

The Nexus of Remittances, Imports, and Private Investments with Nepal's Economic Expansion

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Abstract

This study examines the nexus of remittances, imports, and private investments with Nepal's economic expansion. The study uses annual data from mid-July 1976 to mid-July 2022. Gross domestic product (GDP) at a constant price is considered an indicator of economic expansion. The data is processed for the long-run connection adopting the bound testing technique of autoregressive distributed lag (ARDL), and the short-run trends are confirmed by deploying an error correction model (ECM) generated from the ARDL model. The Granger causality test determines the cause-and-effect connection. The evidence-based findings from ARDL establish that the link between Nepal's GDP and remittances is positive and insignificant in the short and long spans of time, while it is significant as well as positive with imports. It is, however, negative and insignificant with private investment. Similarly, unidirectional causation connecting GDP and remittances, imports and GDP, and remittances and private investments is demonstrated by the Granger causality evaluation.

Keywords: GDP, remittance, import, private investment, economic growth of Nepal.

Introduction

Nepal is a land-linked country with a small economy compared to its neighbouring countries. Economic growth is a significant macroeconomic indicator of welfare, shifting economic structure, increasing GDP per capita, and the nation's development. According to CBS (2022), the nominal per capita GDP is 1372 USD, and the nominal per capita GNI is 1381 USD in 2021/2022. Even after the adoption of an open and liberal economic policy after the restoration of democracy in 1990, the corruption and political unrest demoralized and froze industrialization, investment climate, and employment, resulting in the contraction of national production and the rise in imports that forced people to go to foreign countries in search of jobs (Dhungel, 2018).

Many Nepalis depart the nation each year for employment to financially sustain their families by sending remittances. According to the MoLESS (2022), the significant causes of massive labour migration are poverty, job scarcity within the country, conflict, other social and political factors, and the possibility of higher wages in destination countries. The primary destinations of the Nepali workforce are India, the United Arab Emirates (UAE), Qatar, Malaysia, Saudi Arabia, Kuwait, Bahrain, Cyprus, and South Korea. Remittance has become a primary source of foreign currency and a significant portion of the country's GDP.

The number of new and re-approval employees for Permits for Foreign Employment has reached 5,665,226 as of mid-March 2022, with 5,348,814 males and 316,412 females (MoLESS, 2022). Similarly, in the fiscal year 2020/2021, remittances totalled NPR 961.05 billion, accounting for 22.53 per cent of the total nominal

GDP (MoF, 2021). In the fiscal year 2022, this figure reached NPR 1007.31 billion (MoF, 2022). Remittances are often viewed as a long-term investment in human capital development; however, policymakers prefer remittances to be used to support entrepreneurship and production, create jobs, and boost overall national economic growth (Chaudhary, 2022). Unfortunately, a minimal portion has contributed to the nation's economic growth, while most is used in household and daily consumption. Seventy-nine per cent of the aggregate remittances serve as household funds and routine expenses; seven per cent are allocated to repay credits; five per cent are allocated to property; four per cent are committed to education; just two per cent are used for capital development; and three per cent are used for additional reasons (Sah, 2019). Study shows a significant amount from remittance outflow for consumption rather than economic growth. Even though remittances are the vital component of GDP in underdeveloped nations, studies have demonstrated that their influence on economic progress is negligible (Shakya & Gonpu, 2021).

Imports are necessary for every nation to meet domestic demand since no country can generate all goods and services independently. Nepal imports significant goods and materials since the country's industrial and other products cannot meet the growing demand. Nepal's principal imports are daily consumable foods and goods, coal and petroleum products, vehicles and spare parts, machinery parts, medicines and chemicals, metal items, and electrical and electronic items. The website of the Ministry of Finance records the imports in 1989/1990 were NPR 18.33 billion, reached NPR 374.3352 billion in 2009/2010, and in the fiscal year 2021/2022, were

NPR 1920.448 billion. By proportion, India and China account for roughly 80 per cent of Nepal's foreign trade, and India alone accounts for nearly 65 per cent of the total import volume (Karel & Kharel, 2020).

