

IMPACT OF REMITTANCE ON NEPALESE ECONOMY
AND
REMITTANCE INFLOW DURING COVID-19 IN NEPAL

A Thesis

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ABSTRACT

The paper examines the impact of workers' remittance on economic growth using the dataset of 40 years from 1980 to 2019 and the remittance inflow pattern during the COVID-19 pandemic (2020-2021) in Nepal. The study uses various datasets from the Central Bank of Nepal, World Bank, World Health Organization, and Oxford University.

First, we replicate (Makun, 2018) and (Jebran et al., 2016) study models. Both studies used the Autoregressive Distributive Lag (ARDL) model. One with real GDP as a dependent variable reflects cointegration in the context of Nepal, and similarly, GDP per capita as a dependent variable shows no cointegration. So, both the variables are considered a proxy for economic growth in our ARDL model, and workers' remittance, ODA, domestic credit to private sectors, and exports as explanatory variables.

The findings suggest no long-term cointegration between the variables when the lag length is selected using a serial correlation test. When AIC is the default criterion for choosing the lag length and real GDP as the dependent variable, there is a long-run association between variables but insignificant. However, there is an inconclusive result when GDP per capita is a dependent variable. In addition, the diagnostic tests confirmed that selected models were homoscedastic, not serially correlated, with no omitted variable, and stable.

In the second part, there seems to be a rising share of remittance on GDP when GDP per capita growth slackens in Nepal. In addition, there has been a rise in remittance inflow despite the increase in COVID-19 cases and the high stringency situation in Nepal. That graphical result is consistent with the (Kpodar et al., 2021) empirical study of 52 countries. The result confirms that remittance has worked as disaster relief to smooth consumption and compensate for income to low-income Nepalese families during the pandemic.

BIOGRAPHICAL SKETCH

Before joining Cornell University, Ashish Aryal worked as an officer under the different departments of the Ministry of Finance, Nepal, including the customs department, international economic cooperation and coordination division, and Inland Revenue Department (IRD).

He holds a Master of Business Administration in finance from Pokhara University, Nepal. After completing his graduate degree, he joined public service by excelling in the highly competitive public service commission examination on his first attempt. Instead of working in the corporate sector, his willingness to work for the betterment of society landed him in the government service.

As an aspirant to be a change-maker, he learned many things during his tenure under the finance ministry. He is willing to change the rural and disintegrated society through sustainable and inclusive development in Nepal.

He was awarded the prestigious Joint Japan World Bank Graduate Scholarship (JJWB/GSP) to enhance his knowledge and capability in the international development arena at Cornell University. He is completing his Master of Professional Studies in Global Development with a major in International Development Economics and Policy. He will continue his work in different roles under different agencies of the government of Nepal.

*To My
Father Kul Prasad Aryal
And
Mother Mukta Kumari Aryal*

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LIST OF ABBREVIATIONS

ADF	:	Augmented Dicky-Fuller
AIC	:	Akaike Information criterion
ARDL	:	Autoregressive distributed lag model
COVID-19	:	Coronavirus Disease
CUSUM	:	Cumulative Sum
ECM	:	Error Correction mechanism
GDP	:	Gross Domestic Product
LM	:	Lagrange Multiplier
NPR	:	Nepalese Rupees
NRB	:	Nepal Rastra bank
ODA	:	Official Development Assistance
OECD	:	Organization for Economic Cooperation and Development
OxCGRT	:	Oxford Covid-19 Government Response Tracker
PP	:	Phillips - Perron
RMT	:	Remittances
DCP	:	Domestic Credit to Private sectors
FDI	:	Foreign Direct Investment
USD	:	United States Dollar
WB	:	World Bank
WHO	:	World Health Organization

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CHAPTER 1 INTRODUCTION

1.1 Background of the Study

The wave of globalization is driving migration, becoming a prime characteristic of the twenty-first century. People migrate to another country when they are both pulled by the hope of economic gains worldwide and pushed by a lack of opportunity in the home country. In 2020, there were 281 million international migrants, which is 3.6 percent of the world's population¹. It is estimated that 63.5 percent of this population move for employment opportunities². Especially in the developing world, people lack opportunities in their home countries and are compelled to migrate to other countries. “More than 40 percent of all international migrants worldwide in 2019 (112 million) were born in Asia”³. A large number of South Asian migrants are working in the Gulf Cooperation Council (GCC) countries (Doherty et al.,2014).

Nepal is sandwiched between two giant economies, China and India. As per the Population Census 2021, over two million are absent from Nepal's twenty-nine million population. They are outside the country in search of better living standards. The Department of Foreign Employment under the government of Nepal has issued over four million labor approvals since 2008/09 and issued for 128 countries in 2018/19 (MOLESS, 2020); 2011 census data indicates nearly two-fifths (37.2 percent) of the Nepalese absentee populations are in India. However, Nepal shares an open border with

¹ UN DESA, 2020

² ILO, 2018

³ UN DESA, 2019

India, and it is challenging to track workers migrating to India via the Indian route. (IOM, 2019).

Nepal is landlocked and is one of the least developed nations, with 25.2% of the population earning less than 1.25 per day (*World Development Indicators, 2014*). However, Nepal has lifted many people out of poverty by exporting human resources to other countries. “Nearly one-fifth of the poverty decline in Nepal between 1995 and 2004 can be attributed to higher levels of work-related migration and remittance sent home” (Lokshin et al., 2007). The volume of financial remittance has significantly increased to USD 8.79 billion in 2018/19, which was USD 2.54 billion in 2010/11 (MOLESS, 2020). In 2019/20, Nepal received a total remittance amount of Rs. 875 billion was around 22.4% of the real GDP (MoF, 2020). The remittance amount is higher than the total revenue mobilization amount of 827 billion for FY 2020/2021 and higher than the country's capital expenditure allocation. The flow indicates that the remittance amount has the great potential to contribute to capital formation and enhance domestic productivity.

Temporary migrants belong to low and medium-income families in developing countries. Most countries, governments, and researchers agreed on the role of remittances in poverty reduction and consumption smoothing effects on recipient households in recent decades. (Goff, 2008), (R. H. Jr. Adams, 2006), and (Sanjeev Gupta, 2007) provided some evidence that remittances receiving households are financially better off than similar households that do not receive the remittances. But the impact of remittances on economic development and growth is always questionable. (Barajas et al., 2009) found that “remittances do not affect economic growth.” (Kireyev,

2006) presented that remittance inflow depends on the receiving country's structural characteristics, consumption and investment patterns, and capacity to manage significant financial flow to the country. His study was on the case of large-scale remittance for a small economy. Nepal is also a small mountainous country with high reliance on remittance income for poverty reduction and macroeconomic balance. The remittances "positively impact economic growth by helping overcome liquidity constraints and alternative ways to finance the investment" (Fayissa & Nsiah, 2010b). In the context of Nepal, most of the economic indicators have been stagnant for a long time, but the yearly remittance inflow is nearly tripled within one decade, from Rs. Two hundred thirty-one million in 2009 to Rs. 875 million in 2019.

The disastrous pandemic started in late 2019. Up to the end of December 2021, around 5.5 million deaths have been confirmed and severely impacted the global economy. The global containment measures to control an outbreak of coronavirus have severely disrupted supply chains. In addition to the country's economy, it hardly hit the labor migration and their work, especially in developing countries. COVID-19 affected almost all nations, sectors, and movements of migrants. As the host nations are also affected by the pandemic, migrant workers are more vulnerable to losing employment and wages during such a crisis. In 2020, "remittances to low- and middle-income nations were projected to decline by about 20%, from USD 554 billion in 2019 to USD 445 billion." (World Bank, 2020).

Defying the odds, the remittance inflow in developing countries did not decline during the pandemic. In 2020, international remittances totaled USD 702 billion worldwide.

Although international remittances fell as a result of COVID-19, the actual drop (2.4 percent) was much lower than anticipated (20 percent) (IOM, 2022). (Kpodar et al., 2021) postulated that "remittances responded positively to COVID-19 infection rates in migrant home countries, highlighting its role as an important automatic stabilizer." As per the Economic Survey 2020/21 published by the Ministry of Finance Nepal, the balance of payment is in surplus. The inflow of remittances has increased even during the unfavorable situation.

In this background, this thesis is set up to determine the nature of remittance inflows to Nepal and the impact of worker's remittances on the economic growth of the Nepalese economy in the short and long run using empirical strategies. Furthermore, this study also analyzes the remitting behavior of Nepalese migrant workers during the pandemic in sending remittances back home.

1.2 Statement of Problem

International mobility has been increasing daily as the world is becoming increasingly integrated, and it has become a prime characteristic of the twenty-first century. "People are increasingly moving across borders and within countries in search of better job opportunities and lifestyles" (Tacoli & Okali, 2002). It has also become a prominent feature of Nepal's socio-economic landscape. The migration situation of Nepal has been primarily dominated by the migration of Nepalese workers for foreign employment. According to the 2011 census of Nepal's population and housing, nearly 50% of families had a member who was either working abroad or had recently returned (IOM, 2019). To solve the internal unemployment problem and other national economic

issues, the government of Nepal has been promoting foreign employment through various means.

