



Macroeconomic Determinants of Remittances Inflow in Nepal

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Abstract

Background: The phenomenon of international migration and remittances has gained significant attention in recent years, particularly in the context of developing countries like Nepal. In 2020 alone, remittance flows to low- and middle-income countries (LMICs) reached \$540 billion. In many developing nations worldwide, including Nepal, migration has become an important source of income and foreign exchange, providing critical support for households and contributing to economic growth.

Objective: To investigate the effect of various macroeconomic factors on remittance inflow in Nepal.

Methods: Using the ARDL approach to co-integration, the study examines Nepal's short-run and long-run macroeconomic determinants of remittances, utilising annual data from 1993 to 2021.

Results: The study finds that global oil prices, nominal exchange rate, and domestic output influence remittance inflow in Nepal. None of the macroeconomic variables affect remittance inflow significantly in the short run, while the oil price is positive and significant in the long run. The study also identifies the existence of a correction mechanism in the case of remittances whenever deviations from the long-run equilibrium occur. Furthermore, a negative association between domestic GDP and remittances corroborates the common finding that remittances are countercyclical and altruistic.

Implications: The study has major policy implications, highlighting that remittance inflows are affected by external factors and that there is a negative relationship between domestic GDP and remittance inflows. These findings should be considered when formulating policies related to foreign employment and remittance inflows.

Paper Types: Research Paper

Keywords: Remittance inflow, Macroeconomic variables, ARDL model, Economic growth, Balance of payment

JEL classification: B22, F24, C22

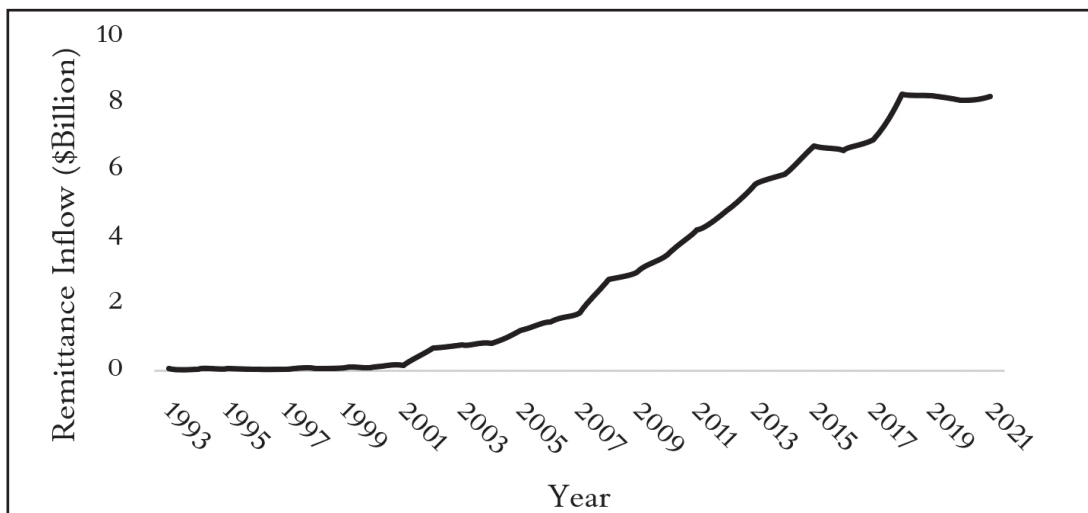
Introduction

The determinants of remittances within this framework include the migrant's income and the economic conditions in their home country. Migrants tend to remit more when their family's income is low. Other influential factors include domestic and international interest rates and stock market returns. The phenomenon of international migration and remittances has gained significant attention in recent years, particularly in the context of developing countries. Remittances, which refer to funds sent back to home countries by migrants, significantly impact the macro economy of recipient countries. As the second largest source of foreign currency in the global economy, remittances play a crucial role in many developing nations' Balance of Payment accounts. In 2020 alone, remittance flows to low- and middle-income countries (LMICs) reached \$540 billion (World Bank, 2021).

