourism on the economic development process of Nepal. The macro economic variables are introduced through the application of various econometric models, such as linear, log-linear, Almon (1965), Granger causality test (1969). The empirical results have been estimated by applying annual data for the period of 1974/75 to 1996/97 in real terms. The estimated regression equations exhibited a strong role and impact of tourism earning on the economic development indices, such as, tax revenue, government internal revenue and real gross domestic product. The impact of tourism earning on per capita income, however, remained insignificant. The income generated by trade, hotel, restaurant, and time have also been found pertinent variables that determine the development indices. Granger causality test confirms a bilateral causality between the lagged coefficients of tourism earning as well as government internal revenue and tax revenue.

Introduction

At mid-century, tourism was simply not a factor in government-led, urban economic development (Law, 1994). Today all large cities have elaborate economic development programmes and many list tourism as one of their most important economic sectors (Judd, 1995; Levere, 1996). Along with business, services and technology, tourism is considered a significant contributor to a city's prosperity and image (Pagano and O'M, 1995). The degree of reliance of a local economy on tourism does have a statistically significant impact on the level of capital outlays, transportation, police protection, fire protection, parks and recreation, financial administration, and general government administration expenditures (Wong, 1996; 313-26). The economic activities associated with tourism improve the quality of life. As such, much of the analysis of this industry has focused on the positive impact of employment, income, tax revenue and economic growth and development generally (Wong, 1996, 313-26). Tourism is not an isolated industry in and of it, but is a bundle of complementary services.

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Martin (1987, 48) broadly defines a tourist is any visitor in a community who comes to spend money and consumes local services. So the travel and tourism industry represents a major segment of the national economy and is a significant economic sector in many state and local economies (Wong, 1996: 313-26).

Once confined to a small number of tourist attractions and few hotel and tour operators, tourism has become a major economic force, demanding the attention of political and economic elite as well as the economic development community that serves them (Feinstein and Stokes, 1995; Randall and Warf, 1996).

The economic impact of tourism is created when purchases made by visitors infuse new dollars into the economy through the sale of goods and services, which induce new employment opportunities, and broaden the local tax base (Wong, 313-26). The same logic may be applied finally at the national level. According to Young (1973), there is saturation level for tourism, if that level is exceeded; the cost of tourism begins to outweigh the benefits. These saturation levels are dictated primarily by constraints on land (Mclntosh, 1977), labour supply (Kaiser and Helber, 1978), and local citizen tolerance, which lead to negative externalities being imposed upon local residents. However, the case of Nepal completely differs in accordance with the above argument and it is believed still far below the saturation level for tourism.

Nirmal (1996) states that the economic development of any state or region is determined in a number of ways. Tourism is considered as an independent variable in terms of tourists' flow, earning of foreign exchange from tourists and share of trade, hotels and restaurants having its role in the economic development of Himanchal Pradesh. Economic development as a whole is treated as dependent variable based on the indices of per capita income, state domestic product and tax revenue along with total revenue.

In concern with the role of income from tourism for the growth of gross domestic product of the country, it is expected that the investment by public as well as the private sector along with the implementation of foreign projects in a variety of sector that produce goods and services. In fact, some significant portion of tourism earning in conformity with foreign capital is invested; it is expected that tourism earning will have a strong association with gross domestic product. Since economic impact is often measured on GDP either its total growth rates or the per capita income (Khadka, 1997: 377) the objective of this exercise is to examine how far tourism earning is a contributory factor although this may also only partially explain the relationship. Despite this, government internal revenue (GIR) and tax revenue (TXR) have also been included as dependent variables. To this end, revenue, a composite form of tax and non-tax revenue, is perceived here as a proximate determining factor in the process of accumulating gross domestic income of a country. Since the items included in tax revenue (such as hotel tax, air flight tax, entertainment tax, sales tax etc.) and non-tax revenue (like electricity, postal services) contribute to GDP, some portion of tourist expenditure might be considered as being initially paid by the tourists during their stay as a final consumer. Owing to data limitation and unavailability of the appropriate economic indicators of development performance, gross domestic product has been considered as one of the main indicators. In fact, gross domestic product is composed of the entire final goods and services

produced in the economy over a year period in terms of monetary value. It is so considered as the main indicator of an economy's process of economic development.