Mainly, migration from developing nations is characterized by a short-term temporary nature. They particularly move to another country to fulfill necessities and the betterment of families. “Nepal's temporary labor migration is a relatively new phenomenon, with volumes increasing since the 1990s when the country liberalized its migrant labor system” (Shivakoti et al., 2021). Because Nepal has many young people, foreign employment has created numerous job opportunities for Nepalese citizens. Nepalese migrants belong to rural and low-income families, so they transfer money back home to support their families. That money transfer from one person to another member/person in the household is called remittances. According to the IMF Balance of Payment Manual (7th edition), “workers who are employed in new economies and regarded as residents there send current transfers back home in the form of worker's remittances.”

There are numerous micro-level studies on workers/migrants sending money directly to the family so that it helps to improve the living standard of an individual family and ultimately reduce the absolute poverty of that country. (Wagle & Devkota, 2018) presented “remittances as a means of alleviating poverty in Nepal.” However, as Nepal's growth-related economic indicators are not changing for a long time, one lingering question is whether remitted money impacts economic growth. In this backdrop, the long-run and short-run association of workers' remittance to the economic growth in the small open economy of Nepal will be studied. To study the association (long run

and short run) of worker's remittances on economic growth following research question is designed:

1. How are remittances associated with economic growth (*real GDP and GDP Per capita are considered a proxy for economic growth*) in the long run and short run in Nepal?

The relationship will be identified using a dataset from different government organizations and global institutions from 1980 to 2019 (40 years). In addition, Nepal has passed through two significant events during the study period. The civil war started in 1996 and ended in 2006, and a devastating 7.8 magnitude earthquake took more than ten thousand lives in 2015. There is evidence that remittances respond negatively to the cyclical position in the receiving country and positively to the migrant's host country. When home economics is facing a crisis, the remittance flow has increased. So, observing these critical events that occurred in Nepal following research question is developed to study the nature of remittance flow:

2. How have workers' remittances responded during adverse times (such as disasters) in the home country (i.e., Nepal)?

The identified relationship will help to understand the remittance behavior of Nepalese migrants during a challenging time. The third part will use a graphical presentation to study remittance inflow patterns during COVID-19. The pandemic that started in late December affects all sectors of almost all countries. Migration and remittances are often considered the major component of recent globalization and are also not free from that pandemic. During the COVID-19 period, some countries

experienced an increased inflow of remittances, while others experienced declining remittances. This paper will try to find the response of Nepalese migrant workers during the pandemic period regarding transferring money to their home country. The following research question is developed to find out the remitting behavior of migrants during the pandemic:

3. How does the migrants' remittance respond to the COVID-19 pandemic and its containment measures in Nepal?

Overall, this study will identify the association of remittances to the country's economic growth in the short and long term, the nature of remittance flow, and remitting patterns of Nepalese migrants during the pandemic.

CHAPTER 2 LITERATURE REVIEW

2.1 Migration Trends

The world is more integrated day by day. The globalization trend is driving migration. Globalization spreads products, technology, information, and jobs across national borders and cultures. “The first episode of globalization began around the mid-nineteenth century and ended with the commencement of the first world war. The second episode started in the aftermath of the second world war” (WTO, 2019). The latest globalization phenomenon was characterized by rising capital flows, labor movement between the countries, and trade integration. The economic trends worldwide influence migration patterns in many ways, and “it is estimated that 63.5 percent of the migrant population move for employment opportunities” (ILO,2018).

Historically, “Previously, the world wars, geopolitical events, cold wars, and terrorism acts (9-11) affected the migration trends, and these things worked as a turning point in migration governance and broader discourse of sentiment. The COVID-19 pandemic has become the latest seismic geopolitical event stemming from a global health emergency” (McAuliffe, 2020). Over the last fifty years, the number of migrants has increased rapidly. Especially in developing economies, people lack employment opportunities, are depressed by political scenarios, and seek better opportunities outside their country. In addition, prospective superior income prospects, fundamental wage differences, and altruistic and self-interest motives are significant drivers of migration and remittances (Lucas & Stark, 1985).

Nepal is rich in natural beauty and abundant resources, but every year, the country exports millions of youth populations to different countries. Nepalese emigrated expecting to improve the living standard of their family. (Malla & Rosenbaum, 2017) postulated that “the main drivers of Nepalese migration to the Gulf region are a lack of job prospects in their home country and a desire to better their families' well-being.” Thus, remittances are a vital livelihood source for many migrant workers and their families in Nepal.

2.2 Motives of Remittances

Economic reasons characterize the migration from developing countries. They send hard-earned money back to their home country to feed their families, educate their children, for better shelter, and ultimately improve living standards. Three literature supported motives behind individuals remitting their hard-earned money back home.

First are pure altruistic motives; under this, migrant moves to another country to seek opportunities by leaving family members in their home. So, remittance would upsurge when natural disasters and financial crises occur (Johnson & Whitelaw, 2015). Moreover, (Lucas & Stark 1985) discuss the altruistic approaches and utility. The study mentioned that “the utility of migrant workers is closely related to the consumption of those who receive remittances.”

The second is pure self-interest motives; migrants who are not remitted in a non-altruistic manner may pay for various other reasons. In this approach, (Bohra-Mishra, 2014) mentioned “motives based on self-interest, such as a desire to inherit parental property or a desire to return home,” and (Lucas & Stark, 1985) provides evidence that

“when individuals have larger herds, remittances tend to be higher to maintain favor in remittances.” In addition, individuals tend to invest in their home country, and migrants planning to return home may invest in savings or property.

The third is tempered altruism. (Lucas & Stark, 1985) presented, “remittances can also be viewed as a mutually beneficial, intertemporal, and contractual arrangement between migrants and their home countries.” In addition, (Poirine, 1997) highlights the implicit loan theory that remittance is considered to reimburse the financial support provided before departure. The implicit loan is utilized for the migrant cost and to secure a better education.

2.3 Remittances in Nepal

Remittances are growing daily in Nepal because of push and pull factors driving emigration. The main pull factors are the excessive demand for labor in developed and industrialized nations in the Middle East, East Asian, and Gulf nations. It can be claimed that the dearth of employment opportunities at home, political instability for a long time, low wage level, lack of subsistence level of the agricultural, liberal government policies, insufficiency of essential services needed for survival, and demonstration effect are primary kind of push factors behind the exodus of Nepalese skilled and unskilled labor force (Mishra & Kunwar, 2020). In addition, Nepal's government has been adopting a policy for promoting migration and foreign employment to solve the domestic unemployment problem.

The economic development strategy of Nepal has been changed since the restoration of democracy in 1990 and moving toward a more market-oriented economy”

(Khadka, 1998). So, the foreign migration and an annual increase in remittance flow started to surge after 1990. In addition, the Nepal government establishes institutions like foreign employment promotion boards to increase participation in foreign jobs. As a result, "remittance income is received in about 56 percent of households" (NPC, 2020). Moreover, the share of remittances in the national economy is also rising. The following figure represents the different sources of foreign currency earnings as a percentage of GDP in Nepal after 1980.

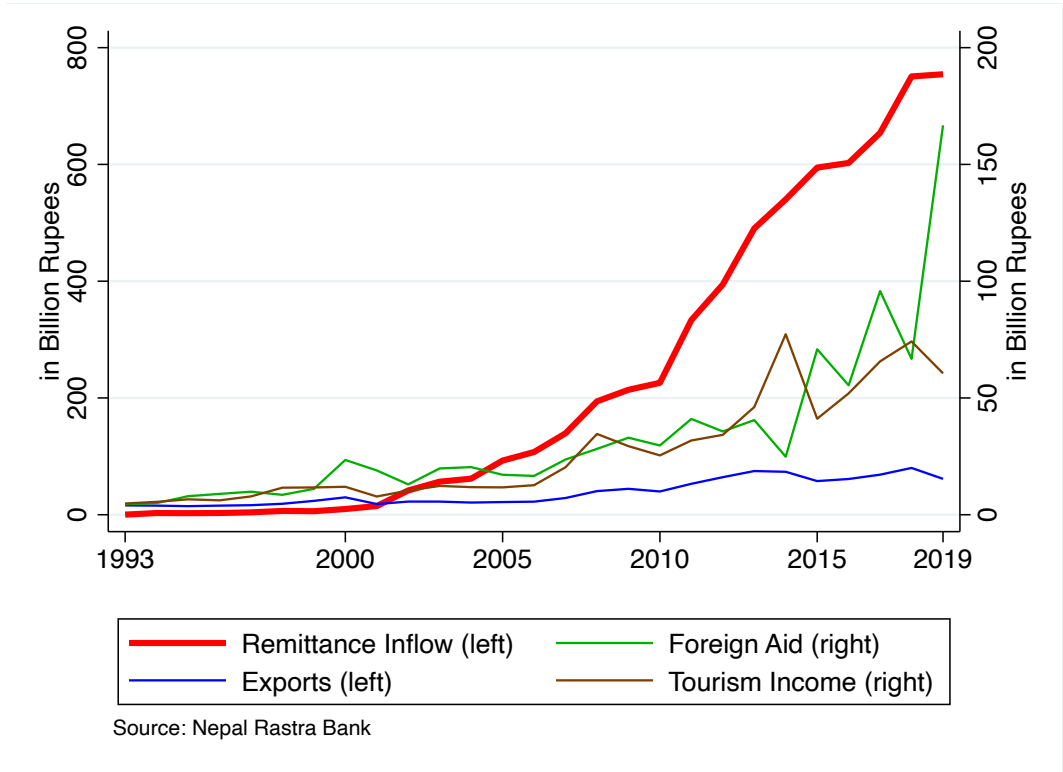


Figure 1 Different ways of foreign currency income as a percentage of GDP in Nepal

As presented in figure 1, the inflow of remittances in Nepal is higher than any other foreign income source, such as foreign aid, tourism income, and merchandise

export. As per (IMF, 2020), remittances are the single component in the current account balance in Nepal. In 2019, Nepal had imports as a percentage of GDP is 41.47. So, remittance is helping to offset the large trade deficit and is the essential item supporting foreign reserves. So, the trend reflects that remittance is becoming a significant source of foreign currency for offsetting trade with other countries and becoming the lifeblood of the Nepalese economy.

