

## Does the Income from Tourism and Remittances Really Matter for Economic Growth? Evidence from the Nepalese Economy

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### Abstract

This study investigates the effects of tourism and remittances on Nepal's Gross Domestic Product (GDP). It is based on secondary information acquired from Nepal's several economic surveys and publications from the Nepal Rastra Bank. It spans 34 fiscal years, from 1987/88 through 2020/21. The study employs descriptive and exploratory research designs. Descriptive statistics, unit root testing, Augmented Dickey-Fuller test, ARDL bound testing approach, heteroscedasticity test, serial correlation test, and CUSUM and CUSUM squares test of stability analysis are some econometrics instruments utilized. The GDP, remittances, and income from tourism are found to be correlated over the long term. In the long run, remittances and tourism revenue increase Nepal's GDP, but there is no discernible effect in the short run. The GDP increased by 0.794 and 0.157 percent for every one percent increase in tourist and remittance income. Therefore, the impact of tourism income is more significant than the impact of remittance income on GDP. Therefore, policymakers can employ tourism to promote Nepal's long-term economic growth.

*Keywords:* Tourism, remittance, ARDL model, consistency, economic growth

*JEL Classification:* E<sub>01</sub>, F<sub>24</sub>, Z<sub>32</sub>

### Introduction

The term "economic growth" describes an expansion of a nation's economy over time. The gross domestic product (GDP), or the sum of all the final goods and services produced in the economy, is a common way to gauge an economy's size. GDP measures the monetary value of products and services generated inside a country's borders during a particular period. An analysis of a nation's GDP can determine its economy's size and growth rate.

The agricultural sector's modernization and commercialization, the tertiary sector's efficient growth, and the greater exploitation of the existing natural resources are all inaccessible to developing countries. Therefore, tourism and remittance revenue have been crucial to economic expansion in several countries, especially in developing countries (Paudyal, 2014). Tourism and remittance money helps address the unfavourable balance of payments in developing countries. Tourism and remittance revenue are two of the many factors that influence a country's GDP growth.

Since ancient times, Nepalese labourers have been relocated to Tibet, Lhasa, and Lahore for employment and military recruiting. But during the 1990s, there has been a considerable increase in Nepalese employees migrating abroad (Ghimire & Kapuri, 2020). Nepalese workers have reached 172 countries of the world in search of employment. Currently, 53,48,814 males and 3,16,412 females; altogether, 56,62,226 Nepalese are employed abroad and receive remittances of

961.1 billion rupees (MOF, 2022). Remittance income makes an essential contribution to the economic and social development of the recipient country.

Remittance income is the income households receive from foreign nations primarily from temporary or long-term immigration to those economies. Cash and non-cash things that move through legal channels using various methods, such as mail transfers, are included in remittance income (IMF, 2009). Remittance income is money that a household regularly receives from family members who work abroad (Ghimire & Kapuri, 2020).

The people who visit for various purposes, such as observing the natural beauty, studying art, and culture, business promotion, mountaineering, trekking, and entertainment, are called tourists. The act that provides different kinds of tourist facilities is called tourism. It includes whole business activities of providing facilities like hotels, lodges, trekking, restaurants, guides, and other related facilities.

Tourism development is the country's most desirable and less defective activity than other economic activities (Nyasha. et al., 2021). There is a high prospect for tourism in Nepal. Like in many countries, Nepal's tourism sector, accompanied by the change in sector structure, is the main element that determines economic growth.

Nepal is unable to utilize the available labour force in the country. It is better to use a labour force in the country. If it is not possible, the second option is to send them to foreign employment for remittance. Foreign employment reduces unemployment, poverty, adverse balance payment, increased household income and living standards. This research aims to search the impact of tourism and remittance income on Nepal's economic growth. It also seeks to determine the influence of remittance revenue or tourism income on Nepal's economic growth, both individually and collectively.