Private investments in the country are supposed to produce well-paying jobs and build a more robust and long-lasting economy. Nevertheless, due to the vastly unfavourable business climate, instead of export-based industries that produce machinery and equipment, tools, and technology, most of the private investments in Nepal are concentrated in the production of consumables and import-based trade. Even an agro-based country has become an agro-importer (Adhikari et al., 2021). Additional obstacles to private investment boosting Nepal's economic growth include poor infrastructure, unstable and unfriendly government policies, and inadequate credit facilities (Afram & Del Pero, 2012). As per the Ministry of Finance record, the investment from the private sector in Nepal in the fiscal year 1989/1990 was NPR 9.034 billion, reaching NPR 211.22 billion in 2009/2010 and NPR 1216.15 billion in 2021/2022. Most of the private investments in Nepal are in import trading, textiles and garments, agriculture, hotels, tourism, cement, banking and insurance, steel, and hydropower.

Despite receiving significant remittances each year, Nepal needs help making import payments. The country's GDP needs to grow at the rate of rising imports, but it needs to be seen in reality. This study aims to address the questions that arise from situations of this kind. What first comes up is: How are the chosen variables impacting economic growth? Are these elements positively or negatively impacting the country's GDP? Additionally, it will examine how much of an impact those elements have on Nepal's Gross Domestic Product (GDP). Considering all these factors, this study focuses on examining and analyzing the nexus of remittances, imports, and private investments with the economic growth of Nepal.

Research Questions and Objectives of the Study

This examines how remittances, imports, and private investments affect Nepal's economic expansion. Gross domestic product (GDP) at a constant price is considered an indicator of economic expansion. The study will show the magnitude and direction of the link of remittances, private investments and imports, on the economic expansion of Nepal. It will also demonstrate the causal links between the study's variables. Annual time series secondary data has been extracted from the Finance Ministry website from mid-July 1976 to mid-July 2022. EViews 12 student version software is used to examine and analyze the data.

Literature Review

Studies on the connection between remittance growth and economic expansion revealed incoherent results.

Remittances possessed a positive knock-on effect on GDP, in line with studies conducted by Le (2015) in Vietnam, Munawar et al. (2019) in Pakistan, and Chaudhary (2022) in Nepal. However, a four-country study by Sutradhar (2020) witnessed a positive link in India but an inverse connection in Bangladesh, Sri Lanka, and Pakistan. Similarly, remittance growth and economic expansion have been reported to be inversely linked by Uprety (2017) and Shakya and Gonpu (2021) in Nepal. However, Emam et al. (2021), found no link between Bangladesh's economic expansion and remittance growth.

Different viewpoints exist on the link between economic growth and imports. Vietnam-based study findings by Minh (2020) indicate that though there is not a statistically significant link between imports and economic development in the short term, there is a positive association over the long term. A statistically significant long-run equilibrium link between imports and Bangladesh's economic development was demonstrated by Miyan and Biplob (2019). Similarly, the findings of studies by Reddy (2020) and Devkota (2019) demonstrated cointegration and causal links between imports and exports and Indian economic development. Both researches discovered a positive link between imports and economic expansion. Bastola and Sapkota (2015) studied the connection between foreign trade and economic development based in Nepal and revealed a significant negative impact of imports on GDP.

Regarding the linkage between investments and economic development, Khan and Reinhart (1990) supported that private investment affects nation's economic growth more than public investment in developing countries. Haque (2013) showed that both public and private investments have a favourable short- and long-term effect on economic expansion. Furthermore, the study supported the idea that private investment surpasses public investment over the long run in Bangladesh. Phetsavong and Ichihashi (2012) did a study using panel data from fifteen developing countries, including Nepal in Asia, revealing that private domestic investment is the primary driver of economic growth.

Even though the external determinants' effects on Nepal's economic development have not been extensively studied, it is still challenging to get consistent results about the impact of private investment, remittances, and imports on the country's economic expansion. Hence, this study will fill the research gap.

Model Specification

From the standpoint of the objective, the equation is designed as equation (i)

$$GDP = f(Rem, Imp, PvtInv) \quad (i)$$

Similarly, the simple linear functional form of model equation (ii) is the following equation.

$$GDP = \beta_0 + \beta_1 Rem + \beta_2 Imp + \beta_3 PvtInv + \varepsilon_t \text{ (ii)}$$

Where GDP = Gross Domestic Product, Rem= Remittance, Imp= Import and PvtInv= Private Investment. All amounts are billion in Nepali Rupees and expressed in natural logarithms.

This study uses an Autoregressive Distributed Lag (ARDL) bound testing approach to analyze long-run relationships and an Error Correction Model (ECM) from ARDL to test short-run dynamics of remittances, imports, and private investments with Nepal's real GDP.