In many developing nations, including Nepal, migration has become an essential source of income and foreign exchange, providing critical support for households and contributing to economic growth. However, the determinants of remittances are complex and multifaceted, and there is still much to be learned about the factors that influence the flow of funds across international borders. Nepal received over \$8 billion in remittance inflows in 2021, accounting for almost 29% of the country's GDP (World Bank, 2021). Despite the COVID-19 pandemic, remittance inflow increased by 7.7% in the fiscal year 2020/21 (MOF, 2021), highlighting the resilience of remittances during crises in many developing nations.

Due to limited job opportunities within the country, foreign employment has become a crucial source of income for over one-third of Nepal's population. Nepal, being one of the poorest countries globally with a per capita income of around \$1200, faces significant unemployment challenges, particularly among its youth. The Nepal Labor Force Survey (2018) reports that the unemployment rate among individuals aged 15-29 is 19.1%. As a result, many Nepalese workers are compelled to seek employment abroad to support their families financially. The increasing trend of foreign employment is further driven by political instability in Nepal. Frequent changes in government and poor governance have resulted in a lack of investment and an economy struggling to generate adequate job opportunities. Over the past two decades, remittance inflows to Nepal have seen rapid growth. This exponential increase in remittances since 2001 can be attributed to the oil price boom and favourable foreign employment policies in host countries.

Figure 1: Remittance Inflow in Nepal



Source: World Bank Database, 2021

The provided figure illustrates the trend of remittance inflow to Nepal from 1993 to 2021, measured in billions of dollars. Over this period, remittance inflows have a clear upward trajectory, with a particularly sharp increase observed from the early 2000s. From 1993 to around 2001, remittance inflows remained relatively low and stable. However, starting in 2002, there was a noticeable increase, marking the beginning of an exponential growth phase. This growth continues steadily through the mid-2000s, reflecting the impact of favourable economic conditions and possibly the implementation of supportive policies for foreign employment.

The trend became more pronounced post-2007, with remittance inflows rising sharply until around 2014. This period of rapid growth can be associated with the global oil price boom and the increasing number of Nepalese seeking employment abroad due to domestic economic challenges and limited job opportunities. From 2014 onwards, the growth in remittance inflows shows some fluctuations but generally maintains an upward trend, peaking around 2019. Despite a slight decline during the early phase of the COVID-19 pandemic, remittance inflows quickly rebounded, indicating the resilience of remittances as a source of income for Nepalese households.

Overall, the figure underscores the critical role that remittances have played in Nepal's economy over the past two decades, highlighting their growth from less than \$1 billion in the early 1990s to over \$8 billion by 2021. This substantial increase emphasises the importance of foreign employment and remittance inflows supporting household incomes and contributing to the country's economic stability.

This paper aims to study and analyse different macroeconomic factors determining Nepal's remittance level. The rest of the paper is structured as follows. Section two explores the existing body of literature on macroeconomic determinants of remittances. The third section explains the use of data and methodology employed to study the links between remittances and several macroeconomic variables in the context of Nepal. The fourth section presents the results and discussion, while the fifth section concludes the paper.

Literature Review

Past remittance studies reveal two main motives behind remittances: altruism and self-interest. In its purest form, the altruism model says that the migrants derive their utility from their dependent household's utility (Lucas and Stark, 1985). This means that remittances should increase as the household income of the remittance recipient decreases. As per Rapoport and Docquier (2006), the self-interest model states that self-interest emerges from the migrants' aspiration to accumulate assets in their home country.

Several variables have been introduced in previous macroeconomic research to address the debate surrounding the various remittance motivations. These studies consider variables from both the host and the home country, such as national income, unemployment, infancy, interest rates, exchange rate volatility and changes in oil prices. The remittance research also pays significant attention to elements including migrant stock, financial development, foreign exchange restrictions, and political risk.

Remittances are said to be mostly determined by the migrant stock. Remittance flows and the population of migrants are positively correlated (Kakhkharova et al. 2017). Freund and Spatafora (2008) demonstrate that an increase in the migrant population causes an equal rise in international remittances in OECD nations. Although unitary elastic, Turkey exhibits this link (Elbadawi & Rocha, 1992).