Data and Methodology

In this study, time series data have been employed for the period of 1974/'75 to 1995/ '96 (Sharma: 2001). The data on national income aggregates represented by GDP series were obtained from the National Planning Commission Secretariat of HMG/ Nepal, Central Bureau of Statistics and the Economic Survey (various issues) of the Ministry of Finance, HMG/Nepal. The data related with tourism sector, total tourist arrival (TTA), total earning from tourism (EFT) and the contribution of trade, hotel and restaurants (THR), were compiled from various issues of the Tourism Statistics, Ministry of Tourism, and the Economic Survey (various issues) of the Ministry of Finance.

Before empirical tests are carried out, it is plausible to say about the data problems associated with the estimation of the effects of tourism on economic development process. Either some data are available in Nepalese fiscal Year or some data in English Calendar that may originate data error during conversion. Along with the absence of quarterly series on GDP data, the national figures from expenditure side are available only from the fiscal year 1974/75 onwards. Because of these problems the nominal GDP were converted into real terms by using implicit GDP deflator. The various incidents, such as, political instability inside the country, Maoist insurgency, air crash, Indian plane high jacking, and a continuous weak investment efforts, all have led to consider the data for the period 1974/75 to 1995/96.

In this study, ordinary least squares (OLS) method has been applied to the simple linear, log linear and first difference form under the single equations system. In addition, Granger causality test has also been employed. Thus, in this section, various models under the single equation system are examined and the results of the empirical works are discussed. The models as applied in this section are given below.

The simple model as applied in this study is in the linear form and can formulate the following simplified version of the linear model as

$$GDP_t = a_1 + a_2 EFT_t \qquad (1.1)$$

where it is expected that $a_2 > o$.

Similarly, the same model is being applied for the data relating to the constant price by deflating with the deflator as used by HMG of Nepal. The model is expressed as:

$$GDP_t = a_1 + a_2 EFT_t \qquad (1.2)$$

Where, a_2 is to be greater than zero.

Moreover, for seeking remedial measures, as there is presence of serial correlation in the equations 1 and 2, the known situation of the structure of auto correlation where $|P| < 1$ and $\bullet_t$ follows the OLS assumptions of zero expected value, constant variance, and non auto-correlation, let the equation be reverted as:

$$GDP_t = ßo + ß_1 EFT_t + U_t \quad (1.3)$$

In this connection, if equation 1.2 holds true at time t, it also holds true at time t-1. Hence,

$$GDP_{t-1} = ß + ß1\ EFT_{t-1} + U_{t-1} \quad (1.4)$$

Multiplying the equation 1.3 by p on both sides, we obtain

$$pGDP_{t-1} = pß_0 + pß_1 EFT_{t-1} + pU_{t-1} \quad (1.5)$$

Subtracting the equation 1.4 from 1.2 gives

$$(GDP_t - pGDP_{t-1}) = ß_0(1-p) + ß_1 EFT_t - pß_1 EFT_{t-1} + (U_t - pU_{t-1})$$

$$= ß(1-p) + b_1(EFT_t - pEFT_{t-1}) + \bullet t \quad (1.6)$$

$$GDP^* = ß^{\wedge} + b_1 EFT^* + t \quad (1.7)$$

$$b_1 > 0$$

In the above equation (1.6), since t satisfies all the OLS assumptions, one may proceed to apply OLS and obtain estimators with all the properties namely unbiased, minimum variance. Thus, a regression that is known as the generalised difference equation has been used. By applying Theil technique to obtain an estimate of p (coefficient of auto-correlation) as:

$$\hat{P} = \frac{\left[N^2\left(1 - \frac{d}{2}\right) + K^2\right]}{N^2 - K^2}$$

Where, N = total number of observations, d = Durbin-Watson statistic, and K = number of coefficients (including the intercept).

