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Remittance and Tourism Income: Pillars of the National Economy of Nepal

Abstract

This study aims to examine the role of tourism income in GDP growth, analyze the contribution of remittances to Nepal's economic growth, and recommend strategies to maximize the benefits of tourism income and remittances. It is based on secondary data collected from the World Bank, Nepal Rastra Bank (NRB), the Ministry of Culture, Tourism and Civil Aviation (MoCTCA), and the International Monetary Fund (IMF) for economic data, and from research papers and journals for meaningful insights. It covers 20 data points from 2005 to 2024. This study is based on both an analytical and descriptive research design. It is guided by positivist research philosophy and deductive reasoning. Simple statistical tools, such as descriptive statistics, correlation, Johnson co-integration test, Ordinary Least Squares, and diagnostic tests for serial correlation, heteroskedasticity, and CUSUM and CUSUM square, are applied. Results show that one percent increase in remittances leads to a 0.816 percent increase in economic growth, whereas one percent increase in tourism income leads to a 0.1307 percent decrease in economic growth in Nepal. The value of R-squared is 0.9692. So, 96.92 percent of the variation in Nepal's economic growth is explained by tourism income and remittances. John Co-integration tests consistently show that GDP, remittance, and tourism income share a stable long-run relationship, despite short-term fluctuations. The findings imply that Nepal should prioritize policies that strengthen and channel remittance inflows toward productive investment, while reforming and diversifying the tourism industry to ensure its long-run contribution to sustainable economic growth.

Introduction

Remittance is the money sent back home by workers abroad. It is the backbone of the Nepalese economy at present. As well as the majority of homes in Nepal being run on remittance income. Remittance inflows are a significant source of income for Nepalese households, helping improve their standard of living and fulfill basic needs such as food, housing, education, and healthcare. Remittances are among the most significant sources of financial inflows to developing countries (NRB, 2018). Khanal (2019) states that remittance inflows to Nepal are on the rise and have contributed mainly to the nation's GDP.

According to the World Bank, remittances are the money and/or in-kind transfers that migrants send home to family members or beneficiaries via formal or informal channels. While the International Monetary Fund (2009) defines remittance as unrequited, nonmarket personal transfers between households across countries, distinguishing them from official aid and private capital flows due to their familial nature. Remittances are more than just financial transfers; they represent a social and economic link between migrants and their places of origin, contributing to community development and investment (De Haas, 2007). Remittances are a significant source of foreign currency to ensure surplus payments for compensation from young, energetic, laborious, and enthusiastic migrants from Nepal (Gaudel, 2006). Lamsal (2023) states that remittances generate macro impacts in receiving countries and micro impacts in receiving households, including effects on GDP, foreign exchange reserves, imports and exports, consumption and expenditures, financial savings, and so on. The World Bank (2011) found that almost half of all households had at least one migrant abroad.

One of the significant sources of income in the Nepalese economy is Tourism income. Nepal is one of the world's major tourist destinations (Bhattarai & Karmacharya, 2022). The tourism industry in Nepal is growing day by day, as is tourism income. It has become another source of livelihood for Nepalese people. Due to the abundance of natural and historical monuments, Nepal has significant potential for tourism development (Acharya & Halpenny, 2013). Tourism income refers to the amount of money tourists spend in Nepal. It is one of the sources of income for Nepalese to maintain their livelihoods. Nepal is rich in natural beauty, a significant factor in the growing number of tourists and the flow of tourism income in the country. Paudyal (2012) states that tourism has positively impacted the Nepalese economy. He also concluded that tourism is crucial to Nepal's economic growth. Recently, the Visit Nepal 2020 campaign was organized to increase tourist visits and tourism income, but it was a complete failure due to the COVID-19 pandemic that year.

Both tourism and remittances generate foreign exchange, which can help countries finance imports, address balance-of-payments issues, and stabilize their economies. Tourism receipts are even considered an "invisible export". Tourist spending and remittance recipients' spending can stimulate demand for various goods and services, thereby generating a multiplier effect within the economy. It creates additional income and employment opportunities across sectors like hospitality, transportation, and local businesses. Tourism, in particular, is a labor-intensive sector that creates direct and indirect employment opportunities. Remittances can also indirectly boost employment by stimulating demand and supporting businesses. Remittances, for example, can increase national savings and potentially lead to capital formation and investments within the country. Both tourism and remittances can contribute to poverty reduction by increasing household income and improving living standards. There is a strong correlation between GDP and remittance income. There is a moderate degree of positive association between GDP and tourism income. Tourism and remittance income positively and significantly impact the long-run economic growth of SAARC countries. A one percent increase in remittance and tourism income increased GDP by 0.277 percent and 0.518 percent, respectively, in SAARC countries. The impact of tourism income is stronger than the impact of remittance income in promoting economic growth in SAARC countries. But in the short run, the significant impact of tourism and remittance income is not identified (Dahal & Shrestha, 2023).

Remittance has become a lifeline for millions of Nepali households. Due to a lack of employment opportunities at home, a large portion of the working-age population seeks jobs abroad, mainly in the Gulf countries, Malaysia, Korea, and, more recently, in developed nations. The money they send back contributes to around one-fourth of Nepal's GDP, making Nepal one of the most remittance-dependent economies in the world. Remittance has helped reduce poverty, improve education and health facilities, and raise the overall standard of living. However, it has also created dependency, encouraged migration of skilled youth, and reduced investment in productive sectors.