There are some pieces of evidence regarding the altruistic behavior of migrants and the poverty reduction impact of remittances in Nepal. The micro-level study of Nepal (Bohra-Mishra, 2014) found that "Self-altruistic and self-interested motives drive remittance behavior, rather than purely altruistic motives." In addition, another microeconomic study by (Pasa & Bishwokarma, 2020) confirms that "remittances are assisting in raising the living standards of remittance-receiving households while also increasing micro-entrepreneurship." and (Dhungana & Pandit, 2014), found overall improvements in socio-economic status. Nevertheless, the macroeconomic impact is always questionable.

2.4 Impact of Remittances on Economic Growth

2.4.1 Theoretical Support

There is no doubt that remittance income has both welfare and growth effects. Under the welfare effect, the money is directly transferred to the migrant's family to help improve their living standard, help covers their children's education, and cover the health expenses of family members. In terms of growth impact, (Ziesemer, 2012) presents both indirect and direct effects of remittances on economic growth.

Some of the indirect impacts on growth by remittances are indirectly rising growth rate by reducing the volatility of remittances (Fullenkamp et al., 2008), “increasing the growth rate by speeding up the development of the financial sector” (Agarwal & Horowitz, 2002), and by appreciating real exchange rate (Lopez et al., 2007). It also impacts education and human capital formation (Chami et al., 2005).

(Barajas et al., 2009) provided the detailed relationship between gross domestic product and remittances and discussed broadly how remittances could affect GDP through labor force, capital accumulation, and total factor productivity (TFP). The remittance comes into the economy through the current account as per the national income perspective, and the remittance is accessible for consumption smoothing and investment in different sectors. However, development economists argue the significance of foreign flows for the generation of economic growth in developing countries in another way. (Todaro & Smith, 2020) identified foreign and domestic as the two primary drivers of economic growth in an economy. Many writers have used the neoclassical growth model (Solow, 1956) to explain better and calculate the impact of remittance income on economic growth. The main idea of (Solow, 1956) is to explain how economic output is created and can develop over time. In this model, labor, capital, and technology generate the total economic output. Different studies used the Solow model to explain the growth impact of remittances by modeling other variables.

There are some variants of the Solow model of economic growth that are useful in the current context. (Rao & Hassan, 2011) extended the Solow growth model, called the "extended Solow model with an endogenous framework." This approach is similar to the well-known method developed by (Mankiw et al., 1992). He extended the Solow

growth model (Solow, 1956), in which the basic neoclassical Cobb–Douglas production function is augmented with shift variables, human capital. The human capital, physical capital, and labor are paid for their marginal products. They simulated the Cobb Douglas Production function at the time (t) given and explained it in the following way:

$$Y(t) = K(t)^\alpha H(t)^\beta (A(t) L(t))^{1-\alpha-\beta} \dots \dots \dots (i)$$

In equation (i),

(Y) denotes the output, (K) Physical Capital, (H) Human Capital, (A) represents the Level of Technology, and (L) Labor. The population growth, saving rate, and technological progress are supposed to be exogenous variables, and labor (L) and level of technology (A) grow at rates (m) and (g).

$$L(t) = L(0)e^{mt} \dots \dots \dots (ii)$$

$$A(t) = A(0)e^{gt} \dots \dots \dots (iii)$$

Here A_0 is the initial stock of knowledge and (g) is growth, and (t) represents the time.

It is well known that the Solow model's steady-state growth rate equals the growth rate of (A), the same as the TFP (Rao & Hassan, 2012). Under the framework used by (Rao & Hassan, 2012), instead of equation (iii) presented above, it was modified to assume:

$$A_t = F(T, Z_t) \dots \dots \dots (iv)$$

In equation (iv), Z_t is the vector of TFP improving variables like remittances, investment, and trade openness. (Barajas et al., 2009) presented that remittances impact investment efficiency by affecting total factor productivity (TFP) growth, depending on who makes the investment decision.

(Bhaskara Rao & Takirua, 2010) explored the underlying framework's applicability (Solow, 1956). It analyzed the significance of aid, remittances, and export besides two conditioning frameworks for determining output in Kiribati's small country. Another study (Kumar, 2013) used “remittance (REM), Official Development Assistance (ODA), and domestic credit to private sectors as a percent of GDP: a proxy for financial deepening on total factor productivity(TFP) captured with the remittance, development assistance, and financial deepening entering as shift variables into the production function of (Rao, 2010)”.

In accordance with these models, this study examines the impact of workers' remittances (RMT), official development assistance (ODA), domestic credit to the private sector (DCP), and export (EXP) as shift variables into the production function of (Rao, 2010). It also examines the significance of RMT, ODA, DCP, and EXPORT, in addition to two conditioning frameworks for determining output. Subsequently, our model of study would be:

$$A_t = A_0 e^{gt} RMT_t^\beta ODA_t^\lambda DCP_t^\gamma EXPORT_t^\delta \dots \dots (v)$$

And $Y_t = (A_0 e^{gt} RMT_t^\beta ODA_t^\lambda DCP_t^\gamma EXPORT_t^\delta) * K_t^\alpha \dots \dots \dots (vi)$

This can be formulated as,

$$\Delta LY^* = g + \beta \Delta LRMT + \lambda \Delta LODA + \gamma \Delta LDCP + \delta \Delta LEXP \dots \dots \dots (vii)$$

The term ΔL is the partial differential of logs of respective variables, and the intercept term is the total factor productivity.

2.4.2 Empirical Studies

After 1990 there were extensive studies related to migration, remittances, and their impact on multiple dimensions of the economy. In recent decades many least developed nations and low-income families are benefiting from the global movement of people. Remittances inflow surpasses exports, development assistance and foreign direct investment (FDI) for many developing countries.

At the micro-level, remittances impact poor households to improve their living standards and meet necessities. So, it is becoming the "major vehicle for reducing scale and severity of poverty in developing countries through pure monetary gains and improving other human development outcomes" (Ratha, 2013). In their study, (R. H. Adams & Page, 2005) suggested that a "ten percent surge in per capita remittances in a developing country will lead, on average, to a 3.5 percent decline in the share of people living in poverty (\$1.00/ person/day)". As migrants transferred money directly to their families residing back home to meet their daily requirements, it helped reduce the absolute poverty level of developing economies. Various studies and survey results show that the micro-level household impact of remittances is positive. Remittances generally positively influence health and poverty in the developing world, according to a review of 50 empirical research (R. H. Adams, 2011) on the economic impact of worker remittances that was based primarily on household survey data.

Recent research suggests that the arrival of remittances may increase the income level of the poor and contribute to the eradication of poverty (Rahman et al., 2021). Remittances are, therefore, more advantageous for reducing poverty than economic progress. Nevertheless, it is crucial to consider how remittances affect economic growth by preserving macroeconomic equilibrium, producing capital resources, and regulating consumption in the recipient country. The result regarding the macro-level impact of remittances is mixed. Some of the studies claimed no effect of remittances on macroeconomic indicators. However, most studies provided evidence that there is a direct and indirect impact on the recipient country's economy through different doors.

2.4.2.1 Macro-level Impact

The overall impact of remittances on the economy is mixed and always debatable. It was said by (Barajas et al., 2009) that although there is no doubt that remittances have effects on recipient households that lessen poverty and stabilize consumption, the critical question is whether they support long-term economic growth. In addition, the study further postulated that the remittance income is a significant source of funds for developing countries, as it is the primary source of currency and can influence the balance of payments. These resources contribute significantly to developing the national economy (Rao & Hassan, 2011).