The ARDL model is superior to some other regression models in the sense that it can be applied to different orders of cointegration, performs well even with small sample sizes, and enables to estimate of short-run adjustment with an Error Correction Model (ECM) deriving from ARDL through a straightforward linear transformation without sacrificing degrees of freedom (Pesaran et al., 2001). Similarly, an ARDL bounds testing approach consists of four steps in general. They are: Testing the integration characteristics of variables, determining the existence of long-run cointegration among variables using the bounds F-test, estimating short-term and long-term relationships in the best model with the appropriate lags of variables, and determining the model's stability. The basic ARDL model is in the form of the following equation (iii).

$$\Delta LnGDP_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta LnGDP_{t-i} + \sum_{i=1}^q \beta_{2i} \Delta LnRem_{t-i} + \sum_{i=1}^q \beta_{3i} \Delta LnImp_{t-i} + \sum_{i=1}^q \beta_{4i} \Delta LnPvtImp_{t-i} + \beta_{11} LnGDP_{t-1} + \beta_{12} LnRem_{t-1} + \beta_{13} LnImp_{t-1} + \beta_{14} LnPvtInv_{t-1} + \omega_t \text{ (iii)}$$

Where Δ is the difference operator, Ln is the natural logarithm, β₀ is constant, β_{1i}, β_{2i}, β_{3i} and β_{4i} (i= 1,2,3,4...n) measure the short-term dynamics and β₁₁, β₁₂, β₁₃ and β₁₄ measure the long-run effects of the variables. Similarly, ω_t represents the white noise error.

The following model, the error correction model (ECM), as in equation (iv), is used to bound the cointegration test to establish a link between the dependent variable Ln GDP and the independent variables Ln Rem, LnImp, and LnPvtInv (iv)

$$\Delta LnGDP_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta LnGDP_{t-i} + \sum_{i=1}^q \beta_{2i} \Delta LnRem_{t-i} + \sum_{i=1}^q \beta_{3i} \Delta LnImp_{t-i} + \sum_{i=1}^q \beta_{4i} \Delta LnPvtImp_{t-i} + \varphi ECT_{t-1} + \omega_t \text{ (iv)}$$

Here, φ the speed of adjustment parameter with a negative sign, and ECT_{t-1} is the error correction term of the model. Similarly, β_{1i}, β_{2i}, β_{3i} and β_{4i} are the short-term dynamic coefficients of the model's adjustment of long-run equilibrium.

The bounds test is performed to test the long-run cointegration between the variables or not. The null hypothesis of no long-run cointegration is as follows:

$$H_0: \theta_1 = \theta_2 = \theta_3 = 0$$

The alternative hypothesis of the long-run relationship is as follows:

$$H_1: \theta_1 \neq 0, \theta_2 \neq 0, \theta_3 \neq 0$$

The study uses the Granger causality technique to examine the causal effects between remittances, imports, private investments, and economic growth in the natural logarithm form. The Granger causality in the equation method regresses a variable, y, on a lagged value of itself and another variable, x. If x is statistically significant, it explains some of the variances of y, which are not defined by lagged values of y. Equations (v) and (vi) Error! Reference source not found. show the model specification of Granger causality.

$$LnY_t = \sum_{i=1}^n \alpha_i LnY_{t-i} + \sum_{j=1}^n \beta_j LnX_{t-j} + e_{1t} \text{ (v)}$$

$$LnX_t = \sum_{i=1}^n \gamma_i LnX_{t-1} + \sum_{j=1}^n \delta_j LnY_{t-j} + e_{2t} \text{ (vi)}$$

The null hypothesis (Ho) is that the variable under consideration does not cause the other variable. The Granger causality test depends critically on the number of lagged terms introduced in the model.

Before ARDL, Unit Root Test is conducted to test the stationary of the collected time series data. For this, an Augmented Dickey-Fuller Test is employed. Similarly, VAR is used for lag selection criteria. In the subsequent steps, some diagnostic and stability tests will be for the model's reliability, goodness of fit, and stability.

Empirical Result and Discussion

The following parts include the study's results and their discussions.

Unit Root Test

By employing the ADF test for stationarity, the ARDL cointegration checks that variables are stationary at level, first difference, or both. Table 1 depicts the results.