Tourism, on the other hand, has long been recognized as one of Nepal's most promising economic sectors. Blessed with the Himalayas, a diverse culture, and a rich heritage, Nepal attracts visitors from around the world. The global tourism industry accounted for an average of 21 percent of worldwide GDP and 30 percent of global employment in 2020 (Brida et al. 2020). Before the COVID-19 pandemic, tourism contributed nearly 7–8 percent to GDP and provided direct and indirect employment for hundreds of thousands of people. Tourism not only brings financial benefits but also strengthens Nepal's global image and fosters cultural exchange. Still, the sector remains fragile, as it is easily affected by political instability, international crises, natural disasters, and poor infrastructure.

Acharya (2024) states that a significant positive causal relationship exists between tourism receipts and GDP in Nepal. Tourist arrivals are known to have a substantial impact on GDP. A study by Tung (2021) found that both tourism receipts and tourist arrivals make an imperative contribution to economic growth, thereby providing evidence in support of the tourism-driven growth hypothesis. At the same time, the study by Alam et al. (2022) identifies key challenges to sustainable tourism in South Asia, including a lack of infrastructure, security concerns, and political instability, which are particularly pertinent to Nepal's tourism sector.

Nepal, a remittance-dependent economy, has witnessed sustained growth in foreign labor migration, which has contributed substantially to household incomes, poverty reduction, and foreign exchange reserves (World Bank, 2023). At the same time, tourism has been a key driver of economic development, job creation, and cultural promotion, with its contribution to gross domestic product (GDP) increasing steadily, especially after the 1990s liberalization policies (Nepal Tourism Board, 2022).

Both remittance and tourism sectors face structural challenges. Overreliance on remittances has raised concerns about the "Dutch disease," brain drain, and reduced agricultural productivity (Pant, 2011). Similarly, the tourism industry remains vulnerable to political instability, inadequate infrastructure, and global shocks such as the COVID-19 pandemic (Shrestha & Subedi, 2021). These dynamics create a pressing need to assess their long-term sustainability and impact on Nepal's overall economic growth. Together, remittances and tourism are the pillars of Nepal's national economy. They bring in foreign currency, sustain livelihoods, and project Nepal's identity to the world. But they also raise important questions about sustainability, vulnerability, and the need for economic diversification. Understanding their role is therefore vital for charting Nepal's economic future.

This study aims to examine the nexus between remittances and tourism income and their impact on Nepal's economic growth. It further seeks to investigate the individual and joint effects of remittances and tourism income on the Nepalese economy's economic growth.

This research is divided into six segments. The rest of the sections are: Section two includes the

theoretical and empirical literature review on the topic. Segment three includes research methods, including research design, data nature and sources, and variable and model specification. Data are analyzed in segment four, and the results, discussion, and conclusions are presented in segments five and six, respectively.

Literature Review

Theoretical review

Remittance and Tourism income are two central pillars of the economy. Nepal's economy heavily depends upon these two factors. From the perspective of Keynesian theory of income and employment, we can understand the importance of these factors. When the household receives remittances, its income and purchasing power increase. The rise in income eventually leads to increased consumption of goods and services, such as education and health, which raise people's living standards. Similarly, the increase in tourism income means greater tourist expenditure on trekking, hotels, restaurants, and other related activities within our country, which in turn increases the earnings of our own people.

While remittances and tourism income contribute to the country's economic growth, they also create several problems, including an increasing reliance on foreign resources. Due to the overreliance on foreign income, Nepal's economy is vulnerable to global fluctuations. For example, the COVID-19 pandemic in 2020, when the Nepalese economy faced challenges due to a decrease in remittances and tourism income. Additionally, Human capital theory emphasizes the importance of skills and knowledge in driving economic growth. Migrant workers often gain experience abroad, while tourism develops the skills of guides, hotel staff, and local entrepreneurs. This accumulation of human capital not only enhances individual livelihoods but also strengthens the productivity and potential of the national workforce. For example, a migrant worker in Japan may learn crucial technologies, or a tourist in Pokhara can share knowledge with their guide.

The tourism-led growth hypothesis holds that tourism contributes significantly to a country's economic growth. Several studies support this hypothesis. According to Balaguer & Cantavella-Jordá (2002), tourism serves as a crucial source of foreign currency inflows, reducing balance-of-payment constraints and stimulating investment in other sectors. In a study by Ohlan (2017), it was found that tourism positively influences economic growth in India, indicating a long-run equilibrium relationship between tourism receipts and GDP. In Nepal, tourism is a major contributor to national income. The study by Sharma and Upadhyaya (2020) shows that international tourism receipts significantly support Nepal's foreign-exchange earnings and employment opportunities, thereby confirming the tourism-led growth hypothesis.

However, some scholars provide a cautious perspective. Katircioglu (2009) argues that the positive effects of tourism on growth may be conditional on the level of infrastructure, institutional quality, and political instability. In fragile economies, a heavy dependence on tourism can make growth volatile and vulnerable to external shocks, such as pandemics and political unrest. Remittances are perceived as an alternative source of capital that can stimulate domestic consumption and investment (Adams & Page, 2005). In the study by Hassan et al. (2022), the results suggest a statistically significant negative impact of international remittances on international tourism in South Asia, implying that recipients spend most of the remittances on basic consumption needs and lack incentives to save and invest. Furthermore, the results suggest that political stability positively

moderates the relationship between international remittances and international tourism, indicating that global remittances will be channeled to the tourism sector if domestic investors expect low political risk in the region.

From a Keynesian demand-side perspective, remittances directly boost household consumption, which triggers multiplier effects on national output (Ratha, 2013). Similarly, the tourism sector is seen as a catalyst for aggregate demand and foreign reserves, thereby supporting balance-of-payments stability in developing economies. However, critics point out that remittances can also fuel inflation and dependency, while unchecked tourism may lead to environmental degradation and cultural distortion (Chami et al., 2008). These theoretical debates suggest that the impact of both remittances and tourism on GDP is not uniform and depends on institutional quality, policy frameworks, and the economy's absorptive capacity.