Using the estimate P, data are transformed as in the equation 1.6. The intercept term in fact is an estimate of $ß_0(1-p)$. Thus, an estimate of $ß_0$ can be obtained as $ß_0{\wedge} = ß_0/(1-P)$.

To explain how the Almon scheme works, the real income function depending on the tourism earning together with the three preceding years can be specified as:

$$GDP_t = a + b_0 EFT + b_1 EFT_{t-1} + b_2 EFT_{t-2} + b_3 EFT_{t-3} + u_t \quad (1.8)$$

Or, $GDP_t = a + åb_i\ EFT_{t-i} + U_t$.

Further, bi can be approximated by the second degree polynomial in the form as

$$b_i = a_0 + a_1 i + a_2 i^2. \quad (1.9)$$

Substititing equation 1.8 into 1.7 and transforming the EFT terms in the form of the constructed variables Z_{0t}, Z_{1t}, and Z_{2t}, one may have

$$GDP_t = a + a_0 Z_0 t + a_1 Z_1 t + a_2 Z_2 t + U_t \quad (2.0)$$

Applying the OLS procedure in the transformed equation 2.0, the regression is estimated.

From the estimated a's coefficients given in equation (2.0) b's coefficients can be

estimated from the relation as expressed in equation 1.9. All the ßs are substituted in the equation 1.8. Further, the standard errors of ß coefficients can be estimated by using a well-known formula from statistics (Gujarati, 1978: 285) which is expressed as:

$$\text{Var. (bi)} = \text{Var. } (a_0 + a_1 i + a_2 i^2 + \ldots a_m i^m) \qquad (2.1)$$

A further cursory effort has been made to check the elasticity of tourism earning to income with the following presumption.

$$Yt = y_t^{1-a} F_t^a \qquad (2.2)$$

Similar to a Cobb-Douglas function, the above equation makes the assumption that the share of tourism earning in total output, a remains constant over time,Y, with its share of 1-a represents all other factors that may have effects in the determination of gross domestic product. Taking a logarithm of the above equation it is represented as:

$$\ln GDP_t = (1-a) \ln Y_t + a \ln EFT_t + U_t \qquad (2.3)$$

where the first term in the equation 2.3 is assumed exogenous to the study at hand; Ut is the error term.

Even if the probable results may have positive magnitude and significant level, caution has to be exercised in blindly interpreting the results. There may be a reverse causation as well (Joshi, 1996:38): an increase in the development indices may encourage the tourism gross earnings. In addition, of course, many other factors such as private sector involvement, and legal and institutional arrangements- determine the growth rate of the development indices. Therefore, the test of causality, however, is conducted with a method prescribed by Granger (1969: 424-38). The Granger causality test assumes that the information relevant to the prediction of the respective variable. is contained solely in the time series data on these variables (Gujarati, 1988: 542). In this model, there is assumed to be a lead- lag relationship between the variables to be analysed for causality. In this context, the variables to be studied are shown to real data. So it needs to find out if it is tourism earning that causes an increase in the development indices, or if it is an increase in development indices that leads to an increase in tourism earning. Accordingly, a simple one-year lag is assumed between tourism earning and the development indices such as, GDP, PCI, TXR, and IGR. The functional equations for this purpose become:

$$GDP_t = a+b\ EFT_{t-1} + g\ GDP_{t-1} + U_t \qquad (2.4)$$

$$EFT_t = q+ lGDP_{t-1} + y\ EFT_{t-1} + V_t \qquad (2.5)$$

Here, t refers to the time in question. In this simple model, a unidirectional significance from tourism earning to GDP would require the coefficient on the lagged tourism-earning variable to be significantly different from zero. The reverse of this condition is required for causation to run in the opposite direction. If both lagged coefficients are significantly different from zero then a bilateral causality is implied; variables are independent if neither of the lagged coefficients are significantly different from zero. In a similar fashion, the same procedure is applied in case of other development indices like tax revenue (TXR), government internal revenue (GIR), and per capita income (PCI).

