

Effect of International Trade on the Economic Growth of Nepal

Maya Acharya¹,

Abstract

The study explores the relationship between exports, imports, remittance, and economic growth of Nepal for the 1974/75 to 2021/22 fiscal year. Descriptive and analytical research designs were employed on time series data obtained from secondary sources. The Augmented Dickey-Fuller unit root test, co-integration technique, and Error Correction Model (ECM) were employed for empirical investigation. The impact of exports, imports, and remittances on economic growth was analyzed through the ordinary least square regression method for the long run relationship. The result reveals the existence of a long-run relationship between imports, remittances, and gross domestic product. The effect of exports and imports was statistically significant on the economic growth of Nepal and the effects of remittance was statistically insignificant on economic growth. The result emphasizes that the Government should ensure the export promotion policies to achieve Nepal's high and sustainable economic growth by investing in trade infrastructure and export subsidies and creating a favorable environment that encourages using remittance money to support productive sectors of the economy.

Keywords: gross domestic product, co-integration, causality, error correction, international trade

Article information

Received: 02-06-2024 Reviewed: 17-06-2024 Revised: 21-06-2024 Accepted: 26-06-2024

Author's Email: acharyamaya2017@gmail.com

Cite this article as:

Acharya, M. (2024). Effect of international trade on the economic growth of Nepal. *Janabhawana Research Journal*, 3(1), 69-82. <https://doi.org/10.3126/jrj.v3i1.68388>

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¹ Assistant Professor at Lumbini Banijya Campus

Introduction

International trade is considered a crucial factor for speeding up economic development. Whether it's trade within a country or between countries, it's one of the most important ways to achieve sustainable growth, create jobs, and improve people's well-being (Bhatta, 2013). Nepal has been engaged in trade with other countries since ancient times. Initially, its trade was mainly with Tibet and India. By the 1950s, more than 90 percent of Nepal's foreign trade was with India. Over time, Nepal's trade has remained heavily focused on India, making India its most significant trading partner (Acharya, 2015). Both imports and exports have increased. Although the growth rate of exports is higher than that of imports, the trade deficit has increased due to the relatively large size of imports (MoF, 2021).

Nepal is suffering from a huge trade deficit because imports have increased rapidly after liberalization and exports have been decreased. There is a huge trade deficit due to imports exceeding the exports. Throughout Nepal's history, there has been a persistent deficit in the balance of payments due to high imports and low exports. Remittances play a crucial role in offsetting this deficit by bringing in money from abroad. However, Nepal continues to spend more on payments to foreigners than it earns from abroad, resulting in a negative balance of payments. The country faces declining exports and rising imports, which worsen the trade imbalance and contribute to the overall unfavorable balance of payments situation. Since the 1980s, Nepal has adopted open economic strategies such as liberalization and privatization to boost international trade. Initially, Nepal mainly imported consumer goods from India while exporting agricultural products there. The reforms aimed to attract local and foreign investments, generate employment, and alleviate poverty through economic expansion and progress (Acharya, 2013).

Similarly, MoF (2022) has highlighted the pressure on the external sector. In recent years exports and imports have seen a bigger imbalance in the total balance of payments. Nepal exported goods to India, China, and other countries worth Rs. 64,338.5, Rs. 70,117.2, and Rs. 20,0031.0 million in the fiscal years 2010/11, 2015/16, and 2021/22 respectively. It had imported goods from these countries worth Rs. 396,175.5, Rs. 773,599.9, and Rs. 1,920,448.1 million in the same fiscal year so that negative balance of trade happened to be Rs. 3,318,437.0, Rs. 437,719.0, and Rs. 1,044,930.4 million (NRB, 2022).