Empirical review

Over the past two decades, remittances and tourism have emerged as major contributors to Nepal's economy, as evidenced by numerous empirical studies and official data. According to the Nepal Rastra Bank, remittance inflows have reached over \$ 10 billion in recent years, accounting for roughly 25–30 percent of Nepal's GDP. This massive inflow has transformed the livelihoods of millions of Nepali households, particularly in rural areas, enabling better access to education, healthcare, and small-scale entrepreneurship. Recent data indicate that Nepal earned 14.19 billion USD in remittances in 2024. Tourism has also played a significant role in generating foreign exchange and creating employment opportunities. In 2024, tourism income reached 588 million USD, a gradual increase following the decrease in 2020 due to the COVID-19 pandemic. According to Dahal's (2024) study, tourism revenue exceeds remittance income in contributing to Nepal's economic growth.

According to Dahal (2023), remittance and tourism income have a positive impact on Nepal's economic growth. Compared with remittance income, tourism income has a more substantial positive effect on Nepal's GDP. However, Dahal states that short-term remittances hurt Nepal's economic growth. He also suggests that Nepal should promote favorable tourism policies to boost economic growth. Tourism can be utilized as a policy instrument to stimulate Nepal's long-term economic growth. Pant (2007) states that Remittances are potentially important stimuli to economic growth. According to Simkhada (2024), foreign exchange earnings from tourism, government revenue from tourism, business revenue from tourism, online ticketing, and tourist activities all positively impact gross domestic product. She concludes that foreign exchange earnings from tourism, followed by business revenue, are the most influential factors in Nepal's economic impact from tourism. The study also concludes that foreign exchange earnings from tourism, followed by business revenue, are the most influential factors in Nepal's economic impact from tourism.

Karki (2018) states that a long-run relationship exists between tourism performance and economic growth. It can be argued that a long-run relationship exists, preventing them from diverging over time. In other words, the two variables follow each other over time. According to John's (2025) study, the findings reveal a significant long-run equilibrium relationship between tourism revenue and GDP, indicating that tourism growth positively influences economic expansion in Nepal. He also emphasizes the need to strengthen tourism infrastructure and sustainable practices to maximize economic benefits. Adams and Page (2005) found that a 10 percent increase in per

capita remittances reduces poverty by 3.5 percent in developing countries, indirectly fostering GDP growth. In the South Asian context, Giuliano & Ruiz-Arranz (2009) highlighted that remittances play a stronger role in countries with underdeveloped financial sectors, serving as a substitute for credit constraints. In Nepal, remittances have consistently accounted for 20–25 percent of GDP since the 2000s (World Bank, 2023).

Nepalese economic growth driven by higher Remittances is essentially a “pseudo-growth”. The economy can afford imports not because of the return from its economic output, through higher levels of exports of goods and services, but simply from the return of exporting labor. Secondly, remittance inflows have been declining since the global economic downturn following the 2008 financial crisis in the United States. This can result from a contracting economy and higher unemployment abroad. With this trend continuing, the Nepalese economy is likely to face downward pressure on remittance inflows, which could be troublesome given that it has grown increasingly dependent on remittances (Thagunna & Acharya, 2021).

According to the study by Shakya & Gonpu (2021), remittances do not significantly impact economic growth. The study also found that a democratic form of governance, as measured by a dummy variable, had a significant and positive impact on economic development, alongside capital formation and exports. Based on additional tests using Co-integration and regression analysis, the paper found that remittances may negatively affect economic growth in the long run. In Chaudhary’s (2021) study, the regression analysis indicates that remittances, foreign debt, exports, and inflation negatively affect GDP.

The tourism-led growth hypothesis has been widely tested and has yielded positive results. Balaguer and Cantavella-Jorda (2002) found that international tourism contributed to Spain’s long-run growth, a result that has been replicated in several developing countries (Proenca & Soukiazis, 2008). In Nepal, Dahal (2023) argued that tourism contributes positively to GDP, with more potent effects than remittances, due to its linkages with services, employment, and foreign-exchange earnings. However, Nepal’s tourism industry has been highly vulnerable to external shocks, such as the 2015 earthquake and the COVID-19 pandemic, highlighting the sector’s volatility. According to the study by Bhattarai & Karmacharya (2022), the results of the ARDL model indicate that tourism has no significant impact on Nepal’s economic growth in both the short run and long run, and the tourism-led growth hypothesis is rejected for Nepal. Pandey’s (2025) study found no long-term relationship between tourism receipts and economic growth.

Research Methods

Research Design

This study will use both descriptive and analytical research designs. The study is based on data from 20 years. To study the impact of remittances and tourism on GDP, a quantitative analysis is applied. Quantitative tools, such as percentage change, growth rate, correlation, and regression analysis, are used to measure the direct influence on GDP growth.

Nature and Sources of Data

This study relies on secondary sources for data collection. The data are quantitative and in USD (millions) to make the analysis easier. The data cover 2005-2024, making this study easier to analyze long-term trends and to measure the comparative roles of remittances and tourism income

in Nepal's economic growth. The primary sources of data include: Nepal Rastra Bank (NRB) – for remittance inflows and balance of payments data, Ministry of Culture, Tourism and Civil Aviation (MoCTCA) – for tourism income and arrivals, World Bank and IMF databases – for data of economic indicators, and Published journals, books, and research reports – for theoretical insights and empirical reviews. By relying on these sources, the study ensures that both the descriptive and analytical objectives are met, enabling a meaningful exploration of how remittances and tourism have contributed to Nepal's GDP growth over time.

Variables Specification

This study focuses on three main variables, namely remittance, Tourism Income, and GDP of Nepal, from 2005 to 2024 AD. The data are presented in USD (millions) to avoid confusion or inaccuracies. Economic growth is treated as a dependent variable, and the rest are independent variables.