The remainder of the article is divided into the following sections: Section 2 presents the theoretical and pertinent literary categories. In Section 3, the research strategy is presented. Section 4 covers the empirical findings, while Section 5 covers the study's conclusions, policy implications, and limitations.

### **Review of Literature**

Based on empirical evidence, four hypotheses have been proposed to investigate the connection between tourism and economic growth (Chatziantoniou, et al. 2013). Tourism-led economic growth hypothesis (TLGH), Economic-driven tourism growth hypothesis (EDTH), the bi-directional causality hypothesis (BC), no causality hypothesis (NC) are the main hypotheses about tourism.

According to the tourism-led economic growth hypothesis, tourism creates an arrangement of benefits that spill over through multiple routes to promote economic growth (Schubert, et al., 2011). This hypothesis believes that tourism increases foreign exchange, encourages investment, and drives business firms to increase efficiency due to increased competition. It increases employment opportunities, production, income, and, ultimately, high economic growth in the nation. (Parrilla & Font 2007). Economic – driven tourism growth hypothesis believes that the tourism growth of a country depends upon well-designed economic policies, governance structure, and investment in both human and physical capital. The condition of economic growth flourishes tourism. (Payme & Mervar, 2010). The bi-directional causality hypothesis believes that economic growth promotes tourism, and tourism promotes economic growth. (Lee & Chang, 2008). No causality hypothesis supposed that there is no impact of tourism on economic growth, i.e., the impact between tourism and economic growth is insignificant (Tang, 2013, and Katricioglu, 2009).

Remittances are essential to migration because one of the primary reasons for migrating is to send a portion of one's earnings back to one's home community (Rehaman. et al. 2014). Mainly two arguments about remittance income's positive and negative impact on economic growth. The remittance income positively affects the balance of payment and economic growth in developing countries because remittance income increases savings, investment, capital formation, and consumption. The remittance income increases the consumption of rural households, which might have a substantial multiplier effect on economic growth (Ratha, 2003). Remittance can contribute positively to economic growth through three main channels: directly investing in capital accumulation, utilizing labour inputs (labour force contribution), and affecting total productivity growth (Barajas. et al., 2009).

Three theories are developed to connect remittance income and economic growth (Jushi. et al., 2021). The optimistic hypothesis regards remittance income as the key factor in reducing the poverty of migrant households in the home country. It is also believed that at the macroeconomic level, remittances are used for financial imports and external imbalances. So, remittance income contributes to an increased GDP in the home country.

According to the pessimistic hypothesis, labour migration to foreign countries increases dependency and hurts economic growth. Because only a few households receive remittances, there are inequalities in the population. Wages cannot generate national prosperity because they represent a small portion of the produce earned by workers. According to the remittance development pluralists' hypothesis, there is no clear optimistic or pessimistic view on the effect of remittances on economic growth. This debate can be resolved by empirically investigating the issue and the country's ground reality (Bucevska. 2022).

Poudel (2014) examined the impact of tourism income on Nepal's economic growth. He discovered tourism income's direct and positive impact on Nepal's economic growth. Furthermore, tourism receipts have been found to have a bidirectional relationship with other variables such as GDP, exports, private consumption, and imports.

Kadir and Karim (2012) examined the causal interconnection between tourism and economic growth in Malaysia. They found the short-run and long-run association between tourism income and economic development. The unidirectional causality was detected from tourism income and GDP growth. Gamage. et al. (2020) observed the nexus between tourism and economic growth by analyzing the 40 Scopus articles database. They revealed that literature on multiple country studies faces difficulties in finding specific relationships than single country studies.

Tugcu (2014), Du. et al. (2014), Harasarn, and Chancharat (2014), Lean. et al. (2014), and Brida, et al., (2013) found a positive and significant relationship between tourism income and economic growth. They identified the authenticity of the tourism-led economic growth hypothesis.