In addition, one of the most important factors affecting the transfer of migrants' income is the economic state of both their destination and originating nations. Darbar and Khan (2005) analyse the impact of macroeconomic variables, such as GDP and inflation rates, on remittance inflows from migrant workers. The authors find that remittances are sensitive to economic conditions in both the source and destination countries. Specifically, remittances tend to increase when the recipient country

is experiencing economic growth and decrease when the sender country is experiencing economic hardship. Similarly, Montiel et al. (1999) examine the effect of economic conditions on remittance flows, including exchange rates and income levels. The authors find that remittances are positively correlated with economic growth in the recipient country and negatively correlated with inflation rates in the sender country. They also find that exchange rate fluctuations can significantly impact the volume of remittances.

Khanal and Atreya (2019) investigate the impact of macroeconomic factors such as exchange rate, GDP growth, inflation rate, and foreign direct investment on remittance inflows in Nepal. The authors use time-series data from 1996 to 2016 and find that exchange rate, GDP growth, and foreign direct investment positively and significantly affect remittance inflows in Nepal.

Fiess and Lopez (2006) focus on Philippine migrants and their remittance behaviour in response to economic conditions. The authors find that remittances are strongly influenced by the economic situation in the host country, with increases in recipient-country GDP leading to higher remittance inflows. They also find that remittances are less sensitive to economic conditions in the Philippines, suggesting that migrants prioritise supporting their families over responding to economic fluctuations.

Acosta et al. (2007) examine the impact of economic conditions on remittance flows in Latin America, focusing on the effect of exchange rate fluctuations and economic growth rates in both the sender and recipient countries. The authors find that remittance inflows are sensitive to exchange rate fluctuations and tend to increase during economic hardship in the sender country. However, they also find that remittance inflows tend to decrease when the recipient country is experiencing economic downturns.

A positive correlation with the interest rate factors shows that the investment return attracts remittances the most. Pozo et al. (2004) studied the effect of interest rates on remittances sent from the United States to Mexico. The authors find that higher interest rates in the US lead to increased remittance inflows, but only for a certain interest rate level. Beyond that level, higher interest rates lead to decreased remittance inflows. Similarly, Sheikh and Zhao (2014) investigate the relationship between interest rates and remittance inflows in Pakistan. The authors find that higher interest rates in the recipient country (Pakistan) lead to increased remittance inflows. However, the effect is insignificant for interest rate changes in the sender country (such as the US).

Abdih and Chami (2011) analyse the effect of interest rate differentials between the Eurozone and several remittance-sending countries (such as Morocco and Tunisia) on remittance inflows. The authors find that higher interest rates in the Eurozone led to increased remittance inflows from these countries. However, the effect is smaller for countries with a higher share of migrants with legal status in the Eurozone. Morena and Castellanos (2019) studied the effect of interest rates on remittance inflows in 16 Latin American and Caribbean countries. The authors find that higher interest rates in the recipient country lead to increased remittance inflows. However, the effect is smaller for countries with a higher share of migrants with legal status in the recipient country.

Agrawal (2016) analyses the effect of exchange rates on remittance inflows in India. The author finds that exchange rate fluctuations significantly impact remittance inflows, with a rupee depreciation leading to higher remittance flows. The author suggests this could be due to increased incentives for migrants to send money home when the exchange rate is favourable and increased purchasing power for remittance recipients.

Similarly, Mustafa (2017) examines the effect of exchange rates on remittance inflows in 14 developing countries. The authors find that exchange rate fluctuations significantly affect remittance flows, with a depreciation of the host country's currency leading to higher remittance inflows. The authors suggest that this could be due to increased incentives for migrants to send money home when the exchange rate is favourable and increased purchasing power for remittance recipients.

Louis et al. (2017) study the effect of exchange rate volatility on remittance inflows in 69 developing

countries. The authors find that exchange rate volatility has a negative effect on remittance flows, with higher volatility leading to lower remittance inflows. The authors suggest that this could be due to increased uncertainty and transaction costs associated with sending money during periods of exchange rate volatility.