Asia and Africa are under poor categories regarding development level and status. However, in both regions, remittances have opposite impacts. A recent meta-study by (Cazachevici et al., 2020) presented the evidence that remittances are a growth-enhancing effect in Asia but not in African countries. In another aspect, growth and

remittances have a positive, statistically significant correlation in small countries, according to (Feeny et al., 2014). They did note that the complex and country- or region-specific mechanisms via which remittances impact growth. Economic growth depends upon the different factors and measures of the economy's aggregate. To some extent, remittances should contribute to this.

(Pradhan et al., 2008) and (Eggoh et al., 2019) found that “remittances have a positive impact on developing countries' growth,” and (Fayissa & Nsiah, 2010b) and (Shera & Meyer, 2013) found “a significant and positive impact on growth in African countries and the Southeastern Balkans.” In addition, (Abdullaev, 2011) found the same effect on Asian and former Soviet nations. In addition, (Fayissa & Nsiah, 2010a) and (Mundaca, 2009) found “remittances' overall effect on the development of Latin American countries' economies.” (Nsiah & Fayissa, 2013), including countries from all regions using multiple empirical tools, found “a significant and positive impact on economic growth.” In a different aspect, (Alhannom & Mushabeb, 2021) found that “workers remittances are influenced by the macroeconomic conditions of both the home and host economies.”

In terms of South Asia, (Cooray, 2012) identified a significant impact on growth, but (Jawaid & Raza, 2016) discovered remittances and their volatility on the economic growth of five South Asian countries (including Nepal) and confirmed a significant positive long-term relationship in others, except Pakistan.

In country-specific impact studies, (A. Das et al., 2019) found that GDP and remittances inflow in Jamaica are cointegrated relationships that reinforce each other

positively. (M. K. Khan et al., 2019) “remittance inflows have a long-term positive impact on Pakistan's economic growth.” (Paul, 2011) found “there exists a positive relationship between remittance and gross domestic product in the long run in Bangladesh.” (Muhammad & Ahmed, 2012) found that "Remittance positively contributed to growth through the multiplier effects, although the workers' remittances mainly were used for private consumption and partially to finance import in Pakistan."

On the contrary, (Barajas et al., 2009) claimed that “workers' remittances do not impact economic growth.” In their study, (Z. S. Khan & Islam, 2013) argues that remittances tend to cause inflationary pressure in the domestic economy, and (Tung et al., 2015) studied Asian and Pacific countries and found that "remittance inflows significantly increase inflation. Whereas, (Lopez et al., 2007) suggested “that remittances escalate the domestic currency in small open economies.” (Matuzeviciute & Butkus, 2016) argued that “remittances could not ensure long-run economic growth or fix the structural economic problems.” (Rao & Hassan, 2011) concluded that remittances have no significant direct growth effect but may have minor indirect growth effects.

2.4.2.2 Nepal Specific Studies

In Nepal, many people are not falling into poverty because remittances provide a safety net (Shrestha, 2017) & (Pant, 2007) examined the impact of remittances on the household level. It concluded that migrant remittances have resulted in poverty reduction and improved living standards for migrant households in Nepal. (Wagle & Devkota, 2018) finds out that "there is economic well-being enhancing effect and

poverty-reducing impact of foreign remittance in Nepal when the remittance originating country is other than India.”

A microsimulation study by (Acharya & Leon-Gonzalez, 2012) shows that remittance has a more significant impact on poverty reduction in regions with higher migration levels." A recent study by (Byanjankar, 2020) found that "In Nepal, remittance-receiving households are 2.3 percent less likely to fall into poverty than non-remittance-receiving households."

There was an exciting growth of remittances in previous decades, but countries' economic indicators are not improved as expected. If the remittances were mobilized productively and adequately, it would have impacted growth through different means. Real GDP at producers' prices and workers' remittances in Nepal in the previous three decades are presented in the following figure.

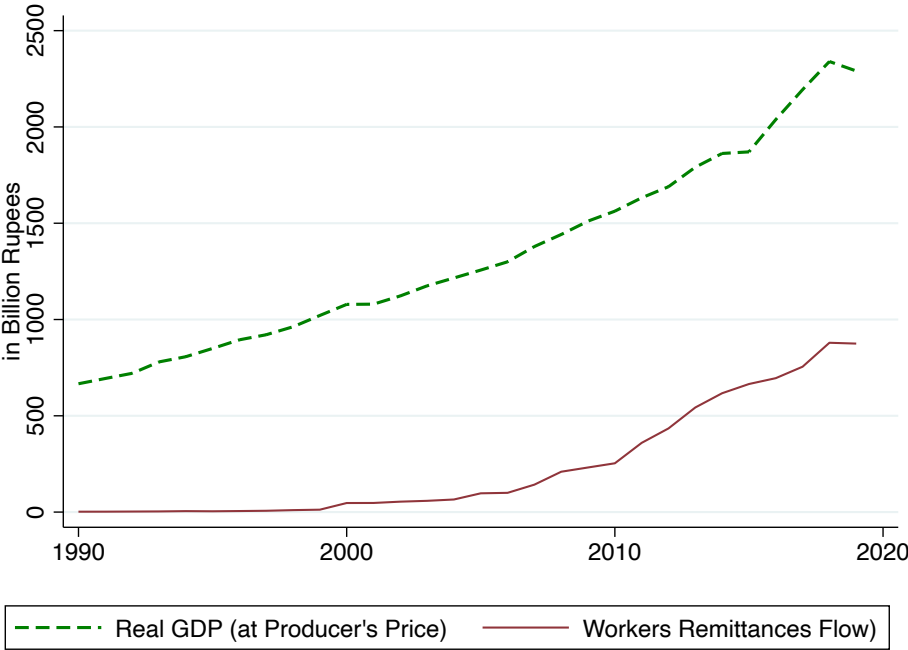


Figure 2 Real GDP and Worker's Remittance Flow

The remittance upsurge trend has continued since 2000. The trend reflects the abundant flow of capital resources in the country and seems to impact the economy. However, multiple pieces of evidence supported the poverty reduction effect, but the impact on economic growth is relatively small.

The percentage of people living in poverty decreased from 42% in 1995-96 to 31% in 2003-2004. However, real GDP growth has not taken place. "A sharp rise in remittances is the cause of one-third to half of the country's total decline in the headcount poverty rate." (WB, 2006). The critical question that needs to be tested empirically is, does the high flow of remittances impact the Nepalese economy at the macro level or not. The migrants from the developing world remit their hard-earned money to maintain their household living standards. At the same time, the countries are getting direct and indirect benefits. Governments are using foreign capital to offset trade transactions with other countries. Remittances have substantially contributed to economic growth in the countries that have experienced stagnation in several industries, including export, tourism, and FDI influx, by reducing foreign exchange limitations and improving the balance of payments (Pant, 2007).

Remittances are the single most significant component in the current account balance in Nepal. " Foreign employment has acted as a safety valve for the labor market by absorbing a larger proportion of new entrants" (Pandey, 2020). A slight fluctuation in the remittance flow is seriously panicking the country. The panic is due to intense dependencies on remittance to maintain foreign currency reserves.

According to a recent study by (Shakya & Gonpu, 2021), remittances have no significant impact on Nepal's economic growth. However, the inclusion of democratic forms of governance as a dummy variable positively impacted economic growth. (Dahal, 2014) found the mixed effect of remittance inflows on economic growth in Nepal. Positive impact on some sectors and no effect on others. Another study by (Uprety, 2017) concluded that “there is no evidence of remittances impact in the longer term, and negatively related to per capita GDP in the short run in Nepal.” (Kaphle, 2019) also confirms “a long-run relationship between economic growth, remittance, and trade, but no short-term causal association exists between economic growth and remittances.”

There are mixed results in the impact of remittance on economic growth. However, remittances positively impact economic growth if the country is small and developing. Given the history of migration, evidence from several literary works, and the recent pattern of remittance inflow in Nepal, we, therefore, assume that the influx of remittance has an apparent beneficial effect on growth in the Nepalese economy.

2.5 COVID-19 and Remittances Flows

The pandemic that began in late December 2019 has taken more than 5.5 million lives up to the end of December 2021. It severely impacted the global economy. An international economic crisis that may be even worse than the one that occurred in 2008–2009 was brought on by this pandemic, which also resulted in a public health emergency (Loayza & Pennings, 2020). The international containment measures to control an outbreak of COVID-19 have severely disrupted the economic chain. In addition, it

hardly hit the labor and work migration; World Economic Forum refers to it as the 'throttling' of international (labor) migration.

It mainly affects different activities and indicators of the developing economy (Alam et al., 2020). "Emerging markets and developing economies are expected to suffer more scarring than advanced" (S. Das et al., 2021). One significant sector severely affected was the migrant workers and their work. They tend to be vulnerable to the loss of employment and incomes during an economic crisis in their host country. Some of low- and medium-income countries' poverty-related issues have been addressed by international migration for a long time. In addition, remittances are becoming the single component of the current account balance. Nepal is one country with a massive number of rural low-income households that depend on remittance income and are highly dependent on remittance in terms of foreign currency earnings.