Antonakakis and Dragouni (2019), and Corrie. et al. (2013) discovered a bidirectional relationship between tourism income and economic progress, i.e., tourism income influences economic growth and economic growth influences tourism development. Mahapatra (2018) discovered a bidirectional causal relationship between growth and tourism spending. Tourism expenditure was found to be detrimental to economic growth. Lee (2008) found no evidence of a linkage between tourism and economic growth in Singapore.

Kaphle (2018) discovered a long-term association between remittances and economic growth but no causal relationship in the short term. Remittances are an essential source of private capital flow and have a multiplier effect on various macroeconomic indicators, such as poverty reduction, saving mobilization, growth in investment capital accumulation, and other areas,

which ultimately help to promote economic growth, according to Mayer and Shera (2017) and IMF (2005). Akter (2016) also came to the same conclusion.

Rehman and Rehman (2020) Concluded that the remittance income is a critical component of economic growth. Sah (2019) observed the positive impact of remittance on economic growth by increasing capital formation. Shafqat. et al. (2014) observed remittance's positive and significant impact on economic growth. It was examined that remittance income was the best source of income for interns of foreign exchange from developed countries to developing countries.

Salahuddin, and Gow (2015) examined the relationship between migrant remittance and remittance by using panel data from some of the largest recipient countries. They found a highly significant long-run positive relationship between remittance and economic growth. However, they have an insignificant positive association in the short run.

The theoretical foundations of many hypotheses and theories on the impact of tourism development and remittance revenue on economic growth are addressed in this paper. Most studies focus on determining the relationship between tourism income and economic growth or remittance income and economic growth individually and whether there is a positive influence, negative impact, or no connection. However, this study aims to examine both the combined and separate effects of tourist and remittance income on economic growth. Therefore, there is a research gap between the current study and earlier studies to some extent.

## **Material and Methods**

### **Research Design**

The descriptive and exploratory research designs provide the foundation of this study. The secondary data, which span 34 data points from 1987/88 to 2020/21, are used. Some econometric tools are utilized to investigate the effect of tourism and remittance revenue on Nepal's GDP, such as the Augmented Dickey-Fuller test and ARDL bound testing approach. This analysis employed 34 data points from the annual GDP, tourist, and remittance data from 1987/88 to 2020/21. The secondary data are gathered from several Nepalese economic surveys and publications by the Nepal Rastra Bank (NRB).

### **Variable Specification**

Three factors, including GDP, remittances, and tourism revenue, are taken into account in this study. Remittances and tourism revenue are treated as independent variables, and GDP is treated as the dependent variable. As a result, these two factors determine Nepal's GDP.

### **Model Specification**

It hires the concept of Cobb-Douglas production function to establish the relationship between variables. The general form of Cobb-Douglas production is:

$$Y_t = AK^\alpha L^\beta \quad (1)$$

Cobb-Douglas production function in logarithmic form:

$$\text{Log } Y = \text{Log } A + \alpha \text{Log } K + \beta \text{Log } L \quad (2)$$

L and K are labour and capital input in this equation, respectively.  $Y_t$  indicates output or income at a certain period.  $\alpha$  and  $\beta$  show the contribution to the production of capital and labour, respectively.  $\alpha$  and  $\beta$  have a positive contribution to production. 'A' is the efficiency parameter. The GDP depends upon tourism and remittance income. In this sense,

$$\text{GDP} = f(\text{TI}, \text{RI}) \quad (3)$$

In equation (3), GDP stands for gross domestic product, TI and RI stands for tourism income and remittance income, respectively. The equation after introducing variables in logarithms form is:

$$\text{LNGDP} = \beta_0 + \beta_1 \text{LN TI} + \beta_2 \text{LN RI} + \mu_t \quad (4)$$

Where  $\beta_0$  indicates the intercept of the regression line.  $\beta_1$  and  $\beta_2$  show the coefficient of tourism income and remittance income and  $\mu_t$  is the error term or disturbance term of the equation.