Table 1: Unit Root Test

At Level		Ln GDP	Ln Rem	Ln Imp	LnPvtInv
With intercept	ADF t-stat.	-0.096	-0.328	-0.887	-3.26
	Prob.	0.944	0.912	0.784	0.023
With Trend and intercept	t-stat.	-2.291	-2.012	-1.637	-5.78
	Prob	0.431	0.579	0.762	0.000
At First Difference					
With Constant	ADF t-stat.	-7.336	-7.587	-6.428	-
	Prob.	0.000	0.000	0.000	0.00
With Trend and intercept	t-stat.	-7.249	-7.488	-6.532	-7.56
	Prob	0.000	0.000	0.000	0.000

Table 1 confirms that LnPvtInv is stationary at level, while LnGDP, LnRem, and LnImp are stationary at the first difference, which opens the door to the ARDL approach to further calculation.

Lag Selection Criteria

In this study, the lag length is selected using a VAR model. **Table 2** clearly shows that the lag length criteria for this study is 1.

Table 2: Lag Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	152.56	NA	1.17	-6.91	-6.74	-6.85
1	344.12	338.57*	3.35*	-15*	-14*	-14*
2	352.87	13.85	4.79	-14	-13.2	-14
3	356.91	5.64	8.81	-14.	-12.	-13
4	375.66	22.67	8.60	-14.	-115	-13

The ARDL Model

The ARDL model, which incorporates both endogenous and exogenous components, is shown in **Table 3** with optimal lags obtained from the VAR model. The best ARDL model based on the VAR model is ARDL (1, 1, 1).

Table 3: ARDL Model

Dependent Factor: LNGDP				
Variable	Coefficient	Std. Error	t-Stat.	Prob.
LNGDP (-1)	0.615	0.111	5.508	0.000
LNREM	0.011	0.015	0.729	0.470
LNREM (-1)	0.000	0.014	0.031	0.974
LNIMP	0.101	0.033	3.002	0.004
LNIMP (-1)	0.001	0.040	0.048	0.961
LNPVTINV	-0.003	0.006	-0.49	0.628
LNPVTINV (-1)	-0.003	0.005	-0.66	0.516
C	0.963	0.280	3.435	0.001
R-square	0.998	Durbin Watson Stat		2.136
Adj. R-sq.	0.998			
F-statistic	4762.74			
Prob(F-stat)	0.000			

ARDL Bound Test

The long-term link in **Table 4** between the factors is found by comparing the F-statistic to the critical thresholds of the lower and upper limits. The null argument for no cointegration is ruled out since the F-statistic 7.5362 exceeds the point range thresholds for each of all significant parameters. Therefore, the link between remittances, private investments, and imports and Nepal's GDP throughout the research period is confirmed.

Table 4: ARDL Bound Test

Dependent Factor: Ln GDP				
Test-stat.	Value	Significance	I(0)	I(1)
F-stat	7.5362	10%	2.37	3.2
stat	3	5%	2.79	3.67
k		2.5%	3.15	4.08
		1%	3.65	4.66

Short-Run Estimates

In **Table 5** the current period's coefficient of remittances is 0.0113, and the P value is 0.3861. The aforementioned

finding signifies those remittances have no beneficial contribution to immediate economic growth, implying that remittances entering the nation do not contribute to overall economic expansion. The P-value of 0.0003 and import's coefficient of 0.1011, point to a significant and favourable influence on economic expansion. The outcome demonstrates that imports have an immediate favourable effect on the economic expansion of the country. It means Nepal's economic expansion is 0.1011 per cent for every 1 per cent increase in imports. The coefficient of private investment -0.00329 and the P-value of 0.471 shows a negative but insignificant influence on the country's GDP. It indicates that investments from the private sector have no impact on the country's economic growth.

Table 5: Short-Run Estimates

Dependent Factor: LNGDP				
Factors	Coefficient	Std. Error	t-Stat.	Prob.
D(LNREM)	0.0113	0.012	0.876	0.386
D(LNIMP)	0.1011	0.025	3.968	0.0003
D(LNPVTINV)	-0.00329	0.004	-0.73	0.471

Coefficient of the Error Correction Term

With a value of -0.3848, the ECT, which is Coint. Eq (-1) * in **Table 6**, shows that the system is correcting the preceding period's disequilibrium at a rate of 38.49% each period as it moves towards equilibrium over the long haul. Likewise, the -6.45 t-statistic value and 0.000 p-values, witness that the coefficient is significant. Coint. Eq (-1) * is less than 1, negative, as well significant, indicating a monotonic adjustment of the model.

Table 6: Coefficient of the Error Correction Term

Dependent Factor: LNGDP				
Factors	Coefficient	Std. Error	t-Stat.	Prob.
Coit.Eq(-1) *	-0.3849	0.059	-6.45	0.000

Long Run Estimates

The long-term connection between series with various integration orders is ascertained using the ARDL cointegration technique Pesaran et al. (2001). **Table 7** depicts the long-term linkage of the inflow of remittances, imports, and private investments with economic development.