The COVID-19-related containment measures introduced by the countries affect the economic activities in almost all countries. Nepal is not free from that effect. It halts the spread of COVID-19 but entails huge economic costs (Deb et al., 2020). The developing countries' most important foreign capital flows were also affected and showed mixed results. As the pandemic started, there was fear in the developing countries and their governments regarding the decline in remittances, thereby hurting the economy in different respects. The remittance shock' is likely to precipitate a decline in foreign exchange earnings, exacerbate structural unemployment, and jeopardize the well-being of millions of low-income families (Withers et al., 2021). However, some countries are experiencing a massive decline in remittances inflow, whereas others face a surge in remittances.

A study of the small island nation Samoa (Chen et al., 2020) found that "COVID-19 has led to increased remittance inflows from some countries and decline from others". There was a sharp spike (more than 60 percent) in remittance flow in Bhutan due to overseas returnees remitting their saving back home country. (Royal Monetary Authority, 2020). In another island nation, the dramatic growth was essentially linked to the migrant's altruism amidst the pandemic (Central bank of Comoros, 2021). In addition, (Kpodar et al., 2021) also claimed that "remittances responded positively to COVID-19 infection rates in migrant home countries, highlighting its role as an essential automatic stabilizer."

Stronger economies are the host nations for migrants. This multi-year global pandemic affects the strong economies also. In a study on natural disasters on aggregate economic activity in the United States, (Ludvigson et al., 2020) argued that in the past four decades, the macroeconomic impact of COVID-19 has been more significant than any other catastrophic event. As host nations' economies are also in trouble, the predictions regarding the severe implications for the migrants are apparent. (Chowdhury & Chakraborty, 2021) presented that the pandemic has brought numerous adverse socio-economic effects on migrant workers.

CHAPTER 3 EMPIRICAL MODELS AND METHODOLOGY

3.1 Research Design

This research study has two parts. The first part is finding the correlation between remittances and Nepal's economic growth. The second part will investigate the nature of remittance flow in Nepal as well as remittance flow during the pandemic in Nepal. The empirical framework used to investigate the effects of remittances on economic growth is discussed in this section.

3.2 Long Term Study

The first part of the study seeks to investigate the impact of remittances and other macroeconomic variables (export, official development assistance, and domestic credit to the private sector) on Nepal's economic growth. The appropriate empirical investigation technique will be applied using the available data for the analysis following the model developed earlier in the literature review section. First, the log transformation of these variables and coefficients are assigned in the following equation (viii) and (ix). Equations (vii) represent the real GDP as a dependent; exports, official development assistance, and domestic credit to the private sector are independent variables, and equation (ix) represents the GDP per capita as a dependent variable with the same kind of explanatory variables.

$$\ln RGDP_t = B_0 + B_1 \ln RMT_t + B_2 \ln DCP_t + B_3 \ln ODA_t + B_4 \ln EXP_t + E_t \dots \dots \dots (viii)$$

And,

$$\ln GDPPC_t = B_0 + B_1 \ln RMT_t + B_2 \ln DCP_t + B_3 \ln ODA_t + B_4 \ln EXP_t + E_t \dots \dots \dots (ix)$$

Where, $\ln RGDP$ is a log of real GDP in Producers price (measured in Nepalese currency) and $\ln GDPPC$ is the log of GDP per capita (measured in US dollars), $\ln RMT$ is the log of Worker's remittances in Nepalese Currency, $\ln DCP$, is log of domestic credit to private sectors, $\ln Export$ represents the log of total export in Nepalese Currency, $\ln ODA$ means log of official development assistance in Nepalese currency. B_1 to B_4 represents the coefficients of variables. To find out the remittance impact on growth, the real GDP and GDP per capita are considered a proxy for economic growth.

(Makun, 2018) used real GDP as a dependent variable, considered a proxy of economic growth, whereas (Jebran et al., 2016) used the GDP per capita as a proxy for economic growth to determine the relationship between the variables. So, our study will test both variables as dependent variables to find the relationship.

The properties of time series data are crucial, and data is needed more scrutiny. Data may be nonstationary and may contain a unit root. In coefficient estimation, the time series must be stationary to avoid inconsistencies (Gujarati & Porter, 2009). It is critical to check the data stationarity to determine the integration of each series. The Phillips and Perron (PP) and Augmented Dicky-Fuller (ADF) unit root tests are widely used to check the variables.

A few econometric methods for determining how time series data are related. The recently created Autoregressive Distributed-Lag (ARDL) model, Engle-Granger (EG), Johansen Maximum Likelihood techniques, LSE Hendry's GETS approach and fully modified ordinary least square (FMOLS) are some examples.

Several studies used the ARDL cointegration technique introduced by (Pesaran et al., 2001) to study the country-specific impact of remittances on the economy.

First, (Makun, 2018) used the ARDL technique to investigate the impact of external factors, such as remittances, on Fijian economic growth.

.Furthermore, (M. K. Khan et al., 2019) and (Jebran et al., 2016) applied the same approach to study the impact of remittance on Pakistan's economic growth. (Majumder & Donghui, 2016) used to study the effect on Bangladesh's economy, and (Wondimu & Solomon, 2020) also applied the same approach to study the impact on the Ethiopian economy. This approach is recent and widely used because it is possible to test the cointegration regardless of integration order. It is appropriate to try if the sample period is small and can also correct for potential endogeneity (Pesaran et al., 2001). This ARDL method has been widely used recently, so in this paper, we will use the ARDL procedure to identify the cointegration between the remittance and other variables.

Regarding the Nepal-specific studies on the impact of remittances on economic growth, (Uprety, 2017) used annual remittances, GDP per capita, consumption, and investment data from 1976 to 2013 using Johansen cointegration and error correction methods, (Shakya & Gonpu, 2021) applied the cointegration and regression analysis, a log-log econometric model was employed by (Kaphle, 2019) to evaluate the relationship between remittances and economic growth, and (Dahal, 2014) applied descriptive techniques to derive the conclusion.

This study is different from other studies conducted previously in Nepal. The real GDP and GDP per capita will be used in this study as proxies for economic growth. Total exports, ODA, and domestic credit to the private sector are considered explanatory variables in addition to worker remittances.

3.2.1 Cointegration Analysis

The Johansen Cointegration approach Field (Johansen, 1988) is applied to check the long-run relationship between the multiple macroeconomic variables. This approach was improved for checking cointegration, but it is inappropriate in certain conditions. It does not deal with small sample sizes, and all variables should be integrated into the same order (Pesaran et al., 2001). We have small observations (40 years) only, so we will use the autoregressive distributed lag model (ARDL) proposed by (Pesaran et al., 2001). “This method is appropriate for a small sample size, and in this method, we can study the long and short-run association simultaneously” (Pesaran, 1998). This method is also can be applied if the series is I(0) and I(1) or a combination of both (Pesaran et al., 2001). Further, (Odhiambo, 2009) noted that "if some of the variables are endogenous, the ARDL approach will still be valid."

3.2.1.1 Unit Root Tests

Before proceeding to empirical cointegration analysis, unit root tests must be used to determine each variable's stationarity. (Dickey & Fuller, 1979) & (Dickey & Fuller, 1981), and (Phillips, 1988) were applied for the analysis of stationarity for each variable using the following equation (ix).

$$y_t = \mu + \delta y_{t-1} + \sum_{i=1}^k \beta_i \Delta y_{t-1} + \varepsilon_t \dots \dots \dots (x)$$

Where $\delta = \alpha - 1$

ADF (Augmented Dicky Fuller) and PP (Phillips Perron) are commonly applied to verify variables' stationarity. Before studying the cointegration test, it is necessary to check that variables are stationary at either level or first difference.

3.2.1.2 Lag Length Selection

First, the optimal lag length needs to be chosen before proceeding to the bounds test for cointegration. There are different approaches to determining the lag length. As per (Altinta & Taban, 2011), when using annual data begins with a maximum of four lags and then reduces it to three, two, and one. Subsequently, we can test the serial correlation using the LM test and confirm the appropriate lag value. Another approach uses the Akaike information criterion (AIC) as the default criterion to determine the optimal lag length. In this study, we have used both methods to identify the relationship.

3.2.1.3 ARDL Framework

The Autoregressive distributive lag methodology covers the bound F-test for cointegration. After testing the variable's stationarity and selecting the appropriate lag length, we will identify the long run cointegration in two steps.