It is generally perceived that inflation discourages investment in the domestic economy. Ibanez (2011) examines the relationship between inflation and remittances in Mexico, a major recipient of remittances. The authors find that inflation has a negative effect on remittance inflows, with a one per cent increase in inflation leading to a 0.36 per cent decrease in remittances. They suggest this could be due to higher costs of sending money during inflation and reduced economic opportunities for migrants.

Kazi and Rashid (2017) analyse the effect of inflation on remittance inflows in six developing countries: Pakistan, Bangladesh, India, Sri Lanka, Philippines, and Indonesia. The authors find that inflation significantly negatively affects remittance inflows in all countries studied. They suggest that this could be due to the reduced purchasing power of remittance recipients, higher costs of sending money, and increased economic uncertainty.

Ahmed and Jamil (2020) examined the impact of inflation on remittance inflows in 23 developing countries using panel data analysis. Their findings indicate that inflation adversely affects remittance inflows, with a one per cent rise in inflation leading to a 0.15 per cent decline in remittances. They attribute this effect to reduced economic opportunities for migrants during high inflation and decreased purchasing power of remittance recipients.

Daratt et al. (2012) investigate the impact of political stability on remittance inflows in developing countries. The authors use panel data for a sample of 45 developing countries over the period of 1980-2009 and find that political stability has a positive and significant effect on remittance inflows. Nicholas (2019) examines the impact of political instability on remittance inflows in 24 sub-Saharan African countries from 1990-2015. The authors find that political instability negatively and significantly affects remittance inflows in the short run. However, the effect becomes insignificant in the long run.

Jijin et al. (2021) investigated the macroeconomic determinants of remittances to India, finding a significant increase in remittance inflows, making India the world's largest recipient. They highlighted that remittances are crucial for reducing the current account deficit and are a stable part of the Balance of Payments. The study examines key macroeconomic variables influencing remittance inflows using an ARDL approach to co-integration. The findings show that exchange rates, oil prices, and domestic GDP significantly impact remittance inflows, with migrants vulnerable to oil price shocks in host countries. The study concludes that remittances in India are not countercyclical and are driven more by altruistic motives than investment motives.

Despite extensive research on remittance motives, a notable gap exists in understanding the nuanced macroeconomic factors influencing remittance flows to Nepal. Previous studies have explored variables like national income, unemployment, interest rates, exchange rate volatility, oil prices, GDP growth, inflation, and political stability. However, limited empirical analysis integrates these determinants within Nepal's unique context of economic vulnerabilities, political instability, and high remittance dependency. Further investigation is needed to address this gap and provide targeted insights for policy-making.

Data, Variable Description and Methodology

Data

The study utilises data from the NRB, World Bank, and FRED databases provided by the Federal Reserve Bank of St. Louis. Table 1 provides a detailed explanation of the variables employed in the study. The time-series data covers 1993 to 2021, with all variables being recorded annually. The sample selection is based on data availability.

Variables and Descriptive Statistics

We have used the following variables to analyse the macroeconomic variables affecting the remittances inflow to Nepal.

The abbreviation “*rem*” denotes the inflow of remittances in USD from the rest of the world into Nepal in a given year. In Nepal’s Balance of Payments, it is termed “*Private Transfers*.” This data is sourced from the World Bank Database. “*gdp*” represents the gross domestic product of Nepal, measured in constant 2015 USD and extracted from the World Bank Database. “*ner*” refers to the nominal exchange rate of NPR relative to USD, with data sourced from the Nepal Rastra Bank. “*oil*” denotes the global crude oil price, measured in USD per barrel, and the data is obtained from FRED. “*usg*” represents the GDP of the USA, measured in chained 2015 USD, with data sourced from the World Bank Database. “*ird*” stands for the interest rate differential, calculated as the difference between the treasury bill rates of the USA and Nepal, using data from FRED and the Nepal Rastra Bank (NRB). “*inf*” indicates relative inflation, defined as the difference between Nepalese and USA inflation rates, with data computed using information from FRED and NRB. “*smd*” represents the stock market return differential, measured as the difference between NEPSE returns of Nepal and NASDAQ returns of the USA, with data sourced from FRED and SEBON.