Model Specification

This study examines the impact of remittance inflows and tourism income on Nepal's GDP growth. To achieve this, a simple linear regression model is employed, with GDP growth as the dependent variable and remittances and tourism as independent variables. The model can be written as:

$$\text{GDP growth} = f(\text{Remittance, Tourism}) \quad (1)$$

Simple regression Model is specified as:

$$\text{GDP}_t = \beta_0 + \beta_1 \cdot \text{Remittance}_t + \beta_2 \cdot \text{Tourism Income}_t + \mu_t \quad (2)$$

$$\text{In Symbol, } \text{GDP}_t = \beta_0 + \beta_1 * \text{RMT}_t + \beta_2 * \text{TOMY}_t + \mu_t \quad (3)$$

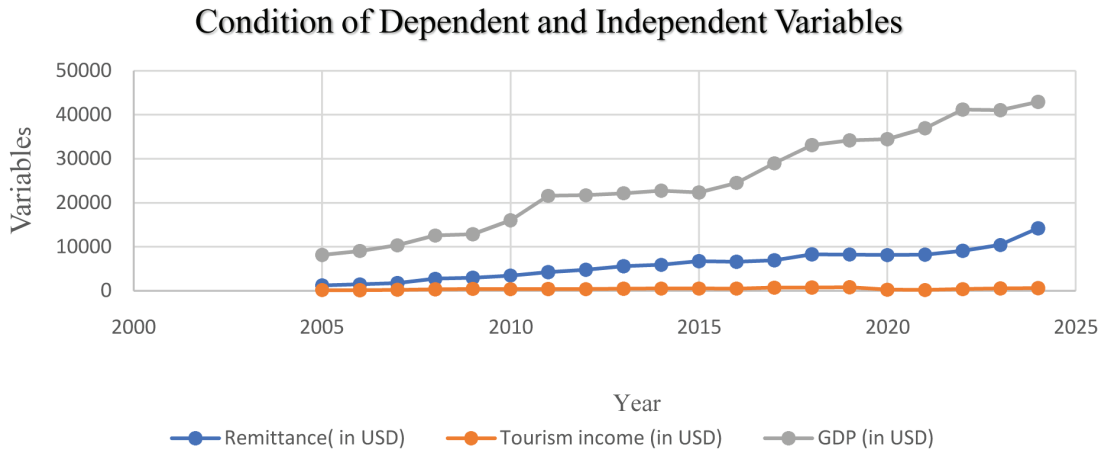
Where, GDP_t = GDP growth in year t (dependent variable), RMT_t = total remittance inflows in year t (independent variable), TOMY_t = total tourism earnings in year t (independent variable), β_0 = intercept (GDP growth when both independent variables are zero), β_1 and β_2 = coefficients showing the impact of remittance and tourism on GDP growth and μ_t = error term capturing other factors affecting GDP growth.

Presentation and Analysis

Condition of Variables

The period from 2005 to 2024 highlights how remittance and tourism together have acted as pillars of Nepal's economy. Remittance has been a cornerstone of Nepal's economy. In 2005, Nepal received approximately USD 1.21 billion in remittances. This figure saw a consistent upward trajectory, reaching USD 14190 million by 2024. This substantial increase highlights the growing reliance on remittances, as many households use this income for daily expenses, education, healthcare, and housing. In 2005, tourism revenue was USD 160 million. By 2019, this figure had surged to a record high of USD 801 million, reflecting the sector's growth and the country's increasing appeal as a tourist destination. However, the COVID-19 pandemic in 2020 led to a sharp decline in international arrivals, causing a temporary setback. Figure 1 shows the condition of the study variables.

Figure 1
Condition of Study Variables



Source: Drawing by the author using Excel, 2026

Descriptive Statistics

Descriptive statistics summarize, organize, and present data in a meaningful way, providing a clear overview of its key characteristics. These methods include measures such as the mean, median, mode, standard deviation, and range, which describe the central tendency, variability, and distribution shape of datasets. The results of descriptive statistics are listed in the following Table.

Table 1
Outcomes of descriptive statistics

Foundation	GDP	Remittance (RMT)	Tourism income (TOMY)
Mean	24835.20	6042.000	433.7000
Median	22545.00	6250.000	427.0000
Maximum	42910.00	14190.00	801.0000
Minimum	8130.000	1210.000	157.0000
Std. Dev.	11280.44	3326.510	188.0193
Skewness	0.098287	0.460324	0.250884
Kurtosis	1.792269	2.961317	2.342301
Coefficient of Variance	45.42%	55.06%	43.35%
Jarque-Bera	1.247714	0.707576	0.570282
Probability	0.535874	0.702024	0.751908
Observations	20	20	20

Note: All data are in Million USD

Source: Author's calculation by using EViews 12, 2026

Table 1 presents descriptive statistics for GDP, remittances, and tourism income over the study period, providing a clear picture of their patterns, growth, and variability. The mean values indicate that, on average, GDP stood at approximately 24,835 million USD, remittances at 6,042 million USD, and tourism income at 434 million USD. This clearly indicates that GDP is the most significant component, as expected, while remittances have emerged as a significant source of income, surpassing tourism, which remains relatively minor. The median values for all three variables are very close to their means, suggesting that the data is reasonably balanced and free of heavy distortions.

The coefficient of variation (CV), which measures relative variability, reveals an interesting picture. Remittance has the highest CV at 55.06 percent, suggesting that although remittance has grown rapidly, it has also experienced larger relative fluctuations than its average. GDP and tourism have slightly lower CVs, at 45.42 percent and 43.35 percent, respectively, indicating they are somewhat more stable in relative terms. Despite these variations, the distribution of all three variables appears to be reasonably standard. The Skewness values (all close to zero) suggest that the data is only slightly right-skewed. In contrast, the kurtosis values indicate flatter distributions than a standard curve for GDP and tourism, with remittances usually being almost flat.