**ARDL Model Specification**

The underlying variables for the autoregressive distributive lag (ARDL) model can be of order I(0), I(1), or a combination of both, but not order I(2) (Nkoro & Uko, 2016). The ARDL model determines variables' short- and long-run co-integration. It introduces the long-run ARDL model,

$$Y_t = \beta_{0i} + \sum_{i=1}^p \beta_1 Y_{t-i} + \sum_{i=1}^q \beta_2 Z_{t-i} + \mu_t \tag{5}$$

where p, q are optimum lag orders.

After introducing all variables in natural logarithms, the following ARDL model is specified:

$$\Delta \text{LN}GDP = \beta_{0i} + \sum_{i=1}^n \beta_{1i} \Delta \text{LN}GDP_{t-i} + \sum_{i=1}^n \beta_{2i} \Delta \text{LN}TI_{t-i} + \sum_{i=1}^n \beta_{3i} \Delta \text{LN}RI_{t-i} + a_{1i} \text{LN}GDP_{t-1} + a_{2i} \text{LN}TI_{t-1} + a_{3i} \text{LN}RI_{t-1} + \mu_t \tag{6}$$

More specifically,

$$D(\text{LN}GDP) = \beta_0 + \beta_1 D(\text{LN}GDP(-1)) + \beta_2 D(\text{LN}TI(-1)) + \beta_3 D(\text{LN}RI(-1)) + a_1 \text{LN}GDP(-1) + a_2 \text{LN}TI(-1) + a_3 \text{LN}RI(-1) + \mu_t \tag{7}$$

In equation (7)  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  show the short-run coefficients, and  $a_1$ ,  $a_2$ , and  $a_3$  represent the long-run coefficient of the concerned variables. If the variables are co-integrated, the short-term dynamics error correction model (ECM) is specified as:

$$D(\text{LN}GDP) = \beta_0 + \beta_1 D(\text{LN}GDP(-1)) + \beta_2 D(\text{LN}TI(-1)) + \beta_3 D(\text{LN}RI(-1)) + \lambda \text{ECT}(-1) + \mu_t \tag{8}$$

In equation (8)  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  show the short-run dynamics coefficients of gross domestic product, tourism income, and remittance income, respectively. The acronym ECT stands for error correction term. It demonstrates the process of adjustment leading to long-term equilibrium.  $\lambda$  is the speed of adjustment parameter. It demonstrates the rate of change from short-run to long-term equilibrium.

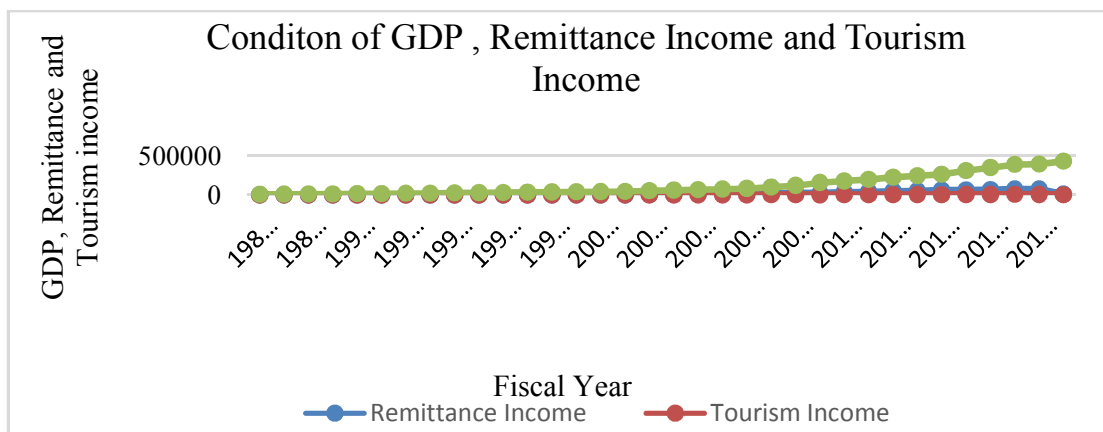
**Results and Discussion**

**Conditions of Variables**

In this analysis, nominal GDP is taken into account along with two of its influencing factors: tourism income and remittance income. Additional calculations are done based on the conditions of the variables. The minimum and maximum numbers for GDP, remittances, and tourism revenue are 7317.0 to 426632.0, 22.3 to 75447.1, and 167.57 to 7580.08 ten million, respectively. In Figure 1, data from 34 fiscal years are shown.