The summary statistics of all the variables used in the study are given below in Table 1.

Table 1. Description of variables

Variable	Mean	Median	Range	Variance	SD	Skewness	Kurtosis
<i>rem</i>	31078257 52.18	1733858 518.10	8242469 390.09	9652455 3563618 80000.0	31068400 91.86	0.53	-1.33
<i>gdp</i>	18570958 713.18	1696316 9002.24	2165756 8172.81	4339552 0050154 000000	65875276 12.86	0.52	-0.86
<i>ner</i>	80.39	74.02	73.15	438.58	20.94	0.48	-0.75
<i>oil</i>	52.89	53.02	98.89	1011.84 8359900	31.81	0.50	-0.89
<i>usg</i>	15640668 204586.20	1603436 7080000.00	10104626 386000.00	0634224 2000000 0000.00	28913491 77014.50	-0.19	-0.91
<i>ird</i>	-1.47	-1.01	10.24	6.96	2.64	-0.45	-0.16
<i>inf</i>	4.38	4.55	12.35	10.64	3.26	0.06	-0.66
<i>smd</i>	-0.48	-6.53	131.86	1197.02	34.60	0.68	0.10

Source: Author’s compilation

Table 2 describes the correlation among the variables used in this study.

Table 2. Correlation matrix

	Rem	usg	Gdp	ird	ner	smd	oil	inf
rem	1.00							
usg	0.92	1.00						
gdp	0.98	0.97	1.00					
ird	-0.17	-0.05	-0.15	1.00				
ner	0.93	0.93	0.96	-0.06	1.00			
smd	0.03	0.13	0.03	0.52	0.09	1.00		
oil	0.59	0.67	0.58	-0.07	0.43	0.18	1.00	
inf	0.08	-0.05	-0.02	-0.17	-0.08	0.14	0.22	1.00

Source: Author's compilation

A strong positive correlation is observed between remittance inflow into Nepal and the GDP of the USA and between domestic GDP and the nominal exchange rate between NPR and USD. Additionally, there's a negative correlation between Nepal's interest rate differential and remittance inflow. Furthermore, the nominal exchange rate between NPR and USD exhibits strong positive correlations with the GDP of the USA and Nepal while showing a weak negative correlation with the interest rate differential. This information will aid us in conducting lateral analysis and estimations.

Methodology

Following Pesaran and Shin (1995) and Pesaran et al. (2001), we use the ARDL bounds testing technique to co-integration to look at the main macroeconomic factors that influence remittances to Nepal. The Johansen technique, for instance, requires that the variables be of order I. However, the ARDL bounds testing methodology allows for verifying the presence of co-integration even in the presence of I(0) and I(1) variables. The endogeneity problems brought on by employing the lags of the dependent variable as instruments are likewise not present in the ARDL model. To test for co-integration among the variables being studied, we estimate equation 1.

$$\Delta Y_t = \beta_0 + \sum_{i=1}^n \beta_i \Delta Y_{t-i} + \sum_{j=1}^n \gamma_j \Delta X_{1t-j} + \dots + \sum_{k=1}^n \delta_k \Delta X_{nt-k} + \Theta_0 Y_{t-1} + \Theta_1 X_{1t-1} + \dots + \Theta_n X_{nt-1} + \varepsilon_t \dots (1)$$

The abbreviation “*rem*” refers to the remittance inflow in USD from other countries to Nepal within a given year. In Nepal's Balance of Payments is categorised as “*Private Transfers*.” This data is sourced from the World Bank Database. “*gdp*” stands for Nepal's gross domestic product, measured in constant 2015 USD and also obtained from the World Bank Database. “*ner*” signifies the nominal exchange rate of NPR against USD, with information provided by the Nepal Rastra Bank. “*oil*” represents the global crude oil price, measured in USD per barrel, and the data is sourced from FRED. “*usg*” denotes the GDP of the USA, measured in chained 2015 USD, with data taken from the World Bank Database. “*ird*” represents the interest rate differential, calculated as the difference between the treasury bill rates of the USA and Nepal, using data from FRED and the Nepal Rastra Bank (NRB). “*inf*” indicates relative inflation, defined as the difference between Nepalese and USA inflation rates, with data derived from FRED and NRB. “*smd*” stands for the stock market return differential, measured as the difference between NEPSE returns of Nepal and NASDAQ returns of the USA, with data collected from FRED and SEBON.