Table 7: Long Run Estimates

Dependent Factor: LNGDP				
Variable	Coefficient	Std. Error	t-Stat.	Prob.
LNREM	0.0306	0.0163	1.8745	0.0668
LNIMP	0.2677	0.0306	8.7464	0.0000
LNPVTINV	-0.017	0.0146	-1.2117	0.2331
C	2.5024	0.0248	100.54	0.000
EC = LNRGDP - (0.0306*LNREM + 0.2678*LNIMP - 0.0177*LNPVTINV +2.5025)				

Remittances and the nation's GDP cannot establish a long-term association, as in, **Table 7** Since the remittance coefficient of 0.0306 and the P-value of 0.0668, indicate that the remittance inflows do not support the expansion of the national economy. Imports and the nation's GDP have a favourable long-term connection, as indicated by the 0.2677 imports coefficient and P-value 0.000 suggesting that, over time, the country's imports are fostering economic expansion. Here, GDP grows by 0.2677% for every 1% rise in imports. In contrast, private investments in Nepal have an inverse as well as an insignificant association with the nation's GDP, as indicated by the coefficients equals -0.017 and P equals 0.2331. The study's conclusion unequivocally indicates that private-sector investments in Nepal have not yet significantly contributed to the nation's economic expansion.

Granger Causality Test

The Granger causality approach analyzes the link and causality's direction between remittances, imports, private investment, and GDP. **Table 8** depicts the result of the test.

Table 8: Granger Causality Test

Causality direction (Null Hypothesis)	F-Stat	Prob.
Ln REM does not Granger cause Ln GDP	0.175	0.678
Ln GDP does not Granger cause Ln REM	4.909	0.032
Ln IMP does not Granger cause Ln GDP	9.9904	0.003
Ln GDP does not Granger cause Ln IMP	0.0708	0.791
Ln PVTINV does not Granger cause LnGDP	1.1088	0.298
Ln GDP does not Granger cause Ln PVTINV	21.778	3.E-01
Ln IMP does not Granger cause Ln REM	3.4206	0.071
Ln REM does not Granger cause Ln IMP	0.0497	0.825
Ln PVTINV does not Granger cause Ln REM	3.093	0.086
Ln REM does not Granger cause Ln PVTINV	17.38	0.000
Ln PVTINV does not Granger Cause Ln IMP	1.1348	0.293
Ln IMP does not Granger Cause Ln PVTINV	20.135	5.E-01

Table 8 shows unidirectional causality from GDP to remittances, imports to GDP, and remittances to private investments at the 5% threshold of significance. This result states that an increase in the GDP increases the remittances inflow, an increase in imports increases the GDP, and an increase in remittances increases imports to

the country, but not vice versa. Furthermore, the study's variables exhibit no bidirectional causation.

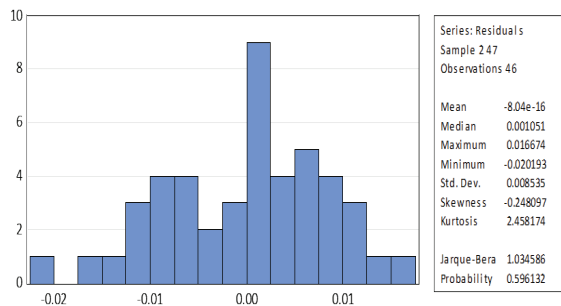
Diagnostic Tests

To evaluate model's goodness of fit as well as reliability, the following diagnostic tests are carried out.

Histogram Normality Test

This test verifies the ARDL model's goodness of fit as well as residual normality; the p-value of Jarque-Bera greater than 5% indicates a good fit. The Jarque-Bera Normality Test ensures that the residuals in the ARDL model are normal and establishes the model's goodness of fit. The test result is depicted in **Figure 1**.

Figure 1: Histogram Normality Test



Breusch Godfrey Serial Correlation LM Test

This test determines if model error is serially associated, rejecting the null hypothesis if residuals do not show serial correlation at a 5% threshold level. **Table 9** depicts the result.

Table 9: Breusch Godfrey Serial Correlation LM Test

F statistics	0.8341	Prob. F(2,36)	0.4425
Obs. R square	2.0371	Prob. Chi square(2)	0.3611

Heteroskedasticity Test

If the R-square value exceeds 5%, the residual of the model should be considered homoskedasticity-free. **Table 10** displays the result test of the study.