Nepal exports goods including aluminum sector, brans, cardamom, dried ginger GI pipes, etc. to India and handicrafts, herbs, Nepalese paper and paper products, pashmina, refined leather, noodles, and readymade garments to China, and other countries. Similarly, petroleum products, transport types of equipment, machinery, and parts, electrical equipment, agriculture equipment and parts, telecommunication equipment, chemical

fertilizer, and medical equipment are major leading commodities imported by Nepal (MoF, 2022).

Nepal followed the policy of liberalization from 1990 to make the economy open so that it could reap benefits from globalization. What progress has Nepal made from liberalization and international trade? To get an answer to this question the study has to analyze the effect of international trade on economic growth. Nepal had trade relations with India and Tibet before liberalization. However, after the liberalization, Nepal's trade has been expanded to other countries also. Now, the question has arisen. Has Nepal reaped benefits from international trade? Has export increased? Has import decreased? Some empirical studies also have different opinions regarding the effect of international trade on economic growth. There is a positive and long-run relationship between international trade and economic growth (Bastola et al., 2015; Paudel et al., 2018; Murshed, 2020; & Kong et al., 2021). There is no relationship between exports, imports, and economic growth (Bakari & Mabrouki, 2017). There is unidirectional causality running from GDP to Exports and exports to Imports (Mehta, 2015). There is long-run positive unidirectional causality from remittance to import (Bhatta, 2013), and bidirectional causality between the exports and income growth (Elbeydi et al., 2010; Bakari & Mabrouki, 2017). From the above discussion, problems have led the researcher to raise the question, is there a relationship between exports, imports, remittances, and economic growth in Nepal?

Ahmed and Uddin (2009) conducted an empirical analysis of export, import, remittance, and growth in Bangladesh. They used annual data on real GDP, exports, imports, implicit GDP deflator, and remittances from 1976 to 2005 assuming the base year 1990. Export, import, and remittance were converted into real terms using the implicit GDP deflator. The study used Co-integration and Granger causality tests to investigate the relationship between import and remittance. Empirical results found that exports, imports, and remittances have caused GDP growth in the short run but have no long-run impact. Long-run GDP growth causes short-run income growth but this effect is once again unidirectional.

Mehta (2015) has examined the relationship between GDP, exports, and imports in India using time series data from 1976 to 2014. This study used the ADF unit root test, Johansen co-integration, and Vector Error Correction techniques to investigate the long-run causality between gross domestic product, exports, and imports in India. It is concluded that there is a long-run co-integrating relationship between gross domestic product, export, and import in India and unidirectional causality running from GDP to Export. There is no causality between GDP and imports and unidirectional causality running from export to import.

Bakari and Mabrouki (2017) investigated the relationship between exports, imports, and economic growth in Panama using annual data for the periods between 1980

and 2015. They used the Johansen co-integration analysis of the Vector Auto Regression Model and the Granger-Causality tests. They concluded that there is no relationship between exports, imports, and economic growth in Panama and there is bidirectional causality from imports to economic growth and from exports to economic growth.

Sharma (2020) suggested that the government should act quickly to boost exports and tackle the trade deficit. One way to do this is to invest more in industries that produce goods for export. This would help increase what we sell abroad and reduce what we buy from other countries. Another idea is for the government to offer subsidies and lower taxes to make our exports more competitive. Lastly, Nepal should also try to trade with more countries and not rely too much on just a few.

Methods

Research Design

Descriptive and analytical research design were used. Four macroeconomic variables were taken to investigate the relationship between gross domestic product, remittance, exports, and imports. All the variables were converted into real terms. The functional relationship was transformed into an econometric model is estimated to find the relationship. The econometric model is a linear multiple regression and it was estimated by the Ordinary Linear Square (OLS) method.

Nature and Sources of Data

Data are taken from Nepal Rastra Bank and the Ministry of Finance, Government of Nepal. So, the study is fully based on secondary data spanning from the years 1974/75 to 2021/22.