Correlation Analysis

Correlation analysis is a statistical method used to measure and evaluate the strength and direction of the relationship between two or more variables. The results of the correlation analysis are listed in the following Table.

Table 2

Results of correlation analysis

Variables	GDP	Remittance	Tourism income
GDP	1.000	0.9566	0.4693
Remittance	0.9566	1.000	0.5366
Tourism income	0.4693	0.5366	1.000

Source: Author's calculation by using EViews12, 2026

In Table 2, the correlation analysis shows that GDP and remittances are highly correlated ($r = 0.9566$). This value is close to 1, indicating a strong positive correlation between the two variables. In other words, as remittance inflows increase, GDP also rises significantly. The correlation between GDP and tourism income is 0.4693, which indicates a moderate positive relationship. It suggests that while tourism contributes positively to GDP, its impact is not as strong as remittances.

Johnsen Co-integration test

The Johansen Co-integration Test is used to determine whether a set of time series variables is cointegrated, meaning they have a stable, long-run relationship despite being non-stationary individually. Developed by Johansen, this test analyzes multiple time series to identify the number of cointegrating relationships, using maximum likelihood estimation to assess both the trace and maximum eigenvalue statistics. The results are listed below in a table:

Table 3*Outcomes of the Johansen co-integration test*

Hypothesized no. of cointegrating equations	Unrestricted cointegrating rank test						
	Eigen value	Trace method			Max-Eigen test		
		Statistics	Critical Value	P-value	Statistics	Critical value	P-value
None*	0.7087	36.32	29.79	0.007	22.20	21.13	0.035
At most 1	0.5003	14.12	15.49	0.079	12.48	14.26	0.094
At most 2	0.0865	1.63	3.84	0.202	1.63	3.84	0.202
Conclusion	There is one cointegrating equation among GDP, remittance, and tourism income.				There is one cointegrating equation among GDP, remittance, and tourism income.		

Source: Authors' Calculation using EViews 12, 2026

In Table 3, the Trace Test assumes the presence of a single cointegrating equation among GDP, remittances, and tourism income. The trace statistic for the null hypothesis of no Co-integration (36.32) exceeds the 5 percent critical value (29.79) with a probability of 0.0077, leading to rejection of the null. For “at most one” and “at most two” cointegrating equations, the statistics are lower than the critical values, confirming that there is only one long-run equilibrium relationship.

The Maximum Eigenvalue Test supports this finding. The maximum eigenvalue statistic for the null of no Co-integration is 22.20, which is greater than the critical value (21.13) at the 5 percent level ($p = 0.0352$). However, for the cases of “at most one” and “at most two,” the test statistics do not exceed the critical values. It again confirms the existence of exactly one cointegrating equation.

Results of Ordinary Least Squares (OLS) Regression Analysis

Ordinary Least Squares (OLS) regression analysis is a statistical technique used to model the relationship between a dependent variable and one or more independent variables by fitting a linear equation that minimizes the sum of squared differences between observed and predicted values. The results of an OLS regression provide critical insights, including coefficients that indicate the magnitude and direction of each independent variable's effect, an intercept representing the baseline value, and standard errors that assess the reliability of the estimates. Additionally, t-statistics and p-values evaluate the significance of individual predictors, while R-squared and adjusted R-squared measure the proportion of variance explained by the model, indicating the model's goodness-of-fit. The F-statistic tests the overall model's significance, and residual diagnostics ensure that assumptions such as linearity and normality are met. OLS is widely applied in economics, the social sciences, and business to predict outcomes, test hypotheses, and understand relationships, such as how income influences spending or how marketing influences sales. However, its results rely on assumptions like independence and homoscedasticity, requiring careful interpretation to avoid misleading conclusions. The results are listed below in a table:

Table 3*Regression analysis*

Dependent Variable: LGDP

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRMT	0.816	0.0426	19.1319	0.0000
LTOMY	-0.1307	0.0588	-2.2202	0.0403
C	3.8256	0.3051	12.5382	0.0000
R-squared	0.9691	Mean dependent var		10.0029
Adjusted R-squared	0.9655	S.D. dependent var		0.5234
S.E. of regression	0.0971	Akaike info criterion		-1.6871
Sum squared resid	0.1605	Schwarz criterion		-1.5378
Log likelihood	19.8719	Hannan-Quinn criterion.		-1.6580
F-statistic	267.1713	Durbin-Watson stat		1.2834
Prob(F-statistic)	0.0000			

Where, LRMT= Remittance income after taking log, LTOMY= Tourism income after taking log, LGDP= GDP after taking log. All original data were in million USD.

In Table 3, a multiple regression model is used, with GDP (LGDP) as the dependent variable and two independent variables: remittance (LRMT) and Tourism income (LTOMY). The model is highly effective, demonstrating strong explanatory power and statistically significant relationships. The core regression equation is:

$$LGDP = 3.83 + 0.82*LRMT - 0.13*LTOMY. \quad (4)$$

It reveals a strong positive relationship between Remittance (LRMT) and GDP (LGDP), and a weaker negative relationship with Tourism income (LTOMY). Both variables are statistically significant, as indicated by their p-values. It is found that a 1% increase in remittances results in a 0.816% increase in economic growth, whereas a 1% increase in tourism income results in a 0.1307% decrease in economic growth in Nepal. The value of R-squared is 0.9692. So, 96.92 percent of the variation in Nepal's economic growth depends on tourism income and remittances.