Once co-integration among the variables is established, we estimate the error correction as given in the equation below.

$$\Delta Y_t = \beta_0 + \sum_{i=1}^n \beta_i \Delta Y_{t-i} + \sum_{j=1}^n \gamma_j \Delta X_{1t-j} + \dots + \sum_{k=1}^n \delta_k \Delta X_{nt-k} + \Theta Z_{t-1} + \varepsilon_t \dots (2)$$

Where, $Z_{t-1} = (Y_{t-1} - \alpha_0 - \alpha_1 X_{1t-1} \dots \alpha_n X_{nt-1})$. The above equation form is then used to estimate the long-run multipliers.

Empirical Results and Discussion

Stationarity Tests

Although the ARDL model does not require pre-testing for unit roots, unlike traditional models, it ensures that none of the variables are integrated into order two. Therefore, this study uses three popular tests: Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) to determine the order of integration of the variables. The ADF and PP tests assume a null hypothesis of the presence of unit roots (i.e., the series is non-stationary). In contrast, the KPSS test assumes a null hypothesis of stationarity. The results of these tests are presented in Table 3.

Table 3. The critical values for unit root tests (ADF, PP, and KPSS)

Variable	Augmented DF		PP		KPSS		Conclusion
	Level	1st dif	Level	1st dif	Level	1st dif	
Log(rem)	-0.730	-3.315	-1.001	-4.791***	0.15**	0.126**	I (1)
Log(gdp)	-3.072	-4.878***	-3.343	-5.952***	0.12*	0.106	I (1)
Oil	-1.938	-4.187**	-1.879	-4.651***	0.128*	0.104	I (1)
Ner	-1.368	-3.259**	-1.397	-4.317	0.119	0.101	I (1)
Log(usg)	-2.152	-3.160	-2.179	-4.52***	0.16**	0.119	I (1)
Ird	-3.405*	-4.878***	-2.44*	-4.160**	0.072	0.146**	I (0)
Inf	-2.618	-6.017***	-3.006	-6.730***	0.102	0.109	I (1)
Smd	-3.081	-4.832***	-4.385	-8.292***	0.105	0.0633	I (1)

The asterisk signs ***, **, * represent levels of significance at 1%, 5%, and 10%, respectively.

Table 4. Significant Level, ADF, PP and KPSS Values

Significance Level	Augmented DF		PP		KPSS
	Intercept	Trend	Intercept	Trend	
1%	-3.743	-4.371	-3.730	-4.352	0.216
5%	-2.997	-3.596	-2.992	-3.588	0.146
10%	-2.629	-3.238	-2.626	-3.233	0.119

The stationarity test results indicate that all variables except interest rate differential are non-stationary at levels of I (1), which is expected. The stationarity tests warrant that this study can employ the ARDL model, as the variables are a mix of the I (0) and I (1) series.

Table 5. ARDL Bounds Testing for Co-integration

Models	Lag Selection	F-stat	t-stat	Co-integration
$rem = f(ner, gdp, oil, usg, ird, inf, smd)$	(1 2 2 2 0 2 2)	4.705***	3.204***	Yes

The asterisks (***) denote statistical significance at 1%

Having ensured none of the variables are integrated in order two, which is a prerequisite for the ARDL model, this study estimates Eq 1 and tests for the presence of co-integration or long-run relationship using the bounds testing approach. This study estimates an ARDL model of the form (1 2 2 2 0 2 2), and the lag selection is based on the AIC criterion as ARDL models are sensitive to lag to avoid endogeneity issues. This study also uses critical values provided by Kripfganz and Schneider (2018), as the critical values obtained are finite-sample and asymptotical as compared to the relative asymptotic critical values provided by Pesaran et al. (2001) and Narayan (2005). The results of bounds testing are reported in Table 6.