Specification of the Model

To establish the functional relationship between exports, imports, remittances, and gross domestic product are taken. In the model, the researcher has taken three variables remittance, export, and import as independent variables that influence the gross domestic product. For this, a conceptual idea and variables were taken from the literature review regarding the relationship between economic growth and international trade. Now, the functional relationship between economic growth, remittances, imports, and exports is as follows:

$$GDP = f(IMP, EXP, REM) \dots\dots\dots (2)$$

Where,

IMP = import

REM = remittance

GDP = gross domestic product

Now, regression equations are derived from equation (2)

$$GDP = \beta_1 + \beta_2 Imp + \beta_3 Exp + \beta_4 Rem + \mu \dots \dots \dots (3)$$

$\beta_2, \beta_3, \beta_4, \beta_5$, = parameter estimates

μ, ϵ = error terms

Taking natural log

$$LnGDP = \beta_1 + \beta_2 LnImp + \beta_3 LnExp + \beta_4 LnRem + \mu \dots \dots \dots (4)$$

$$ECT = lnGDP - \beta_2 LnImp - \beta_3 LnExp - \beta_4 LnRem + \beta_1 \dots \dots \dots (5)$$

Where, ECT=Error Correction Term

$$dLnGDP = \beta_1 + d\beta_2 LnImp + d\beta_3 LnExp + d\beta_4 LnRem + ECT(-1) \dots \dots \dots (6)$$

Where, d = first difference

Now, equations (5) and (6) are the required models to be estimated

Unit root test

When dealing with time series data, it is necessary to assess whether the series is stationary or not. The reason behind this is that the estimation of regression with non-stationary series gives spurious results. Furthermore, statistical tests of the parameters resulting from such regression may be biased and inconsistent. The standard approach to investigate the stationary of a time series is through unit root tests. Several tests are available but the Augmented Dickey-Fuller (ADF) tests was used.

Null Hypothesis: The series has got unit root

Alternative Hypothesis: The series has not got a unit root

There are two ways of testing: one having a look at the p-value and the other looking at the Augmented Dickey-Fuller test statistics with test critical values. First, if the p-value is less than 5%, the null hypothesis is rejected and the alternative hypothesis is accepted. Secondly, if absolute Augmented Dickey-Fuller test statistics are greater than the absolute test critical values, the null hypothesis is rejected.

Engle-Granger Co-integration Test

Engle and Granger (1987) developed asymptotic tests critical values at 1% level, 5% level, and 10% level. Augmented Dickey-Fuller test statistics are compared with Engle-Granger critical values at 5% and 10%. If absolute Augmented Dickey-Fuller test statistics are greater than the absolute Engle-Granger critical values, the null hypothesis is rejected and the alternative hypothesis is accepted.

Null Hypothesis: ECT has got unit root.

Alternative Hypothesis: ECT hasn't got a unit root.

Results

To analyze the effects of international trade on economic growth, it is must to run the regression equation to analyze the coefficients of the variables. For this, the regression equation must be fitted in an appropriate econometric model and the variables must be stationary.

If variables are non-stationary they are made stationary through the first difference as the interpretation of the regression with non-stationary variables gives spurious results. After getting the variables stationary, the regression model is run and then the coefficients of the variables are analyzed to investigate the effects of export, import, remittance, and GDP.

An Augmented Dickey-Fuller unit root test is used to check whether the variable is stationary or not. If the P-value of t statistics is less than 5 percent we accepted the alternative hypothesis and rejected the null hypothesis.

Appendix I shows that p -value of t-statistics of gross domestic product, import, export, and remittance is not stationary because the p-value of test statistics is more than 5 percent in lag length (0,1 & 2) respectively meaning that we can reject the alternative hypothesis i.e. null hypothesis fails to reject in the intercept and intercept plus trend. This indicates that all variables have got unit root at level data.

To make the variables stationary we must convert data from level to first difference by using Augmented Dickey-Fuller Test.