Effects on Output, Per Capita Income, Tax and Government Revenue:

Simple Linear Models:

The basic starting point is the examination of a direct relationship between the development indices and the amount of tourism earning. The regressions as considered on real data summarise the results of the statistical endeavour, one that was conducted to check for the effect of tourism earning on various development indices of the economy.

Table 1: Regression Results

Simple linear Model (1974/75-1995/96) **(Annual data)**

Equations	Dependent Variables (Real)	EFT (Real)		Statistic			
		Constant	Coefficients	Adj. R^2	F	D-W	SEE
1.1	GIR	808.91 14.938***	2.124	0.918	223.152	1.036	298.69
1.2	TXR	690.478 14.526***	1.609	0.913	211.016	1.087	232.63
1.3	PCI	1130.595 11.146***	9.970	0.861	124.231	0.949	87.0
1.4	GDP	14323.954 14.945***	15.614	0.914	223.366	0.834	2177.22

Note: Figures in parentheses below the parameters of each equation indicate t values.
* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
Adj. R^2 : The adjusted R-square
SEE : Standard error of estimates
F : F statistic for the significance of all the coefficients.
D-W : Durbin-Watson statistic for the presence of auto correlation.

A close examination of the regression results as depicted in the Table 1 confirms a priori notion in terms of both sign and magnitude. The coefficients of tourism earning in different equations have shown significant at 1% level. Although, the models have revealed high 'R^2 and F value, the evidence that has been exhibited by D-W statistic does not allow drawing conclusive inferences. In fact, the problem of auto- correlation persists. Therefore, to overcome the problem of serial correlation, it would be practicable. In this regard, Theil (1961:793-806) corrective measure has been applied in the first order difference form where P is known through the formula P = (1-d/2). Modifying the regression in that manner reveals the results in Table 2, where 'EFT, 'GDP, 'TXR, 'GIR, 'PCI all refer the transformed variables according to the requirement of the model in first order difference form. The results derived in accordance with the above presumption are expressed in Table 2.

Table 2: Regression Results Model of first Difference Form (1974/75-1995/96)

(Annual data)

Equations	Dependent Variables	TEFTr		Statistic			
		Constant	Coefficient	'R2	F	D-W	SEE
1.5.	'GIR	1490.01 16.55***	2.17	0.932	273.84	1.61	536.84
1.6.	'TXR	437.46 8.67***	1.49	0.790	75.17	1.84	208.90
1.7.	'PCI	612.984 2.759**	6.648	0.276	7.614	1.159	122.742
1.8.	'GDP	7250.715 6.126***	11.970	0.652	37.528	1.468	1946.288

Note: Figures in parentheses and asterisks confer the same meanings as explained in Table 1.

As far as the empirical results are concerned, x-ray scrutiny is felt necessary to arrive at the truth. A close examination of the overall results pertaining to the impact of tourism earnings on internal revenue and tax revenue, confirms a priori notion in terms of both sign and magnitude. The coefficients are positive and highly significant at 1% level. The pattern of rising tendency in the coefficient of government internal revenue and tax revenue is well justified. For instance, the coefficients for GIR comes to as much as 2.17 which implies that one percent increase in tourism earning leads to more than two percent increase in government internal revenue. Similarly, a unit increase in tourism earning insists to increase tax revenue by 1.49 units. It is seen that all the statistical tests have revealed good fit of the models because both the regressions (1.5 and 1.6) exhibit high 'R^2 and F value along with the D-W value within acceptable bounds.