The following equation is rearranged as an unrestricted error correction model to investigate the presence of long-run association within the ARDL framework (UECM).

$$\begin{aligned}
\Delta \ln r g d p_t &= B_0 + B_1 \ln r g d p_{t-1} + B_2 \ln r m t_{t-1} + B_3 \ln D C P_{t-1} + B_4 \ln O D A_{t-1} + B_5 \ln e x p o r t_{t-1} \\
&+ \sum_{i=1}^{\rho} \alpha_1 \Delta \ln r g d p_{t-i} + \sum_{i=1}^{\rho} \alpha_2 \Delta \ln r m t_{t-i} + \sum_{i=1}^{\rho} \alpha_3 \Delta \ln D C P_{t-i} + \sum_{i=1}^{\rho} \alpha_4 \Delta \ln O D A_{t-i} \\
&+ \sum_{i=1}^{\rho} \alpha_5 \Delta \ln e x p o r t_{t-i} + \varepsilon_{it} \dots \dots (xi)
\end{aligned}$$

Another equation with GDP per capita income as a dependent variable is also analyzed with the same explanatory variables.

$$\begin{aligned}
\Delta \ln g d p p c_t &= B_0 + B_1 \ln g d p p c_{t-1} + B_2 \ln r m t_{t-1} + B_3 \ln D C P_{t-1} + B_4 \ln O D A_{t-1} \\
&+ B_5 \ln e x p o r t_{t-1} + \sum_{i=1}^{\rho} \alpha_1 \Delta \ln g d p p c_{t-i} + \sum_{i=1}^{\rho} \alpha_2 \Delta \ln r m t_{t-i} \\
&+ \sum_{i=1}^{\rho} \alpha_3 \Delta \ln D C P_{t-i} + \sum_{i=1}^{\rho} \alpha_4 \Delta \ln O D A_{t-i} + \sum_{i=1}^{\rho} \alpha_5 \Delta \ln e x p o r t_{t-i} \\
&+ \varepsilon_{it} \dots \dots (xii)
\end{aligned}$$

The difference operator, (Δ) delta, represents short-term dynamics in the above equation. The beta parameters from B_1 to B_5 with one period of lagged variables are used to measure long-term relationships. As a result, the hypothesis can be developed in the following manner:

$$H_0: B_1 = B_2 = B_3 = B_4 = 0 \text{ i.e., There is no long-run Cointegration}$$

$$H_0: B_1 \neq B_2 \neq B_3 \neq B_4 \neq 0 \text{ i.e., There is long Run Cointegration}$$

The variables with a single period lag are used to measure long-term associations. The Wald F-statistics are obtained by applying the Wald coefficient limits to impose constraints on long-run parameters in the bound F test. “The calculated F

value will be compared with the lower and upper band critical values” (Pesaran et al., 2001).

The second step uses the error correction term to estimate the short-term model. The following equation (ix) error correction model is used to identify short-run dynamics and validate the robustness of the long-run model's estimated coefficient.

$$\Delta \ln rgdp_t = \delta_0 + \sum_{i=1}^{\rho} \alpha_1 \Delta \ln rgdp_{t-i} + \sum_{i=1}^{\rho} \alpha_2 \Delta \ln rmt_{t-i} + \sum_{i=1}^{\rho} \alpha_3 \Delta \ln DCP_{t-i} + \sum_{i=1}^{\rho} \alpha_4 \Delta \ln ODA_{t-i} + \sum_{i=1}^{\rho} \alpha_5 \Delta \ln export_{t-i} + (ECM)_{t-1} + \varepsilon_{it} \dots \dots (xiii)$$

Here, error correction is represented by ECM. The long-term estimated parameters in equation (xi) calculate the Error Correction Model. The error correction term (ECT) is expected to be negatively associated and significant with the dependent variable. The same approach is applied when analyzing GDP per capita as the dependent variable, equation (xii).

3.3 COVID-19 and Nature of Remittances

The nature of remittance flow for the long run from 1990 to 2019 and Nepali migrants' remit behavior during COVID-19 is studied in the second part of the study. In addition, (Kpodar et al., 2021) provided evidence that there was an increase in remittance flow in developing countries during COVID-19 using 52 countries and multiple datasets. However, as we are analyzing a single country study, the graphical presentation is used in our research.

3.4 Data Sources

For this study, the annual dataset is used from the Quarterly Economic Bulletin of the Central Bank of Nepal, the Economic survey of the Ministry of Finance Nepal, and the World Bank. The real gross domestic product (at producers' price), workers' remittances, domestic credit to private sectors, official development assistance, and export data are drawn from the quarterly bulletins of Nepal Rastra Bank (Central Bank of Nepal). The selected variables are described in World Development Indicators, which are presented in Appendix I. In addition, other related data used for graphical presentation and analysis are used from the World Bank.

Data are collected from various sources for the second part of the study. The COVID-19 cases per million data of the home country are collected from World Health Organization (WHO), Monthly remittance inflow from the Nepal Rastra Bank, and Stringency Index data from The Oxford Covid-19 Government Response Tracker (OxCGRT), Oxford University.

CHAPTER 4 : RESULTS AND ANALYSIS

4.1 Cointegration Analysis

4.1.1 Unit-Root Test

For the first step, the concern related to the stationarity of variables is addressed using an Augmented Dicky Fuller (ADF). This unit root test is conducted to ascertain that the selected variables for the study do not have a stationarity-related issue, and their integration order is either in level or one. The ADF unit root test is applied to two scenarios, being constant and constant with a trend. The results of the unit root are presented as follows:

Table 1 Unit Root Test Results

S. N	Variables	Symbol	Level		First Differences		I.O
			Constant	Constant w. Trend	Constant	Constant-w. Trend	
1	real GDP	lnrgdp	-0.689	-2.811	-6.926*	-6.824*	I(1)
2	GDP per Capita	lngdppc	1.107	-1.491	-4.827*	-5.020*	I(1)
3	Worker's remittance	lnrmt	-0.351	-2.182	-7.051*	-6.960*	I(1)
4	Domestic Credit to Private Sector	lndep	-0.179	-2.684	-5.029*	-4.972*	I(1)
5	Official Development Assistance	lnODA	-0.716	-3.912	-9.998*	-9.921*	I(1)
6	Export	lnexport	-1.783	-1.174	-5.163*	-5.530*	I(1)

* and ** represent significance levels at one and five percent, respectively.

Note:

- McKinnon's (1991) critical values are used to reject the null hypothesis of the unit root.
- I (0) indicate the variable is stationary, and I(1) show the variable is integrated at order one.
- The critical values for ADT are 1% = -3.750, 5% = -3.000, and 10% = -2.630.

The study results indicated that at levels, the selected variables were non-stationary when constant and constant, with the trend at a five percent significance level.

All the chosen variables are stationary in the first difference, either at constant values or constant values with trend conditions. The findings demonstrate that the order of integration is not more than one, which is critical for examining long-term cointegration. As a result, the cointegration analysis can be used to calculate the long run cointegration by utilizing an unconstrained error correction equation.

4.1.2 Lag Length Selection

We used the unconstrained error correction (UEC) method to investigate the long-term cointegration connection. The lag order must be established before performing the cointegration analysis. First, the lag length is chosen by starting with a maximum of four lags and gradually decreasing it to three, two, and finally one, as recommended by (Altinta & Taban, 2011). On different lags, the serial correlation is evaluated using the LM test. Then, verify that there is no serial correlation and choose the best lag length. In the second approach, we use the Akaike information criterion (AIC) as the default criterion for determining the optimal lag length.

4.1.3 Cointegration Results

Using the statistical procedure such as the Wald test, it is possible to determine the cointegration test makes it possible to decide on the existence of a long-term equilibrium using statistical procedures such as the Wald test. The hypothesis tested is as follows:

Null : $H_0: B_1 = B_2 = B_3 = B_4 = B_5 = 0$ i.e., There is no long run cointegration

Alternative : $H_0: B_1 \neq B_2 \neq B_3 \neq B_4 \neq B_5 \neq 0$ i.e., There is long run cointegration

If the null hypothesis is rejected, there will not be a long-term link between the variables. The variables have a long-term association if the null hypothesis is not disproved. The F statistic value can be determined via the Wald test first, and the null hypothesis is tested by comparing the value to the crucial values provided by (Pesaran et al., 2001). The null hypothesis is rejected if the F- statistics value calculated from the Wald test is greater than the upper band value. The null hypothesis is not rejected if the computed F statistic is less than the lower band value. We begin by replicating previous studies and then develop our model in the context of Nepal to determine the relationship between selected variables.

4.1.3.1 Replication Study Results

Before starting our study model, first replicate the two related studies by (Makun, 2018) and (Jebran et al., 2016) with different dependent variables. The first study, (Makun, 2018), used the ARDL approach to study the impact of remittance on GDP in the small island country Fiji. This study used real GDP as the dependent variable and import, remittance, and Foreign Direct Investment as the independent variable. So, we also developed the same model using the same variables used in that study. The study period is from 1993 to 2019 due to the unavailability of data in the Nepalese context.

For the cointegration analysis, lag length is selected by beginning with a maximum of four lags and then reducing it to three, two, and then one, as recommended

by (Altinta & Taban, 2011). When using lag lengths four and three, there is the issue of multicollinearity. In lag two, there is a serial correlation; when there is lag one, they are not serially correlated. It is essential to ensure that there will be no serial correlation issues on the regression model to carry out the bounds F test. So, lag one is the appropriate length for this study.

In Annexure-II, the F statistics value from the bounds test is compared to the critical values of (Pesaran et al., 2001). The F-statistics value of 16.29 is greater than the upper band critical value of 4.156 at the 5% significance level, indicating that the null hypothesis is rejected and reflects the long-term economic relationship between the selected variables. Additionally, over the longer period, all three variables—import, remittances, and FDI—are significant and have positive relationships; however, over the shorter term, these relationships are insignificant and negative. The results are provided in detail in Annexure III.