Table 1

Results of Augmented Dickey-Fuller Unit Root Test at First Difference (Intercept)

Variables	t-statistics (P-value)		
	Lag Length: 0 (Fixed)	Lag Length: 1 (Fixed)	Lag Length: 2 (Fixed)
dLnGDP	-7.633 (0.000)***	-5.175 (0.000)***	-4.294 (0.001)***
dLnX	-6.305 (0.000)***	-5.175 (0.000)***	-3.682 (0.007)***
dLnM	-8.515 (0.000)***	-6.944 (0.000)***	-4.484 (0.000)***
dLnRem	-7.754 (0.000)***	-4.592 (0.000)***	-6.674 (0.008)***

Source: Output from analysis of data using E-views 8

*, **, *** represents 10%, 5% and 1% level of significance.

Gross domestic product, exports, imports, and remittance do not have unit root in intercept only. It indicates that all variables are stationary at first difference because the p-value oft-statistics is less than 5 percent i.e., we can reject the null hypothesis meaning that accepted alternative hypothesis. It indicates that all variables are stationary at the first difference in (0, 1 & 2) lag length.

Table 2*Augmented Dickey-Fuller Unit Root Test at First Difference (Trend + Intercept)*

Variables	t-statistics (P-value)	t-statistics (P-value)	t-statistics (P-value)
	Lag Length: 0 (Fixed)	Lag Length: 1 (Fixed)	Lag Length: 2 (Fixed)
dLnGDP	-7.568 (0.000)***	-6.422 (0.000)***	-4.167 (0.010)***
dLnX	-6.206 (0.000)***	-5.118 (0.000)***	-3.704 (0.032)**
dLnM	-8.453 (0.000)***	-6.985 (0.000)***	-4.547 (0.003)***
dLnRem	-7.665 (0.000)***	-4.538 (0.003)***	-3.586 (0.042)**

Source: Output from analysis of data using E-views 8

*, **, *** represents 10%, 5% and 1% level of significance.

Gross domestic product, exports, imports, and remittance do not have unit root intercept and trend only. It indicates that all variables are stationary at first difference because the P-value of t-statistics is less than 5 percent i.e. we can reject the null hypothesis meaning that accepted the alternative hypothesis. It indicates that gross domestic product, exports, imports, and remittances are stationary at the first difference in (0, 1 & 2) lag length respectively.

The Long run Relation and Error Correction Model (ECM)

If variables are non-stationary they are made stationary through first differenced as the interpretation of the regression with non-stationary variables gives spurious results. It indicated that the result is overfitted or not reliable. The study can apply ordinary least squares (OLS) analysis with stationary variables. In the Engle-Granger Co integration procedure, the initial step involves estimating a regression using the original level data and obtaining the residuals from this regression. Next, unit root tests are applied to these residuals, which are often referred to as the Error Correction Term (ECT).

If all the variables are integrated of order I (1), meaning they are stationary at their first differences, and the residuals (ECT) are integrated of order I (0), stationary at their levels, it indicates the presence of cointegration or long-run relationships among the variables. Cointegration tests typically present their results in a table format, summarizing the statistical evidence for such relationships between the variables under study.

Table 3*Long Run Relationship*

Variables	Coefficient	t-Statistics	Prob.
LnM	0.436	14.772	0.000***
LnX	0.018	0.905	0.370
lnRem	0.105	7.728	0.000***
Constant	7.375	37.178	0.000***
R-squared: 0.990		P-value of F- statistics: 0.000	DW-Stat 1.251

Source: Output from analysis of data using E-views 8

*, **, *** represents 10%, 5%, and 1% level of significance.