Table 10: Heteroskedasticity Test

F statistics	1.2416	Prob. F(7,38)	0.3049
Obs. R square	8.5628	Prob. Chi square(2)	0.2856

The P-value of Jarque-Bera in the histogram-normality test of 0.596132 in **Figure 1**, Observed R square 2.0371 and P-value 0.3611 of LM test in **Table 9**, and Observed R square 8.5628 and p-value 0.2856 of Heteroskedasticity test in **Table 10** clearly describe the model's perfect fitting, no serial correlation likewise no heteroscedastic, respectively. Therefore, it is concluded that the model is well-fitting and reliable.

Stability Diagnostic Test

The following Ramsey reset test, including CUSUM testing, are conducted for the model's stability.

Ramsey Reset Test

This testing serves to confirm that the model is functioning in the correct functional form. A model is considered well characterized when the F-statistics P-value exceeds 5%. Ramsay reset test result in **Table 11** depicts the F statistic's P-value, a figure of 60.06%. Which proves that the model is well-specified.

Table 11: Ramsey Reset Test

	Value	Df.	Probability
T statistic	0.528050	37	0.6006
F statistics	0.278836	(1, 37)	0.6006

CUSUM and CUSUM of Square Test

The following CUSUM test **Figure 2** as well as CUSUM of Square test **Figure 3** assessments evaluate model parameter stability, showing both within 5% significance limits, indicating the model's stability over time.

Figure 2: CUSUM Test

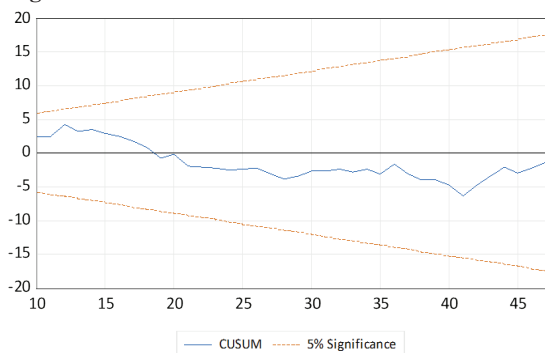
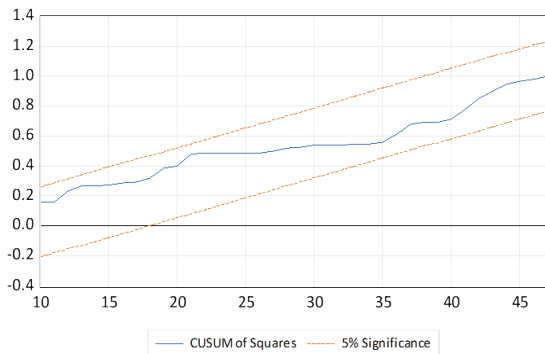


Figure 3: CUSUM of Square Test



Conclusion

The study examines and analyzes the impact and relationship of remittances, imports, and private investments on Nepal's economic expansion. Based on the ARDL model's result, there is both a short- and long-term positive but insignificant link between Nepal's remittance inflow and GDP of the country, meaning that despite Nepal receiving a significant amount of remittance every year, it has no significant contribution to the country's economic expansion. Similarly, data

results revealed Nepal's imports are positively linked with the nation's economic expansion throughout the short as well as long term. The expansion of the nation's economy has been positively impacted by imports. However, studies conducted by **Bastola and Sapkota (2015)** and **Ghimire et al. (2020)** showed that imports negatively impacted the economic expansion of the country. Similarly, Private investments has negative but insignificant link with economic expansion for the short as well as long periods. The study result confirms that whatever investments are made by the private sector in Nepal, could not strengthen the economy of the nation. The Granger causality test result shows unidirectional causality from GDP to remittances, imports to GDP, and remittances to private investment. This result states that economic expansion supports the inflow of remittances, imports boosting the economic expansion and the remittances inflow helping to lift the investment from the private sector.

For the economic expansion of Nepal, the remittances are to be used for productive sectors and capital formation to foster local production and economic expansion. The focus of imports into the country is to generate commodities and services so that they may help increase exports. Private sector investments should aim to increase productivity, foster exports, foster interest in domestic manufacturing, and create well-paying jobs. Similarly, the government should focus on developing adequate infrastructure, stable and business-friendly government policies, better credit facilities, and political stability to promote an environment favourable to the nation's economic development.

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