Residual Diagnostic: Serial Correlation and Heteroscedasticity test

Ordinary Least Squares (OLS) is a statistical method used to estimate the relationship between dependent and independent variables by minimizing the sum of squared residuals. A serial correlation test checks whether the error terms in OLS are correlated over time, which violates the OLS assumptions and renders the estimates inefficient.

Table 4*Outcomes of the serial correlation and heteroscedasticity test*

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation				Heteroskedasticity Test: Breusch-Pagan-Godfrey Null hypothesis: Homoscedasticity			
F statistics	2.894	Prob-F	0.086	F statistics	2.493	Prob	0.112
Obs*R-squared	5.569	Prob Chi-square	0.061	Obs*R-square	4.536	Prob chi square	0.103
-		-		Scaled explained SS	1.998	Prob Chi square	0.368
Conclusion	We conclude that there is no significant serial correlation in the model's residuals.			No statistically significant evidence to conclude that Heteroskedasticity is present in the model.			

Source: Author's calculation using EViews12, 2026

The concurrence of both probability values 0.0865 and 0.0617 leads to a definitive conclusion. At the 5 percent level of significance, there is insufficient statistical evidence to reject the null hypothesis. Therefore, we conclude that no significant serial correlation exists in the model's residuals at up to two lags. This finding is crucial, as it validates the integrity of the original regression output.

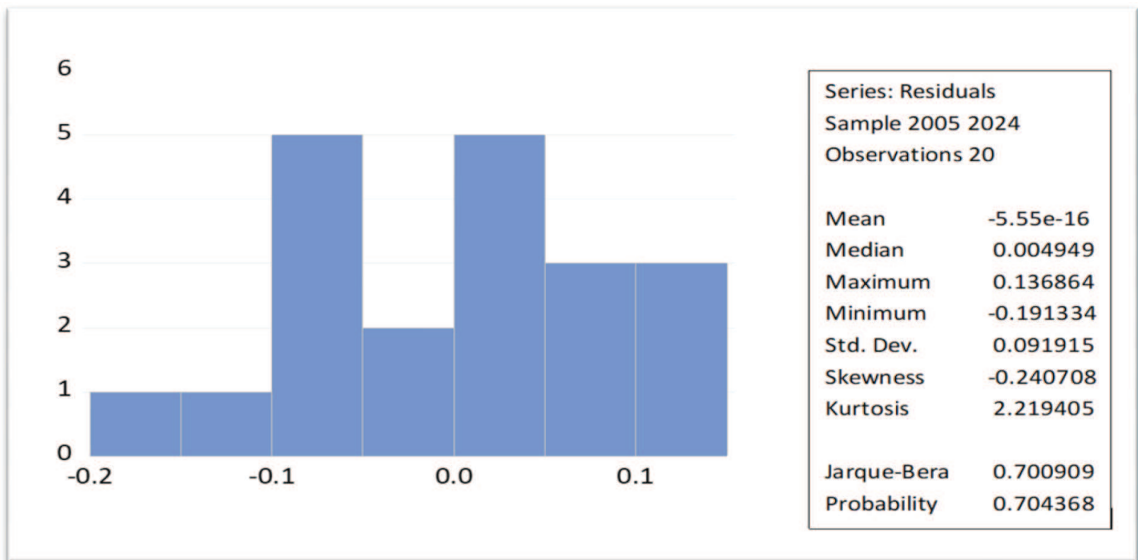
A Heteroskedasticity test is a statistical test used to determine whether the variance of the error terms in a regression model is constant. In OLS, one key assumption is homoscedasticity (equal error variance); however, if the variance changes with the level of an independent variable, this is referred to as heteroscedasticity. The F-statistic, the observed R-squared, and the Scaled explained SS all yield probability values (0.1123, 0.1035, and 0.3681, respectively) that exceed the conventional 5 percent significance level. Since all these p-values are greater than 0.05, we fail to reject the null hypothesis. It means the test finds no statistically significant evidence to conclude that Heteroskedasticity is present in the model. Therefore, we can assume that the constant-error-variance assumption holds, and that the standard errors and inferential statistics from the original regression are valid and trustworthy.

Normality Test of the Model

A normality test is a statistical test used to determine whether the residuals (errors) of a regression model follow a normal distribution, which is a crucial OLS assumption for valid hypothesis testing. If residuals are not normally distributed, confidence intervals and significance tests may become unreliable.

Figure 2

Normality test graph



Source: Drawn by author using EViews 12, 2025

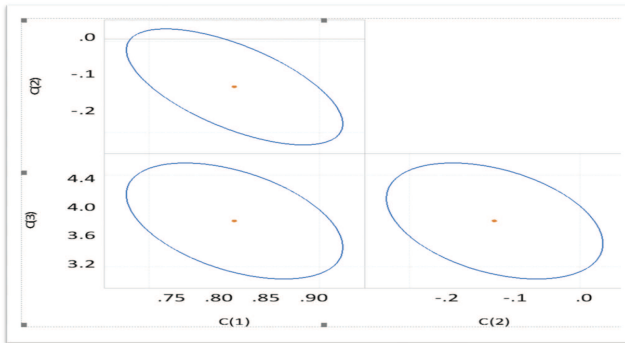
In Figure 2, a summary of the residuals from a regression model is presented, along with a formal test for normality. The key information is the result of the Jarque-Bera test. The null hypothesis for this test is that the residuals are normally distributed. The test yields a statistic of 0.701 and, more importantly, a very high probability value of 0.704. Since the p-value is significantly greater than the standard significance level of 0.05, we fail to reject the null hypothesis. It means there is no statistical evidence to suggest that the residuals are not normally distributed. Therefore, we can conclude that the residuals follow a normal distribution, which satisfies a critical assumption for the validity of the regression model's inferential statistics.