The estimated relationship between GDP, imports, and remittances is found to be long-run relationship. The estimated equation is as follows:

$$\text{LnGDP} = 7.375 + 0.436\text{LnM} + 0.018\text{LnX} + 0.105\text{LnRem}$$

Where, LnGDP= log GDP at factor cost, LnX= log exports LnM = log imports

LnRem = log remittances

The unit root test of residual obtained from the above table has been done. The ADF statistics at lag zero, one, and two were found -4.605, -4.533 & -4.214. The tabular value of co-integration test statistics at the five percent level is -4.10. So the study concluded that there is co integrating relation among variables. Because absolute Augmented Dickey-Fuller test statistics are greater than the absolute Engle-Granger critical values, the null hypothesis is rejected and the alternative hypothesis is accepted.

Table 4*Augmented Dickey-Fuller unit root test of error correction term at level*

Variables	t-statistics (P-value) Lag Length: 0 (Fixed)	t-statistics (P-value) Lag Length: 1 (Fixed)	t-statistics (P-value) Lag Length: 2 (Fixed)	Critical Value 5% level
ECT	-4.605 (0.000)***	-4.533 (0.000)***	-4.214 (0.000)***	-4.1

Source: Output from analysis of data using E-views 8

*, **, *** represents 10%, 5%, and 1% level of significance.

ECT is stationary meaning that the estimated model is not spurious i.e. Augmented Dickey-Fuller unit root test of P-value is 0.000 in different lag lengths which is less than 5 percent means that ECT does not get a unit root.

The t-statistics of ECT (-4.605, -4.533 & -4.214) in different lag lengths greater than the critical value of Engle Granger at a five percent level (-4.10) ignoring negative sign or If the absolute value is greater than the critical value, we can reject the null hypothesis and accept alternative hypothesis i.e. ECT is stationary means that residuals

are stationary. It indicates that Gross Domestic Product, Exports, Imports, and Remittances are co-integrated.

In this model, four variables namely GDP, X, M & Remittance are co-integrated, we have to develop the Error Correction Model, and data should be in first difference like this as follows.

$$dLnGDP = \beta_1 + d\beta_2 LnImp + d\beta_3 LnExp + d\beta_4 LnRem + ECT(-1)$$

It is called Error Correction Model and one period lags of the residuals also another variable, it is error correction term.

Table 5

Results of Estimated Regression Model

Variables	Coefficient	t-Statistics	Prob.
D(LnM)	0.056	2.151	0.037**
D(LnX)	0.060	3.737	0.000***
D(LnRem)	-0.002	-0.195	0.845
ECT(-1)	-0.222	-3.742	0.000***
Constant	0.0341	9.526	0.000
R-squared: 0.410		P-value of F- statistics: 0.000	

Source: Output from analysis of data using E-views 8

, **, * represents 10%, 5%, and 1% level of significance.*

Imports and exports are statistically significant and positive effect on economic growth because the P-value is less than 5 percent. It showed that exports and imports have a positive relationship with gross domestic product. This means that exports increase with the increase in economic growth and vice versa.

Similarly, imports and economic growth have a direct relationship. An increase in imports leads to an increase in economic growth. The general theory is that import has a negative effect on economic growth but developing countries like Nepal import capital goods and technology which creates increased economic activities in a nation that enhances economic growth. But remittance is statistically insignificant on economic growth i.e. P-value is greater than 5 percent indicated that there is no strong relationship found between remittance and economic growth. The P-value of the F-statistic is 0.000 is less than 5 percent meaning that all independent variables like exports, Imports, and Remittances have jointly affected the economic growth. The value of R-square 0.410 indicates that independent variables explain dependent variables by 41 percent.

Table 6*Summary Results of Serial Correlation, Heteroskedasticity & Normal Distribution*