Table 6. Bounds testing

Tests	10%		5%		1%	
	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F-test	2.03	3.13	2.32	3.50	2.96	4.26
t-test	-2.57	-4.23	-2.86	-4.57	-3.43	-5.19

Source: Kripfganz and Schneider (2018)

Long-Run and Short-Run Dynamics

Once co-integration between the variables has been established, Eq. 2 is estimated to derive the long-run and short-run coefficients of the estimated model. Given the validity and reliability of the model, the short-run and the long-run relationship between remittances and their macroeconomic determinants is discussed.

Panel A of Table 7 reports the short-run dynamics of remittances with other variables. The estimated lagged error correction term (*ect*) is negative and highly significant at 10 percent. It confirms the existence of a correction mechanism in the case of remittances whenever deviations from the long-run equilibrium occur. The speed of adjustment is relatively high, implying that 89 per cent of the deviation dissipates within the following year. Therefore, the remittance-receiving households may recover quickly from the disequilibrium in their regular income caused by macroeconomic shocks. The impact of lagged error correction term (*ect*) was assessed in the context of many developing countries, such as India, Bangladesh and Sri Lanka (Jijin et al., 2021).

None of the variables is statistically significant in the short run. However, there are macroeconomic variables that have a long-run association with remittances (see Panel B). The nominal exchange rate is significant, with a value of 0.11, which suggests that a one per cent increase in the exchange rate leads to a 0.11 per cent increment in remittances in Nepal. The literature also reports similar observations in the developing country context. For example, an analysis by Jijin et al. (2021) found negative results in the context of the Indian economy. The paper by Ojede et al. (2019), Akçay and Karasoy (2019), and Abbas (2020) also revealed similar insights. These findings suggest that exchange rates have a significant role in remittance inflow in the context of the Nepalese economy.

The oil price is positive and significant in the long run, with a coefficient value of 0.03, which means a 0.03 per cent increase in remittances to Nepal for a corresponding one per cent increase in oil prices. Most Nepali migrant workers are in the Gulf Cooperation Countries and are engaged in low-skilled

jobs. The results imply that they are most vulnerable to oil shocks. The US GDP is not significant in the short or long run. Similarly, in literature, Jijin et al. (2021) found positive results in the context of the Indian economy. The oil price has a positive and significant impact (0.28). Similarly, a paper by Akçay and Karasoy (2019) also aligns with this literature. This suggests that Nepali migrant workers in the US are not exposed to the US economic shocks.

This study also finds a negative association between domestic GDP and remittances, corroborating the common finding that remittances are countercyclical and altruistic. When the economy experiences a macroeconomic shock, more money is sent back home to Nepal. A weak interest rate differential and stock market differential indicate indifference of remittances to the stock market returns and interest rate premiums. Similar findings are also reported in the analysis published by Jijin et al. (2021). However, the findings of Mughal and Ahmed (2014) are in the opposite direction, which can be attributed to the macroeconomic realities of the country.

Finally, this study finds a positive association between inflationary pressure in the home country and remittances, although the relationship is not significant. This can be due to an increase in aggregate demand fueled by the income received from abroad. The association must be confirmed with longer time series data and adequate data points.