The second study, (Jebran et al., 2016), investigated the impact of remittances on economic growth in Pakistan by using remittances, investment, and total exports as independent variables and GDP per capita as the dependent variable. In the context of Nepal, we use the same types of variables. The study spans the years 1980 to 2019. The lag size is determined by default using the Akaike information criteria (AIC).

At the 5% significance level, the value of F statistics is 2.203, which is less than the lower bound critical value of 3.152, and the null hypothesis is not rejected. As a result, there is no long-term economic relationship between the variables chosen. In the case of Pakistan, the analyses by (Jebran et al., 2016) “evidence statistically significant

positive long-run and short-run impacts of remittances on per capita economic growth.” However, the evidence in Nepal indicates that remittances have a positive, statistically insignificant, and no long run association. Likewise, investment (as measured by gross fixed capital formation) and export have a negative and insignificant relationship. Annexure IV contains the detailed output.

The dependent variable in the first study by (Makun, 2018) was real GDP, while the dependent variable in the second study by (Jebran et al., 2016) was GDP per capita. Both replication approaches produced different results in our research. There appears to be long-run cointegration and a significant relationship with independent variables imports, remittances, and FDI as a percentage of GDP in Nepal in the first replication study, whereas in the second model, when exports, remittances, and gross fixed capital formation are independent variables, there is insignificant and no long-run association. In the following section, we will analyze the model developed in the literature review.

4.1.3.2 Results and Analysis

For our study, we have selected the four independent variables, official development assistance, export, domestic credit to private sectors, and remittances. First, we will use real GDP as the dependent variable. Then we will test using GDP per capita income as a dependent variable to identify remittance's impact on Nepal's economic growth.

A. Real GDP as Dependent Variable

We have already developed the ARDL framework in equation (x) by considering Real GDP as a dependent variable. At the same time, explanatory variables are official

development assistance, export, domestic credit to private sectors, and remittances. The period of study is from 1980 to 2019. First, the lag length is selected as (Altinta & Taban, 2011) recommended in their study. Starting with four, three, two, and one. And then the Serial correlation test using the LM test. There should be no serial correlation to determine the long-term cointegration relationship.

Lags	P value		LM test
4	0.002	< 0.05	Serial Correlation
3	0.0039	< 0.05	Serial Correlation
2	0.0055	< 0.05	Serial Correlation
1	0.7421	> 0.05	No Serial Correlation

At a 5% significance level, there is no serial correlation when lags length is one. As a result, we chose one as the appropriate lag length for our study. Then the F statistics value is 0.473, less than the lower band critical value (Pesaran et al., 2001). Annexure V contains a detailed output presentation. According to the results, all coefficients are positive but insignificant in the long run. Remittances, ODA, and domestic credit to the private sector are negatively associated and insignificant in the short term, whereas exports have a positive and significant relationship.

Likewise, if the lag size is chosen with the Akaike information criteria (AIC) as the default. The F- statistics value of 6.709 is greater than Field's upper band critical value (Pesaran et al., 2001). Annexure VI contains the detailed output. The results suggest that the selected variables have a long run cointegration relationship.

B. GDP Per capita as Dependent Variable

The ARDL framework for the second approach is developed in equation (xii) in the earlier chapter. In this approach, we have also used GDP per capita as the dependent variable and the same independent variables used in the previous ARDL model. First, we followed the same approach to select the lag length as in the last model. Start from four, three, two, and one, and evaluate using the LM test. The result for optimal lag length selection is as follows:

Lags	P value		LM Test
4	0.0001	<0.05	Serial Correlation
3	0.0105	<0.05	Serial Correlation
2	0.0227	<0.05	Serial Correlation
1	0.8027	>0.05	No Serial Correlation

There is a serial correlation issue when selecting four, three, and two as lag lengths. But, when the lag length is one, there is no serial correlation at 1 %. So, we are selecting the optimal lag length of one. Then, the F statistics result is 2.153, which is lower than Field's lower bound critical value (Pesaran et al., 2001); as a result, do not reject the null hypothesis. This confirms that the selected variables do not have a long run cointegration relationship. Annexure-VII contains the detailed results.

According to the annexure VII table, remittances are significant at a 5% significance level and are positively associated in the long run. However, remittances are negatively related and insignificant in the short term. Official development assistance and exports have a negative coefficient and are insignificant, whereas

domestic credit to the private sector has a positive correlation but is insignificant at the 5% significance level.

Furthermore, the lag length is chosen using the Akaike Information Criterion (AIC). The F value is 3.457, which is between the lower and upper band values at 5% significance levels, indicating that the results are inconclusive. Annexure VIII contains a detailed output presentation. The following table provides a summary of various scenarios:

Table 2 Summary of results

S. N	Lag Length one		AIC Criteria as default	
	Real GDP	GDP PC	Real GDP	GDP PC
F Value	0.473	2.153	6.709	3.457
Results	No Cointegration		Cointegration	Inconclusive

4.1.4 Diagnostic Test Results

After confirming the relationship between the selected variables, the diagnostic tests were performed from ARDL estimates in both conditions. These tests include:

a) RESET test

To ensure that the omitted variables are not causing misspecification of the model, Ramsey’s RESET tests are applied. The null hypothesis of this test is specified below, and the result is presented in Table 2.

$$H_0: : Model has no omitted variables$$

After confirming the long-run association between the selected variables, the diagnostic tests were reviewed from ARDL lag estimates in both conditions. These tests include:

Table 3 RESET Test Output

S. N	Lag Length one		AIC Criteria as default	
	Real GDP	GDP PC	Real GDP	GDP PC
F Value	8.50	0.76	1.04	1.07
P Value	0.0004*	0.5271	0.4179	0.3831

*Rejection of Null Hypothesis

When the dependent variable is real GDP and lag length is selected one with uncorrelated serial correlation, the model has omitted the variable. Otherwise, in all conditions, the model has no omitted variables.

b) Heteroscedasticity test

One of the major assumptions about the residuals/errors in OLS regression is that the errors have the same variances or homodetic. When this assumption violates this assumption, there is the situation of heteroscedasticity. The null hypothesis of this test is as below, and the result is presented in Table 3.

$$H_0: : \text{Constat Variance}$$

Table 4 Heteroscedasticity Test

S. N	Lag Length one		AIC Criteria as default	
	Real GDP	GDP PC	Real GDP	GDP PC
Chi Sq	0.66	2.89	0.16	2.53
P Value	0.4160	0.0891	0.6901	0.1114

At a 5% significance level, the null hypothesis is not rejected. This denotes constant variation in all scenarios. Furthermore, disturbance terms are normally distributed, and there is no serial correlation with residual homoscedasticity, confirming that the model has the correct functional form.

c) Stability Test

In addition to these tests, the CUSUM of the recursive residuals is plotted, indicating that the model's parameters are relatively stable over time. Annexure-VII shows the CUSUM stability test results for the replication models in our study. This study's CUSUM test result when real GDP and GDP per capita are dependent variables is shown below.

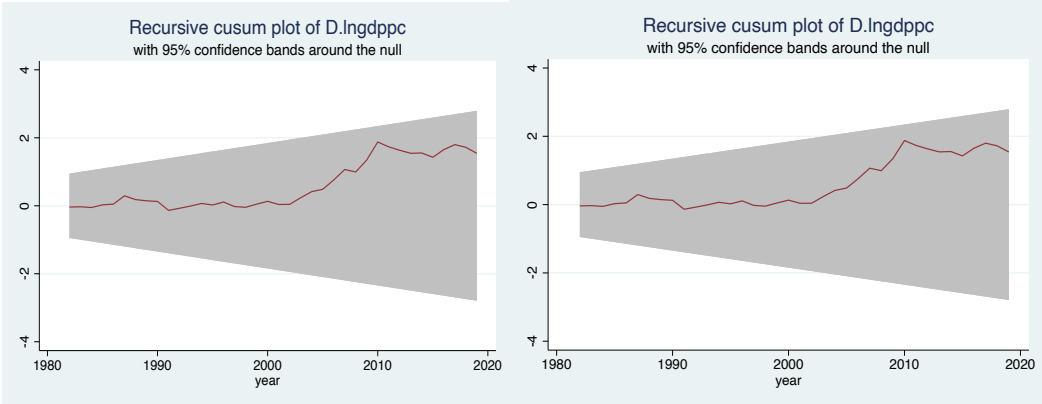


Figure 3 Plots of Cumulative Sum of recursive residuals

Figure 3 above represents the CUSUM plots tests when real GDP is the dependent variable and GDP Per capita is the dependent variable, respectively. At a 5 percent significance level, the figures do not exceed the critical limits in both cases. Therefore, this shows stability in the selected models.