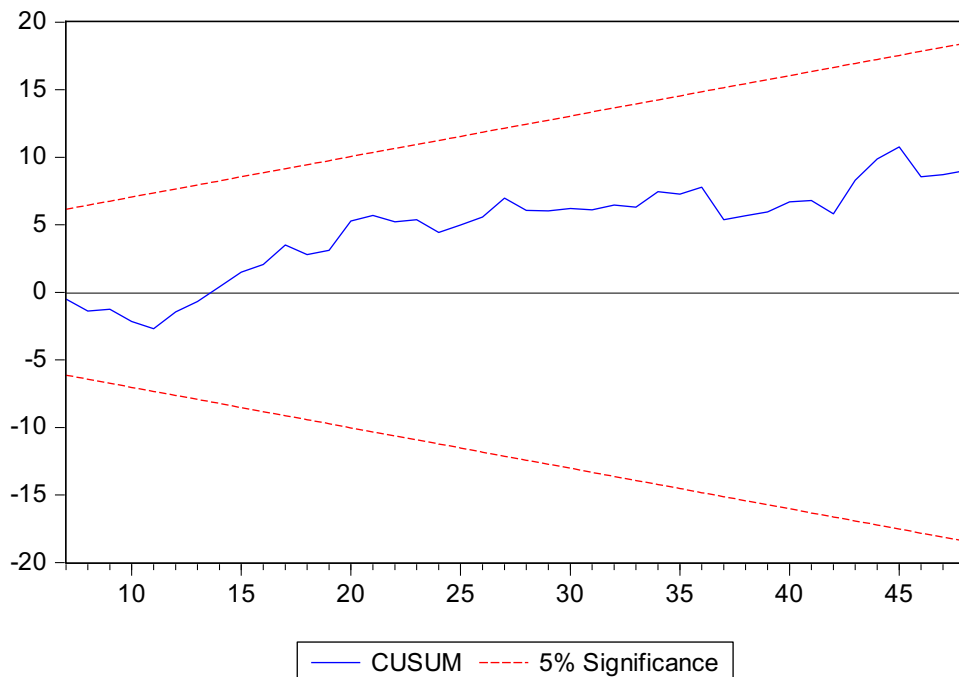
Test	F statistics	Obs* R-squared	P- Value
Breusch-Godfrey Serial Correlation LM Test:	0.289	0.671	0.714
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.961	3.993	0.423
Histogram Normality: Jarque-Bera Test	--	--	0.263