In addition, tourism earning has also aided real gross domestic product. Since the explained percent of variation, 'R^2 has improved and reached to 0.65 with significant coefficient at 1% level of significance (Equa.1.8), the association should be granted as a grain of salt. No doubt, standard error of the estimates (SEE) seems to be higher, significance F value and falling of D-W within acceptable bounds of 5% level of significance, allow to draw the inferences for formulating and implementing the policies in conformity with real gross domestic product. In this regard, it may be argued that a unit increment in real tourism earning leads to an increase in real gross domestic product by around 12 units. On the other hand, per capita income of the country has not been found as highly influenced by tourism earning. The regression (1.7), however, demonstrates positive sign and magnitude along with significant d-test at 1% level; the explanatory power ('R^2=0.28) of the model is quite low.

Thus, it may be concluded that the effect on government internal revenue and tax revenue over the sample period 1974/75 - 1995/96 can best be interpreted by a rise in real tourism

earning. Moreover, tourism earning also has its considerable impact on real gross domestic product of the country during the long course of time. Consequently, the empirical results have indicated that not only the tourism earning plays an important role in the expansion of government internal revenue, tax revenue, and real gross domestic product of the country per se but also, more importantly, an increase in tourism development expenditure programme will have far-reaching implications on the process of economic development of the country.

Log Linear Models

Keeping the above empirical findings at hand, it has been felt necessary to examine some of the commonly used regression models, which are linear in the parameters but are not necessarily linear in the variables. Accordingly, a cursory effort has been made to check the average elasticity of tourism earning to the various development indices with the presumption as noticed earlier in the equations 2.2 or 2.3. The results of the subsequent regressions, all of which are measured in log-linear forms, are given below in Table 3.

Table 3 : Regression Results: Log Linear Models (1974/75-1995/96)

(Annual data)

Equations	Dependent Variables (Real)	LnEFT (Real)		Statistic			
		Constant	Coefficient	'R²	F	D-W	SEE
1.9	lnGIR	3.744	0.615 (13.06)***	0.895	170.565	0.983	0.1399
1.10	lnTXR	3.733	0.581 (13.046)***	0.895	170.206	1.036	0.1323
1.11	lnPCI	6.481	0.236 (7.571)***	0.741	57.321	0.688	7.381E-02
1.12	lnGDP	7.53	0.403 (11.318)***	0.865	128.101	0.735	0.1059

Note: Figures in parentheses and asterisks are used in the same way as in Table 1.

The empirical results derived through the application of log-linear models on real database also justify that there is positive relationship between tourism earning and the development indices. Nevertheless, inconclusive d-test regarding government revenue and tax revenue (Equ.1.9 & 1.10) and the persistence of auto-correlation concerning GDP and PCI (Equ.1.11 & 1.12), disprove to draw decisive inferences. Actually, Theil corrective measure has been used again which is elicited erstwhile.

The application of log-linear regressions (Table 4) to real term data in first difference form, exhibit that the elasticity coefficient of the development indices like government internal revenue (GIR), tax revenue (TXR), per capita income (PCI) and gross domestic product (GDP) with respect to tourism earning, are positive and significant at 1% level.

Table 4 : Regression Results

Log Linear Models in First Difference Form (1974/75-1995/96) (Annual data)

Equations	Dependent Variables (Real)	ln'EFT (Real)		Statistic			
		Constant	Coefficient	'R²	F	D-W	SEE
1.13	ln'GIR	0.431	1.060 (6.947)***	0.707	48.261	1.142	0.2779
1.14	ln'TXR	0.565	0.992 (6.518)***	0.680	42.491	1.108	0.2757
1.15	ln 'PCI	0.631	1.489 (3.358)***	0.361	11.276	1.006	0.5086
1.16	ln 'GDP	0.325	1.693 (7.303)***	0.727	53.336	0.994	0.4376

Note: Figures in parentheses and asterisks are used in the same way as in Table 1.

In spite of this, the elasticity coefficients of government internal revenue, per capita income and gross domestic product of the country seem to be more responsive with respect to tourism earning. Although the explanatory power (R^2) of all the models, except the one which deals about per capita income of the country, manifest good fit of the model along with satisfactory F - statistic, the D-W statistic lying in the region of indecision does not permit to draw reliable conclusion.