**Figure 1**

*Condition of Nominal GDP, Remittance, and Tourism Income of Nepal*



Source : *Economic Surveys of Nepal 2001/02, 2007/08, and 2021/22*

## Descriptive Statistics

The descriptive statistics show the basic statistical characteristics of the dependent and independent variables that are used in the study. Table 1 shows the results of descriptive statistics of the variables individually.

The descriptive statistics show an average of GDP is 118884.9, remittance income of 18724.31, and tourism income of 2288.679 ten million during the period of 34 years from the fiscal year 1987/88 to 2020/21. The standard deviation of tourism income is smaller than others. So, the mean value of tourism income is more representative than others. The value of GDP ranges from a minimum of 128573.2 to a maximum of 426632.0 ten million, remittance income ranges from 22.3 to 75447.10, and tourism income ranges from 167.570 to 7580.080 ten million during 34 years in Nepal. All variables are positively skewed, i.e., the Mean is more than the median. The data on tourism income is comparatively more consistent than GDP and remittance income because it has less value (90.54%) of coefficient of variation (CV) than others. Similarly, the data of GDP is more variable than others.

**Table 1**

*Results of Descriptive Statistics*

Descriptions	NGDP	RI	TI
Mean	118884.9	18724.31	2288.679
Median	56310.00	6205.000	1191.080
Maximum	426632.0	75447.10	7580.080
Minimum	7317.000	22.300	167.570
Std. Dev.	128573.2	25161.34	2072.295
Skewness	1.132	1.115	1.092
Kurtosis	2.943	2.765	3.024
Coefficient of Variation	1081.82%	134.38%	90.54%
Observations	34	34	34

*Where NGDP = Nominal Gross Domestic Product RI = Remittance Income TI = Tourism Income*

## Unit Root Testing

Unit root testing is carried out to determine the order of integration of the series. It checks the stationary or non-stationary data. The Augmented Dickey-Fuller (ADF) test is used for unit root testing. The non-stationary data cannot predict anything. The outcomes of Augmented Dickey-Fuller (ADF) are listed in table 2.

**Table 2**

*Outcomes of Augmented Dickey-Fuller test*

Series Name	Description	Level		First Difference	
		Intercept	Trend & intercept	Intercept	Trend & intercept
LNGDP	t- value	-2.954	-3.557	-2.957	-3.557
	ADF test	-1.289	-2.094	-4.175	-4.212
	P-value	0.623	0.529	0.003	0.012
LNRI	t-value	-2.954	-3.553	-2.952	-3.558
	ADF test	-1.114	-1.247	-6.513	-6.461

	P-value	0.698	0.884	0.000	0.000
LNTI	t- value	-2.954	-3.553	-2.960	-3.563
	ADF test	-2.233	-2.752	-4.430	-4.585
	P-value	0.199	0.224	0.001	0.005

Source: Authors calculation by using EViews12

Where LNGDP = Gross Domestic Product after taking log

LNTI = Tourism income after taking log

LNRI = Remittance income after taking log

According to the results of unit root testing, the P-value of all variables in level form is more than 0.05 or 5% level of significance. So, we cannot reject the null hypothesis, but at the first difference, all variables are non-stationary. At the first difference, the P- value of all variables is less than 0.05 ( $P < 0.05$ ). So, we can reject the null hypothesis and accept the alternative hypothesis. All the variables are non-stationary in level  $I(0)$  and stationary in their first difference  $I(1)$ . The data of GDP, remittance income, and tourism income all are stationary in their first differences  $I(1)$ . So, we can run the Autoregressive Distributive lag (ARDL) model (Pesaran, Shin, etal. 2001).