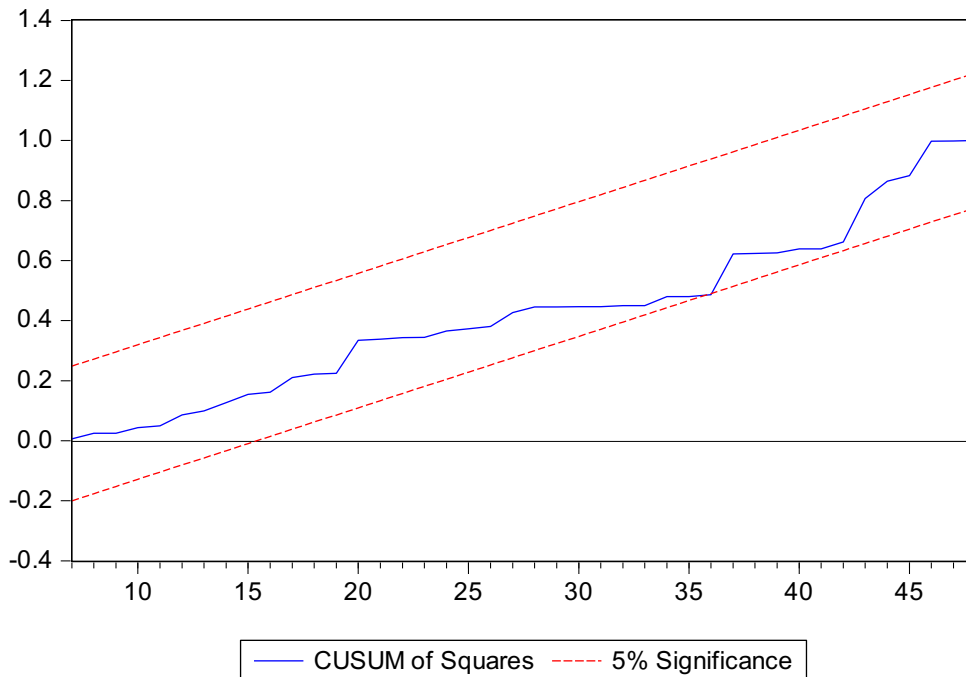
Source: Output of Eviews 8

The p-value of the observed R-squared of the serial correlation LM test is (0.714) 71.4 percent which is more than 5 percent. So, we cannot reject the null hypothesis i.e. rejected alternative hypothesis means that residuals are free from serial correlation which is desirable. Similarly, P- value of the heteroskedascity test is (0.423) i.e. 42.3 percent is more than 5 percent meaning that we accepted the null hypothesis i.e. residuals are homoskedasticity. Likewise, the Jarque-Bera test also indicates that residuals are normally distributed because the P-value is 0.263 which is greater than the 5% level of significance. This result indicates that the null hypothesis is accepted.

Stability Test

A stability test has been done to test whether the model is fit or not. Kusum and kusum square tests are used to check the model stability.





The stability test showed that the model is stable because the blue lines between the red lines KUSUM test and the line lies within the red line in the KUSUM square test. So, the model is stable. In other words, the blue line lies within the 5% critical line, which proves that the model performed stably.

Discussions

This study aims to analyze the effect of international trade and economic growth with the macro variables export, import, remittance, and gross domestic product. The empirical result found that exports are positively and statistically significant to economic growth. This result is consistent with the findings of Gries and Redlim (2012); Bregish and Ali (2021); Silajdzic and Mehic (2018); and Oloyede et al., (2021). However, this result contrasts with the finding of insignificant effect in Elbeydi et al., (2010); and Edo et al., (2020).

Similarly, the significant positive impact of imports on Gross Domestic Product is consistent with previous studies (Manni & Afzal, 2012; Yang et al., 2022), which indicates that imports are a significant contributor to GDP growth, when imports increase, it also encourages GDP growth. However, this result contrasts with the finding of the insignificant effect of imports on GDP by Singh, et al., (2023).

When explaining other macro-economic variables understudy, this study finds remittances had a negative but insignificant influence on economic growth. This result is similar to that of Singh, et al., (2023). This implies that as remittances increase, GDP

growth decreases but insignificantly. So, remittances are not a significant contributor to economic growth.

Similarly, moving to the long-run relationship among the macro variables, the study shows a long-run relationship between exports, imports, remittances, and gross domestic product. This result is however consistent with the findings of Bastola et al., (2015); Paudel et al., (2018); Murshed (2020) and Kong et al., (2021). However, this study's result contradicts with Edo et al., (2020); Le (2020).

Conclusion

Nepal's trade deficit has continued to grow. This situation has emerged as a declining rate of export and the increasing rate of import produces a trade imbalance. However, increasing remittance inflow has been proven to be a boon in reducing the trade deficit in Nepal. Imports and exports are statistically significant and have positive effects on economic growth. It showed that exports have a positive relationship with gross domestic product. Export increases make the increase in economic growth and vice versa. The result emphasizes that the Government should ensure the export promotion policies to achieve Nepal's high and sustainable economic growth by investing in trade infrastructure and export subsidies. Similarly, imports and economic growth have a direct relationship. An increase in imports leads to an increase in the economic growth of Nepal. The relationship between imports and economic growth suggests that imports are associated with economic activities that contribute to the economic growth of Nepal. Contrary to a conventional economic theory suggesting that imports typically hinder economic growth, Nepal's experience shows that importing capital goods and technology, petroleum products, etc. fosters economic activities, thereby stimulating economic growth.

However, remittance is statistically insignificant in economic growth, indicating no strong relationship between remittance and economic growth. The statistical result indicates that remittances might be used in consumption rather than investment in productive sectors that contribute the economic growth. The government should create a favorable environment that encourages using remittance money to support productive sectors of the economy.

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