Coefficient Diagnostic by Confidence Ellipse Method

The coefficient diagnostic using the confidence ellipse method is a graphical approach in regression analysis that evaluates the joint significance of two coefficients. Instead of testing each coefficient separately with a t-test, this method constructs an ellipse that represents the joint confidence region for the two estimated coefficients, based on their approximately bivariate normal sampling distribution. The shape of the ellipse reflects both the variances and the correlation between the two coefficients. Suppose the confidence ellipse includes the origin (0,0). In that case, it suggests that the null hypothesis, which assumes both coefficients are equal to zero, cannot be rejected, meaning they may not be statistically significant when considered together. On the other hand, if the ellipse does not include the origin, then the two coefficients are jointly significant. Thus, the confidence ellipse method not only tests joint hypotheses but also provides visual insight into the relationships and correlations among regression coefficients, making it a useful diagnostic tool beyond individual significance testing.

Figure 3

Coefficient diagnostic by the confidence ellipse method



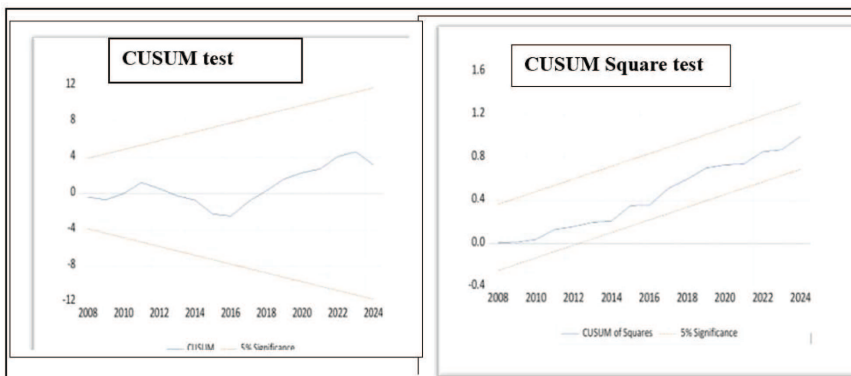
In Figure 2, the stable, well-behaved patterns observed in the chart for parameters C(2) and C(3) provide strong evidence that these economic relationships exist between variables LTOMY, LRMT, and LGDP. It allows us to conclude with greater confidence that the model's findings are not a statistical artifact but a reliable representation of the underlying dynamics among these variables, thereby solidifying the basis for any subsequent economic interpretation or policy recommendation derived from them.

CUSUM and CUSUM Squares Test

The CUSUM (cumulative sum) test and the CUSUM of Squares test are used to assess the stability of regression parameters over time. The CUSUM test tracks the cumulative sum of residuals to detect structural changes in the model's intercept or slope. In contrast, the CUSUM of Squares test uses squared residuals and is more effective in identifying changes in variance or volatility. If the plotted test statistic moves outside the confidence bands, it indicates parameter instability or structural breaks in the model.

Figure 3

CUSUM and CUSUM test



Source: Drawn by authors using EViews 12, 2025.

Conclusion

An analysis of data from 2005 to 2024 shows that both remittances and tourism have had a substantial, consistent impact on Nepal's economy. The Johansen Co-integration and correlation analyses also highlight a long-run relationship between remittances and GDP, demonstrating that remittances not only support households in the short run but also contribute to broader economic stability in the long run. The analysis suggests that tourism's contribution to GDP may be smaller than remittances in absolute numbers, but its multiplier effect is potent. The analytical results also indicate that, in the long run, tourism income is positively associated with GDP growth, making it a crucial component of Nepal's economic structure. The correlation analysis reveals a strong correlation between GDP and remittance, with a coefficient of 0.9566. This value is close to 1, indicating a strong positive correlation between the two variables. In other words, as remittance inflows increase, GDP also rises significantly. The correlation between GDP and tourism income is 0.4693, which indicates a moderate positive relationship. It suggests that while tourism contributes positively to GDP, its impact is not as strong as remittances. It is found that a 1% increase in remittances results in a 0.816 percent increase in economic growth, whereas a 1% increase in tourism income results in a 0.1307 decrease in economic growth. The value of R-squared is 0.9692, which means that 96.92 percent of economic growth in Nepal is dependent on tourism and remittance income. The findings imply that Nepal should prioritize policies that strengthen and channel remittance inflows toward productive investment, while reforming and diversifying the tourism industry to ensure its long-run contribution to sustainable economic growth.

References

- Acharya, B. P., & Halpenny, E. A. (2013). Homestays as an alternative tourism product for sustainable community development: A case study of women-managed tourism product in rural Nepal. *Tourism Planning & Development*, 10(4), 367–387. <https://doi.org/10.1080/21568316.2013.779313>
- Acharya, C. (2024). Investigating the causality between tourism revenue and GDP in Nepal: An ARDL Bounds Testing Approach. <https://shorturl.at/aCS19>
- Adams, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, 33(10), 1645–1669. <https://doi.org/10.1016/j.worlddev.2005.05.004>
- Alam, J., Alam, Q. N., & Kalam, A. (2022). *Prospects and Challenges for Sustainable Tourism: Evidence from South Asian Countries*. <https://doi.org/10.48550/arXiv.2211.03411>
- Balaguer, J., & Cantavella-Jordá, M. (2002). Tourism as a long-run economic growth factor: The Spanish case. *Applied Economics*, 34(7), 877–884. <https://doi.org/10.1080/00036840110058923>
- Bhattarai, K., & Karmacharya, R. (2022). Impact of tourism on economic growth of Nepal: Is the tourism-led growth hypothesis valid for Nepal? *The Gaze: Journal of Tourism and Hospitality*, 13(1), 93–110. <https://hspublishing.org/ASSM/article/view/157>
- Brida, J. G., Gómez, D. M., & Segarra, V. (2020). On the empirical relationship between tourism and economic growth. *Tourism Management*, 81, 104131. <https://doi.org/10.1016/j.tourman.2020.104131>
- Chami, R., Fullenkamp, C., & Jahjah, S. (2008). *Macroeconomic consequences of*