### Lag Selection

Lag selection aids in determining the period during which one variable impact another or itself. Sometimes, a variable's former value affects its present value. To run the autoregressive distributive lag (ARDL) model, the same number of lags of all variables are used in the equation. The Schwarz Info Criteria (SIC) and Akaike Info Criteria (AIC) may differ depending on the lags chosen. The ideal lag length is selected using the AIC and SIC criteria. Table 3 is a list of the AIC and SIC values.

**Table 3**

#### Optimal Lag Selection

Criteria	Selection of lag order			
	Lag 1	Lag 2	Lag 3	Lag 4
AIC	-3.012	-2.937	-2.825	-2.773
SIC	-2.691	-2.475	-2.218	-2.019

Source: - Authors Calculation by Using EViews12

According to Table 3, the minimum value of AIC and SIC is in lagone than other lag orders. So, the optimum lag for this model is 1. Recall that lower the AIC and SIC value better the model for analysis.

All variables are found stationary after the first difference. The selected ARDL optimal model is used with the maximum lag selection. The maximum lag of dependent and dynamic regressors was ARDL (1, 1, 1). The selected ARDL model is presented in Table 4.

According to the ARDL optimal model, the GDP and remittance income after the first difference is significant in determining the GDP. But the tourism income is directly significant in determining the Nepalese GDP. The coefficients LNGDP (-1), LNRI (-1), and LNTI are individually significant to explain the Nepalese nominal GDP. The value of R-squared is 0.9988 or 99.88 percent which is more than 60 percent. So, independent variables are nicely fitted, i.e., tourism and remittance income positively impact the GDP of Nepal. The probability value of F-statistics is less than 0.05. So, the independent variables like tourism and remittance income have

a combined effect on the nominal GDP of Nepal. The ARDL optimal model is far from the serial correlation problem because the probability value of the observed chi-square is 0.527, which is more than 0.05. Similarly, there is no problem with heteroscedasticity because the P-value is 0.729 at a 5 percent level of significance.

**Table 4**

*Results of ARDL Optimal Model*

Dependent Variable: LNGDP

Method: ARDL

Dynamic regressors (1 lag, fixed): LNRI, LNTI

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNGDP(-1)	0.818	0.052917	15.46	0.00
LNRI	-0.0014	0.011	-0.125	0.901
LNRI(-1)	0.037	0.014	2.592	0.015
LNTI	0.118	0.037	3.133	0.0041
LNTI(-1)	-0.0003	0.041	-0.0092	0.992
C	0.975	0.233	4.1733	0.0003
R-Squared	0.9988	Adjusted R- Squared	0.9986	
F-Statistics	4689.256	D-W test	-2.146	
Prob. (F-statistics)	0.000	S.E. of Regression	0.044	

Serial correlation (P- value) = 0.527      Heteroscedasticity (P-value) = 0.729

Source: Authors Calculation by EViews12

### ARDL Bound Testing for a Short Run and Long Run Relationship

The bound testing method establishes both the short- and long-term relationships between variables. Long-run associations between variables exist when the F-statistics value is higher than the upper bound  $I(1)$ . When the value of the F-statistics is smaller than the bottom bound  $I(0)$ , there is only a short-term correlation between the variables. The outcome is unidentifiable or inconclusive if the F-statistics value falls between the upper bound  $I(1)$  and lower bound  $I(0)$  values. Table 5 displays the findings from the ARDL-bound testing.

**Table 5**

*Results of ARDL Bound Testing*

H0: No Co-integration:	Value	5% Critical		1% Critical	
		I(0)	I(1)	I(0)	I(1)
Computed value of F-statistics	52.65	3.1	3.87	4.13	5.00
	0				

Source: Authors Calculation by EViews12

The F-statistics value is more than the upper bound value, so we can reject the null hypothesis of no co-integration between dependent and independent variables. There is a long-run relationship between Gross Domestic Product and tourism income and remittance income in Nepal. GDP, remittance income, and tourism income are moved together. From the bound test, it is found that GDP, remittance income, and tourism income are co-integrated in both 5 percent and 1 percent critical bounds. So, we must follow both short-run ARDL and long-run Error Correction Model (ECM).