Thus, the empirical analysis with log-linear models of first order difference has well justified that the tourism earning contributes to raise government internal revenue as well as the tax revenue. However, less than proportionate increase has been realized in these variables, the results should be given great consideration for making further investment in the development of tourism in Nepal so as to raise GDP through increased revenue.

Distributed Lag Models

Alternatively, the familiar Almon (1965) scheme of polynomial lag is applied to examine the gestation impact of income (in forms of GDP and tourism earning). Koyck (1954) distributed-lag is used however extensively in practice, the assumption that the ß coefficients decline geometrically as the lag lengthens may be too restrictive in either situations when ß's increase at first and then decrease, or they follow a cyclical pattern.

As it has been found in the simple regression model (1.0) an unsatisfactory D-W statistic, the solution offered by Poudel (1988) is the application of Almon lag, whereby independent variables are lagged. The main problem with the Almon technique is quite apparent: 'specification of the maximum lag tends to be arbitrary and not based on certain theory' (Joshi, 1996, 34). The Almon polynomial lag (1965) as an alternative approach to the Koyck

distributed lag model has been applied here to find out the response of lagged variable in the income function. With the Almon technique, GDP (at constant price) is regressed on the constructed tourism earning based on the second-degree polynomial with the three lags for the purpose of analysis. With the help of estimated a's coefficients the original B's coefficients are derived and substituted in the function. Finally, the modified distributed lag model becomes:

$$GDPr = 13769.10 + 7.282EFT_t + 2.786\ EFT_{t-1} + 0.494\ EFT_{t-2} + 0.406\ EFT_{t-3}$$
$$(1178.28)\quad (2.503)\quad (0.96)\quad (1.78)\quad (1.8)$$
$$2.91***\quad 2.902***\quad 0.277\quad 0.225$$
$$R^2 = 0.921,\ F = 62.98,\ D\text{-}W = 0.553$$

The resulting lag pattern of the equation helps to conclude that weights have been decreasing successively. Therefore, it may be inferred that the Almon technique does not provide better results. Moreover, the model also suffers from positive auto correlation.

The Test of Causality

The test of causality, however, is conducted with a method prescribed by Granger (1969) where a lead -lag relationship is presumed between the variables to be analysed. In this context, the variables to be studied are the development indices as discussed earlier and tourism earning at constant prices. The results derived through the use of the functional equations (2.4 and 2.5) are summarised below in the Table 5

Table 5 : The Regression Results (Annual data)

Equ.	Dependents	a	b	g	$\bar{R}2$	F	D-W	SEE
1.a	GIR_t	188.975	0.661 EFT_{t-1} 2.228**	0.791 GIR_{t-1} 5.605***	0.973	324.29	1.758	172.11
b.	EFT_t	-59.297	0.762 EFT_{t-1} 3.595***	0.130 GIR_{t-1} 122.89	1.286	0.933	126.02	2.00
2.a	TXR_t	243.235	0.702 EFT_{t-1} 2.891***	0.666 TXR_{t-1} 4.370***	0.967	263.35	1.614	144.58
b.	EFT_t	-27.76	0.11 TXR_{t-1} 0.827	0.855 EFT_{t-1} 4.037***	0.930	119.36	1.988	126.03
3.a	PCI_t	-62.093	0.117 $(EFT/TP)_{t-1}$ 0.093	1.059 PCI_{t-1} 8.713***	0.963	237.16	2.645	45.84
b.	EFT_t	-56.137	5.279E-02 $(PCI)_{t-1}$ 3.49***	0.470 (EFT_{t-1}/TP) 2.973***	0.932	122.54	1.985	5.70
4.a	GDP_t	-932.884	-0.518 EFT_{t-1} -0.427	1.097 GDP_{t-1} 14.457***	0.991	1058.753	2.893	706.63
b.	EFT_t	-437.446	3.406E-02 GDP_{t-1} 3.038***	0.502 EFT_{t-1} 2.795**	0.947	178.075	1.896	104.402

Note: Figures in parentheses and asterisks are used in the same way as in Table 1.