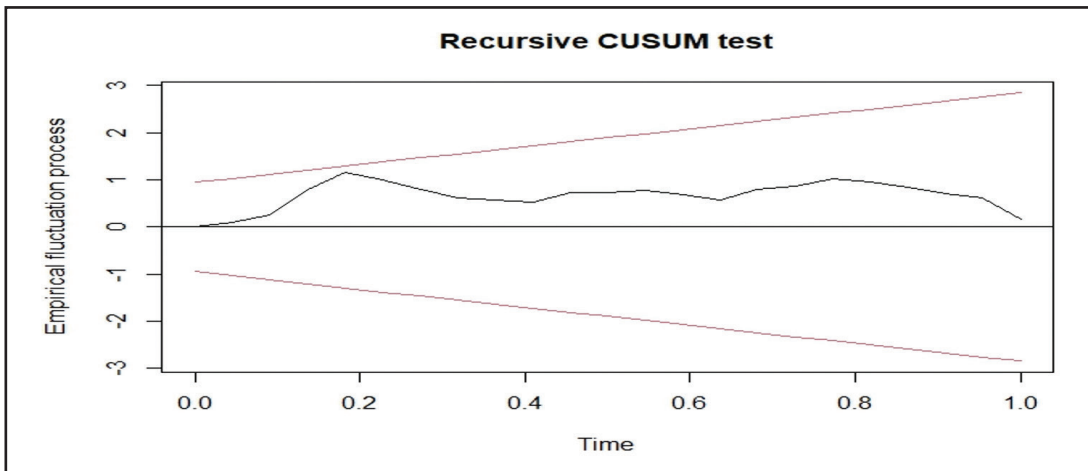
Panel C reports the diagnostic test results of the ARDL model. The R-squared and adjusted R-squared values are also reasonable with a significant F-statistic, a point towards the overall significance of the model. Finally, the stability of the model parameters is also tested using the cumulative sum of recursive residuals (CUSUM) test proposed by Pesaran and Pesaran (1997). This indicates that the model parameters are stable. In Fig. 2, the curve remains between the two critical limits and confirms the stability of the model parameters. The literature, for example, Jijin et al. (2021) also uses these statistical tests to assess the model specification and consistency and efficiency of the parameters.

Table 7. Estimated Short and Long Run of ARDL Model

Variables	Coefficients
<i>A. Short-run coefficients</i>	
<i>Ect</i>	-0.89*
D(log(nep)) (11.7)	10.8
D(oil) (0.01)	-0.014
D(exchange) (0.08)	-0.16*
D(log(usg)) (11.24)	-16.36
D(inf) (0.07)	-0.049
D(smd) (0.01)	0.002
Con (11.2)	42.33
<i>B. Long-run coefficients</i>	
log(nep)	-4.17*

(4.00)	
Oil	0.03*
(0.01)	
Exchange	0.11**
(0.04)	
log(usg)	2.05
(5.64)	
Ind	0.01
(0.06)	
Inf	0.13
(0.10)	
Smd	0.004
(0.01)	
<i>C. Diagnostic tests</i>	
R-squared	0.77
Adj. R-squared	0.65
CUSUM test	stable

Figure 2. CUSUM of recursive residuals of the model.



Source: Author's calculation

Conclusion

As established in the literature, remittances play a critical role in Nepal's development. While the link between remittances and growth has been well studied, less attention has been given to their association with macroeconomic conditions in Nepal. This study addresses this gap by using an ARDL approach to co-integration, analysing annual data from 1993 to 2021 to identify key macroeconomic determinants of remittances. Significant factors include oil prices, the nominal exchange rate, and domestic output. The ARDL model's high error correction term indicates that approximately 89 per cent of deviations from the long-run equilibrium are corrected within a year, suggesting that remittance downturns from macroeconomic shocks are short-lived for recipient households. Consistent with recent findings, the

study shows that higher oil prices lead to increased remittances to Nepal due to many Nepali workers in GCC countries remitting more when oil prices rise. The US economy does not significantly impact remittances, likely because low-skilled Nepali workers in GCC countries are more vulnerable to host country economic conditions.

The study confirms that remittances are countercyclical; a negative coefficient for domestic GDP indicates that remittances rise during economic downturns. Remittances are unresponsive to interest rate and stock market differentials but are positively associated with inflationary pressures in Nepal. Low-skilled workers are particularly exposed to economic shocks in host countries, threatening their ability to provide stable support to their households. The COVID-19 pandemic exemplifies such threats, significantly impacting migrant destinations. Further research is needed to explore future remittance prospects under these conditions. Despite irregular shocks, remittances generally offer a stable income flow to dependent households, quickly correcting macroeconomic disturbances.

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