### Long run ARDL Model

The long-run ARDL model establishes the relationship between dependent and independent variables. Table 6 shows how the estimated coefficients of independent variables like remittance income and tourism income respond to the GDP of Nepal. Tourism and remittance income are significant in explaining the GDP of Nepal. It shows that a one percent increase in tourism income increases GDP by 0.794 percent. Tugcu (2014), Du, et al. (2014), Harasarn, and Chancharat (2014), Lean, et al. (2014), and Brida, et al. (2013) also found a positive and significant relationship between tourism income and economic growth. The result followed the tourism-led economic growth hypothesis in Nepal. Similarly, a 1 percent increase in remittance income increases GDP by 0.157 percent. Oshota and Badejo (2014) found a positive and significant impact of remittance income to increase the GDP in their respective countries. The impact of tourism income is stronger to increase GDP than the remittance income in Nepal.

**Table 6**

*Results of Long-Run ARDL Model*

Dependent Variable: LNGDP

Method: Least Squares

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.0425	0.449	8.998	0.00
LNTI	0.794	0.086	9.247	0.00
LNRI	0.157	0.029	5.4004	0.0000
R-Squared	0.9655	Adjusted R- Squared	0.9633	
F-Statistics	434.349	D-W test	1.1783	
Prob. (F-statistic)	0.000	S.E. of Regression	0.2356	

*Source: Authors Calculation by EViews12*

The value of Rquared is 0.9655 which is more than 60%. So independent variables like tourism and remittance income are nicely fitted to determine the GDP of Nepal in the longrun. The probability value of F-statistic is 0.00, which is less than 0.05. So independent variables like tourism and remittance income jointly promote Nepal's economic growth. The long-run equation is estimated:

$$\text{LNGDP} = 4.0425 + 0.794 \text{LNTI} + 0.175 \text{LNRI} \quad (9)$$

### Estimation of Short-Run Dynamics of ECM Model

The short-run ARDL model shows how independent variables affect the dependent variable. It can also estimate the speed of adjustment of the variables. The results of the short-run dynamics Error Correction Model (ECM) are listed in Table 7.

According to Table 7, the error correction term is negative but not significant. The coefficient of ECT shows the speed of adjustment. The coefficient of ECT is -0.124, and the probability value is 0.019. The short-run coefficient is getting adjusted toward long-run equilibrium at the rate of 12.4 per cent. The short-run dynamic impact coefficient is different from the long-run counterparts. The short-run coefficients of tourism and remittance income are not significant in determining Nepal's GDP. Salahuddin and Gow (2015) also found a highly significant long-run positive relationship between remittance and economic growth. However, they have an insignificant positive association in the short run.