The empirical results of the Granger causality test for one lag period confirm that the causation seems to run in different directions for different development indices. With regard to the government internal revenue (GIR), causation seems to run from both tourism earning (EFT) and the government internal revenue (GIR): the coefficients on EFT_{t-1} and GIR_{t-1} are significant with GIR_t as the dependent variable. The same thing seems to happen in tax revenue (TXR) as well. Therefore, with regard to tax revenue (TXR) and government internal revenue (GIR) bilateral causation has been realized. This indicates that, in government internal revenue and the tax revenue sector, tourism earning has led to generate the amount. On the other hand, one lag period's tourism earning has not been found as a significant factor that influences the per capita income (PCI) of the country. It is, rather, lag period's per capita income (PCI) of the country that maintains the causality. Moreover, reverse causation, leading from nominal gross domestic product (GDP) to earning from tourism, seems to be apparent. The functional forms also seem to be good fits, as evidenced by high R^2 statistics in all the cases lying between the ranges of 0.930 to0.991.

The empirical evidence as demonstrated by the functional equations clear that lag period's tourism earning (EFT_{t-1}) plays an important role to make an increase in current government internal revenue (GIR_t) and tax revenue (TXR_t). Similar to the previous results, that is, causation leading from real gross domestic product (GDP_t) to tourism earning is apparent but d-statistic shows negative serial correlation. Thus, it may be concluded from the above analysis that the lagged coefficients of tourism earning as well as government internal revenue and tax revenue are significantly different from zero and so a bilateral causality is implied.

Multiple Regression Analysis

The two-variable model studied extensively is seldom so simple for economic theory. A number of other variables are also likely to affect the development indices. Besides tourism earning, an obvious example is total tourist arrival (TTA) in the country. As another example, the gross domestic product (GDP) of the country is likely to depend also on the contribution made by trade, hotels and restaurant (THR). In most multiple regression analysis involving time series data it is a common practice to introduce the time in addition to several other explanatory variables (Gujrati, 1978). The reason for introducing the time variable X_{5i} is to avoid the problem of spurious correlation between economic time series. Therefore, the single-equation model needs to be extended to cover models involving more than two variables. Generalizing the single-equation function, the four-variable population regression function (PRF) may be written as:

$$Y_i = b_1 + b_2X_{2i} + b_3X_{3i} + b_4X_{4i} + b_5X_{5i} + u_i \qquad (2.6a)$$

$$b_2>0,\ b_3>0,\ b_4>0,\ b_5>0.$$

Where, Y is GDP_t, the dependent variable, X_2, X_3, X_4 and X_5 the explanatory variables which refer EFT_t, TTA, THR_t and Time respectively, u the stochastic disturbance term and i the i^{th} observation. The results of the multiple regressions are given as follows:

$$GDPr = 13013.75 + 5.696\ X_{2i} + 0.008\ X_{3i} + 1.688\ X_{4i} + 264.13\ X_{5i} \quad (2.6b)$$

$$(4.369)^{***} \quad (0.642) \quad (3.70)^{***} \quad (1.62)$$

$'R^2 = 0.985$ F=352.147 SEE=899.57 D-W =1.54

The results obtained from the above equation (2.6b) for the period (1974/75-1995/96) conforms a priori notion in terms of both sign and magnitude. The coefficient of tourism earning and trade, hotels, restaurant (THR) play a dominant role in raising GDPr. On the other hand, Time and tourist arrivals seem to be insignificant. Although, the model seems to be good fitted, it does not meet the criteria of no positive and negative autocorrelation ($d_u < d < 4 - d_u$). In fact, it is 1.54 ($d < 4 - d_u$). In addition, tourist arrival and tourism earning may be highly correlated. It is the tendency of many economic series to move together in the same trend and business cycle pattern over time. In this concern, multicollinearity may be recognized as a problem arising in estimation of linear equations and is a phenomenon for time series data (Ragnar, 1934). Multicollinearity can sometimes be avoided by changing the specification of the model. There may prevail a fixed relation between tourism earning and the number of total tourist arrival in the country. Even if the parameter values b2 b3 in the above equation are somehow obtained, and therefore, cannot be interpreted. In many cases, although theoretically a technical relation exists between independent variables, the observed data may not exhibit any such relation. So to detect the presence of multicollinearity in the data many economists suggest that the standard errors, the partial correlation coefficients and the total R^2 may be used for testing for multicollinearity. Yet, none of these criteria by itself is a satisfactory indicator of multicollinearity (Koutsoyiannis, 1884, 238-42). In this regard, stepwise method has been applied and found that the partial correlation coefficient of tourist arrival seemed to be quite low ($r_{13.245} = 0.154$) when compared to the $R^2 = 0.986$ of the model itself. The results of the stepwise regression method are given in Table 6.