- remittances. IMF Occasional Paper No. 259. International Monetary Fund. <https://doi.org/10.5089/9781589067010.084>
- Dahal, A. K. (2023). Does the income from tourism and remittances really matter for economic growth? Evidence from the Nepalese economy. *Problems and Perspectives in Management*, 21(1), 32–42. [https://doi.org/10.21511/ppm.21\(1\).2023.04](https://doi.org/10.21511/ppm.21(1).2023.04)
- Dahal, A. (2024). Overseas capital streams and economic growth nexus: Pragmatic insights from Nepal. *Adhyayan Journal*, 11(11), 9–23. <https://doi.org/10.3126/aj.v11i11.67052>
- Dahal, A. K., & Shrestha, R. K. (2023). Effect of tourism and remittance income on economic growth in SAARC countries. *Journal of Management*, 6(1), 15–30. <https://doi.org/10.3126/jom.v6i1.58862>
- De Haas, H. (2007). *Remittances, migration and social development: A conceptual review of the literature* (UNRISD Program Paper No. 34).
- Gaudel, Y. S. (2006). Remittance income in Nepal: Need for economic development. *Journal of Nepalese Business Studies*, 3(1), 9–17. <https://doi.org/10.3126/jnbs.v3i1.491>
- Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, 90(1), 144–152. <https://doi.org/10.1016/j.jdeveco.2008.10.005>
- Hasan, M. A., Abdullah, M., Hashmi, M. A., & Sajid, A. (2022). International remittances and international tourism development in South Asia: The moderating role of political stability. *Journal of Economic Impact*, 4(3), 177–187. <https://doi.org/10.52223/jei4032204>.
- International Monetary Fund. (2009). *Balance of payments and international investment position manual* (6th ed.). Washington, DC: International Monetary Fund.
- John B. (2025). *Examining the Causal Relationship Between Tourism Revenue and GDP in Nepal: An ARDL Bounds Testing Approach*. Eudoxia Research Centre
- Karki, D. (2018). The dynamic relationship between tourism and economy: Evidence from Nepal. *Journal of Business and Management*, 5, 16–22. <https://doi.org/10.3126/jbm.v5i0.27384>
- Katircioglu, S. T. (2009). Revisiting the tourism-led-growth hypothesis for Turkey using the bounds test and Johansen approach for cointegration. *Tourism Management*, 30, 17-20. <http://dx.doi.org/10.1016/j.tourman.2008.04.004>
- Khanal, D. (2019). *Flow of remittance and its impact on revenue and GDP in Nepal* (Doctoral dissertation, Tribhuvan University).
- Lamsal, M. R. (2023). The effects of remittance on economic growth in Nepal. *Nepalese Journal of Management Science and Research*, 6(1), 168-181.
- Nepal Tourism Board. (2022). *Annual report 2022*. Kathmandu: NTB.
- NRB. (2018). *Foreign employment, remittance economy and Nepal: A Research Report*, Special study Section, NRB
- Pandey, B. (2025). Tourism and Economic Growth: Assessing the Role of Tourism Industry in Nepal. *Cognition*, 7(1), 1–13. <https://doi.org/10.3126/cognition.v7i1.74716>
- Pant, B. (2006). Remittance inflows to Nepal: Economic impact and policy options. *NRB Economic Review*, 18, 21–36. Nepal Rastra Bank.
- Pant, B. (2011). Harnessing remittances for productive use in Nepal. *Nepal Rastra Bank Economic Review*, 23, 1–20.
- Paudyal, S. (2012). Does Tourism Really Matter for Economic Growth? Evidence from

- Nepal. *NRB Economic Review*, 24(1), 48–66. <https://doi.org/10.3126/nrber.v24i1.52738>
- Proença, S., & Soukiazis, E. (2008). Tourism as an economic growth factor: A case study for Southern European countries. *Tourism Economics*, 14(4), 791–806. <https://doi.org/10.5367/000000008786440175>
- Ratha, D. (2013). *The impact of remittances on economic growth and poverty reduction*. Migration Policy Institute. <https://www.migrationpolicy.org>
- Shakya, P., & Gonpu, G. P. (2021). Impact of remittances on economic growth in Nepal. *Nepal Public Policy Review*, 1, 31–47. <https://doi.org/10.3126/nppr.v1i1.43419>
- Sharma, K., & Upadhyay, M. (2020). Tourism and economic growth in Nepal: Evidence from time series analysis. *Journal of Tourism and Development Studies*, 15(2), 45-49
- Shrestha, S., & Subedi, B. (2021). Impact of COVID-19 on Nepal's tourism industry: Challenges and opportunities. *Journal of Tourism and Development Studies*, 18(2), 45–59.
- Simkhada, M. (2024). The economic impact of tourism in Nepal. *Nepalese Journal of Finance*, 11(3), 92–106. <https://doi.org/10.3126/njf.v11i3.79556>
- Thagunna, K. & Acharya, Saujanya. (2013). Empirical analysis of remittance inflow: The case of Nepal. *International Journal of Economics and Financial Issues*. 3. 337-344.
- Tung, L.T. (2021). The tourism-led growth hypothesis in transition economies? Empirical evidence from a panel data analysis. *GeoJournal of Tourism and Geosites*, 38(4), 1076-1082. <https://doi.org/10.30892/gtg.38412-746>.
- World Bank. (2025). *How do you define remittances?* World Bank Data Help Desk. <https://shorturl.at/qR6z2s>
- World Bank. (2023). *Migration and remittances data*. World Bank. <https://www.worldbank.org>