**Table 7**  
*Short-Run Dynamics Error Correction Model*

Method: Least Squares

Included observations: 32 after adjustments

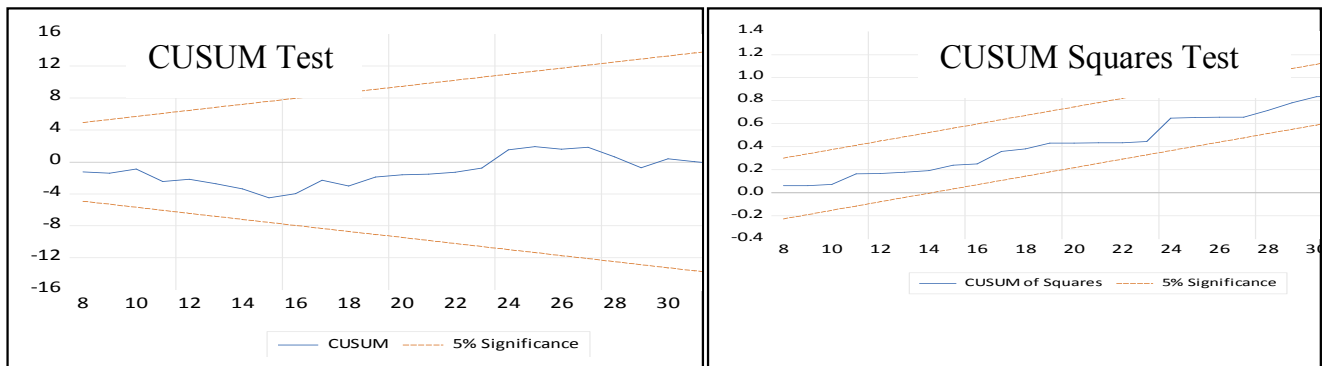
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.109	0.026	4.144	0.0003
D(LNGDP(-1))	0.103	0.201	0.513	0.612
D(LNTI(-1))	0.011	0.051	0.213	0.833
D(LNRI(-1))	-0.025	0.019	-1.313	0.2003
ECT(-1)	-0.124	0.093	-1.329	0.195
R-Squared	0.170	Adjusted R- Squared	0.0470	
F-Statistics	1.383	D-W test	2.047	
Prob. (F-statistic)	0.266	S.E. of Regression	0.0539	

Serial Correlation (P-value) = 0.725      Heteroscedasticity (P-value) = 0.7098

Source: Authors Calculation by using EViews12

According to the results of diagnostic checking of the short-run ARDL model, multi-dimensional results are found. The value of R-Square is 0.170 or 17 percent, which is less than 60 percent. It represents that tourism and remittance income are not nicely fitted to determine the economic growth of Nepal in the short run. The probability value of F-statistics is 0.266, which is more than 0.05. So, there is no combined effect of independent variables like tourism and remittance income that are not nicely fitted to determine the economic growth of Nepal in the short run. The probability value of F-Statistics is 0.266, which is more than 0.05, so there is no combined effect of independent variables like tourism and remittance income to determine the nominal GDP of Nepal in the short run. The serial correlation problem is not found because the probability value of the observed chi-square is 0.725, which is more than 0.05. The problem of heteroscedasticity problem is not also identified because the P-value is 0.7098 or more than 0.05. The CUSUM and CUSUM square test of recursive residuals indicate the stability of this model. It means the blue line is in between two red lines. The CUSUM and CUSUM square test are presented in Figure 2.

**Figure 2**  
*CUSUM and CUSUM Square Test*



**Conclusion and Policy Implication**

The tourism and Remittance income jointly determines the nominal GDP of Nepal. The long-run relationship of tourism and remittance income to GDP is observed. The data of GDP is

identified more variable than other variables. In the long-run, GDP, remittance, and tourism income moved together. It was found that a one percent increase in tourism income increases GDP by 0.794 percent, and a one percent increase in remittance income increases GDP by 0.157 percent in the longrun. The impact of tourism income on GDP is stronger than the impact of remittance income. But in the short run, remittance income hurts the economic growth of Nepal.

The remittance and tourism income have a positive impact on the economic growth of Nepal. Comparatively, tourism income has a strong positive effect on the GDP of Nepal than remittance income. So, it is necessary to develop the tourism industry in Nepal. The study suggests that Nepal should promote favourable tourism policies to boost economic growth. Tourism can be used as a policy instrument to stimulate the long-run economic growth of Nepal.

This study is based on secondary data from Nepal's economic surveys covering 43 fiscal years between 1987/88 and 2020/21. Remittances and tourism revenue are the only two factors used to determine GDP. With the aid of the data processing program EViews12, descriptive statistics and the ARDL bound testing approach are used to examine the effects of tourism and remittance revenue on Nepal. Therefore, additional research utilizing other factors, additional data, tools, and data processing software is required.

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