Table 6 : Stepwise Linear Regression Models (1974/75-1995/96) (Annual data)

Equ.	Depen-	b_1	b_2	b_3	b_4	b_5	Statistics			
	dents	Constant	Time	EFTr	TTA	THRr	$'R^2$	F	SEE	D-W
1.0	GDPr	12902.39	1112.907 (56.6730) 19.637***	-	-	-	0.948	385.62	1686.44	1.667
2.0	GDPr	12967.678	674.295 (97.586) 6.91***	6.767 (1.382) 4.895***	-	-	0.976	426.18	1150.63	1.667
3.0	GDPr	13611.574	335.485 (117.269) 2.861***	6.152 (1.075) 5.72***	-	1.687 (0.449) 3.760***	0.986	485.24	884.76	1.667

Note: Figures in the parentheses refer standard error of the estimates. Asterisks indicate the same meanings as explained in Table 1.

The introduction of EFT_t improves slightly the overall $'R^2$. The signs of the b's are

correct and both the coefficients are significant at 1% level of significance. The high inter correlation of time and EFTr does not affect the stability or the significance of b_2. In a similar fashion, the introduction of THRr also does not affect the significance level of the earlier variables. Rather, the overall 'R^2 has further improved and reached to 0.986 from 0.976 per cent. The standard errors of estimates of the model and the F significance level of the regressions have exhibited gradual descending and ascending order, respectively.

Therefore, dropping TTA in the function a better overall fit is obtained. 'R^2 is slightly increased, and all the parameter estimates have the correct sign and are statistically significant. Along with this, d statistic also satisfies the condition of no autocorrelation.

Thus, from above empirical analysis based on simple linear regression, it can be concluded that tourism earnings have positive and significant effects on the development indices such as gross domestic product, tax revenue and government internal revenue. Contrary to this, tourism earnings with regard to per capita income of the country, however, has been found ineffective.

Empirical Findings

The major findings from the empirical analysis for the effect of tourism on economic development process of the country are summarised as follows:

i. The effect on government internal revenue and tax revenue over the sample period 1974/75 – 1995/96 can best be interpreted by a rise in real tourism earning. Moreover, tourism earning also has its considerable impact on real gross domestic product of the country during the long course of time;
ii. The empirical analysis of real data with log-linear models of first order difference has well justified that the tourism earning contributes to raise government internal revenue as well as the tax revenue. However, less than proportionate increase has been realized in these variables, the results may provide guide lines for making further investment in the development of tourism in Nepal so as to raise GDP through increased revenue;
iii. Granger causality test for one lag period confirms that the lagged coefficients of tourism earning as well as government internal revenue and tax revenue are significantly different from zero and so a bilateral causality is implied. In contrary to this, there has been no clear evidence about causal relation regarding the aforesaid proposition;
iv. The inclusion of other explanatory variables in the linear regression such as income from THR and time further assists the earlier proposition that along with tourism earning THR and time both influence GDP significantly.

Conclusions

From the foregoing discussion of empirical findings, it is clear that tourism earning is one of the factors, which has its effects on the development indices like tax revenue, government internal revenue and real gross domestic product of Nepal. The impact of tourism earning on per capita income, however, remains insignificant.

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