4.2 Nature of Remittances Flow in Nepal

A small south Asian nation, Nepal, is receiving a high flow of remittances relative to the size of its economy. Annual remittance inflows to Nepal are estimated to be around USD 6.73 billion in 2015, up from USD 50 million in the early 1990s, with the ratio of remittance inflows to GDP rising to 32.2 percent from 2 percent. However, the economic reforms that have been aggressively implemented since the restoration of democracy in 1990 will not produce the desired results (Khadka, 1998). The following figure represents the relationship between the share of remittances on GDP and Nepal's GDP per capita growth.

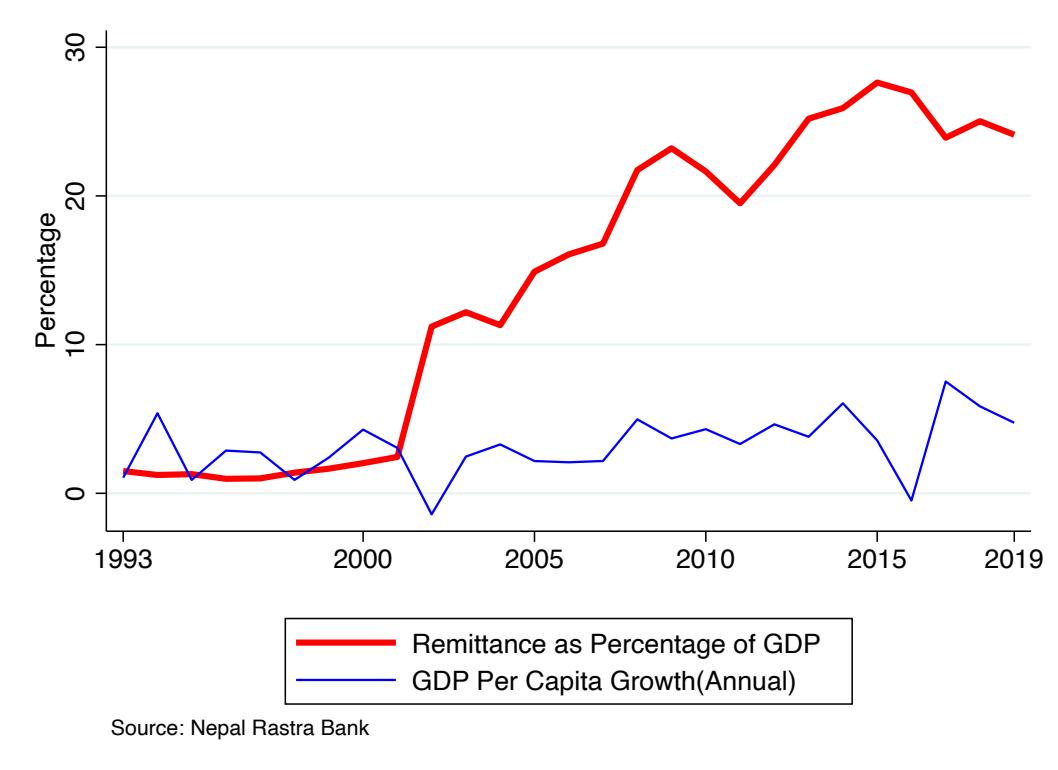


Figure 4 Nature of Remittance Flows in Nepal

The GDP per capita growth is not crossed double-digit in the previous four decades, but the remittances share of GDP is rising. In the above figure 5, in the fiscal

year 2015/16, the annual GDP per capita growth was -0.482, but remittance as a percentage of GDP during that period was around 26 percent, rising from 2014. Remittance income jumped to 14.3 percent in the year of the earthquake to reach USD 6.7 billion, clearly underscoring the value of remittances as a social safety net (WTO, 2019). When the country faces a macroeconomic shock, the remittance flow increases; migrants ensure their families back home against income shocks during difficulties, smoothing and supporting their consumption. In addition, Nepal experienced a devastating earthquake and poor economic growth, but the migrant remittance as a percentage of GDP has increased.

The figure reflects that in Nepal's context, remittances are behaving countercyclically. Mainly, it shows that whenever GDP per capita growth slackens, remittances as a proportion of GDP tend to upsurge in Nepal. With this, when the country was distressed, remittances flow increased in previous years. There was a civil war between 1996 and 2006, but remittance provided stable income support to many families so that a significant portion of the population got rid of absolute poverty. However, this relation does not deal with all the complexities involved in economies when we can witness the expected effects of government policies such as adjustment policy, devaluations, and adverse external conditions.

4.3 COVID-19 impact on Remittance Flow in Nepal

Nepal is a small landlocked nation that depends on remittance resources for different aspects, from household consumption to balancing trade. COVID-19 has had an enormous impact on Nepalese migrant workers. Due to COVID-19, In 2019/20, the

lowest recorded outmigration in Nepal was a 20% fall from the previous year (NPC, 2020). The World Bank had projected that remittance in Nepal would slide by more than 14% in 2020. Moreover, the renewal of work permits for migrant workers declined by 65 percent during the first seven months of 2020 (WB, 2021).

4.3.1 COVID-19 and Monthly Remittance flow

During the fiscal year 2019/20, the total remittance inflow was Rs. 591.19 billion; by mid-March of the fiscal year 2020/21, the total remittance inflow had increased by 8.6 percent to Rs. 642.14 billion (MoF, 2020). The monthly dataset from January 2081 to December 2021 is in Annexure IX. The graphical representation of the monthly remittance flow from January 2018 to December 2021 is presented in the following figure:

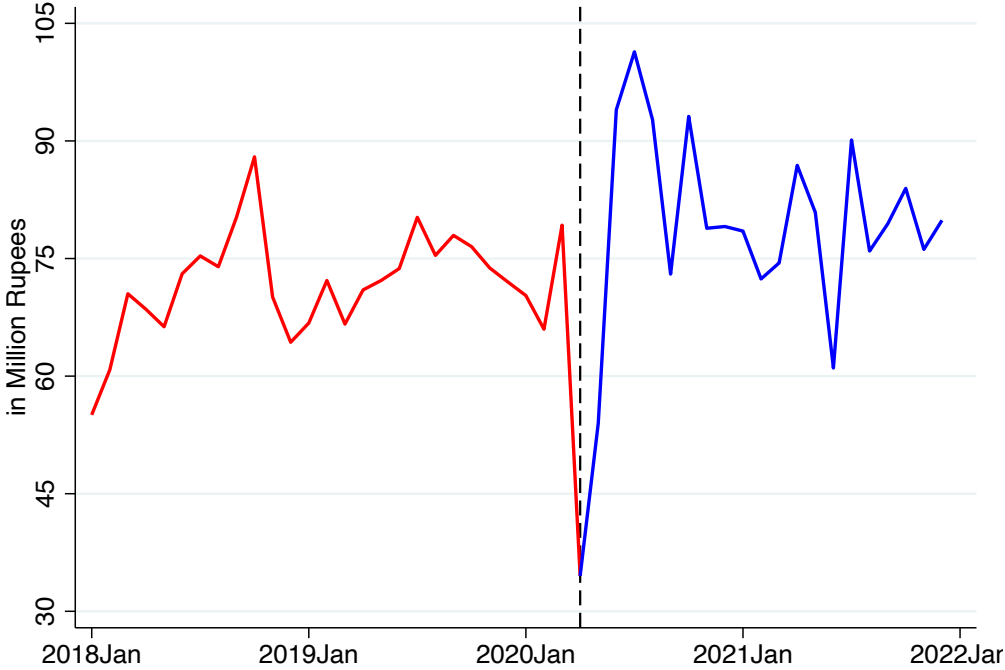


Figure 5 Monthly remittances flow before and after COVID-19 in Nepal

The pandemic started in December 2019. In the figure, we can observe that the remittance flow massively declined during the early phase of the pandemic. But the trend reversed immediately, and remittance inflow surged from the second month. Despite the rise in COVID-19 cases, the monthly remittance flow was increasing.

The Average monthly remittance in 2018 was 70 million Nepalese rupees; in 2019, 73 million, and in March 2020, around NPR 79 million. In April 2020, the government of Nepal introduced the first lockdown measure to control the spread of the pandemic, and remittance declined by around 56 percent and became around NPR 34 million. However, it rebounded immediately, became an all-time high NPR 101 million in June 2020, and surpassed the monthly average after June 2020. And, during the second lockdown in June 2021, remittance slightly declined. This can be pointed out in Figure 4 above. This shows that migrants tend to support family members who face day-to-day consumption, economic hardship, and health-related problems and continue sending money home.

4.3.2 Stringency Measures and Remittance Flows

Most countries adopted containment measures to break the COVID-19 pandemic chain. The OxCGRT used a stringency index to measure different kinds of activities. This Stringency takes values between 0 and 100. There were nine metrics used to calculate the stringency index. The metrics include school and public transport closure, workplace closure, public events cancellations, public gatherings, internal movement restrictions, stay-at-home requirements, general information campaigns, and

global travel controls. Due to these strict measures, there was slowness in business activities, thereby affecting the migration pattern.

Despite some migrants returning home, loosening jobs in destination countries, companies were closed, declined work permits, and the remittance money had increased in Nepal. The following figure represents the trend of remittances flows despite the high stringency index.

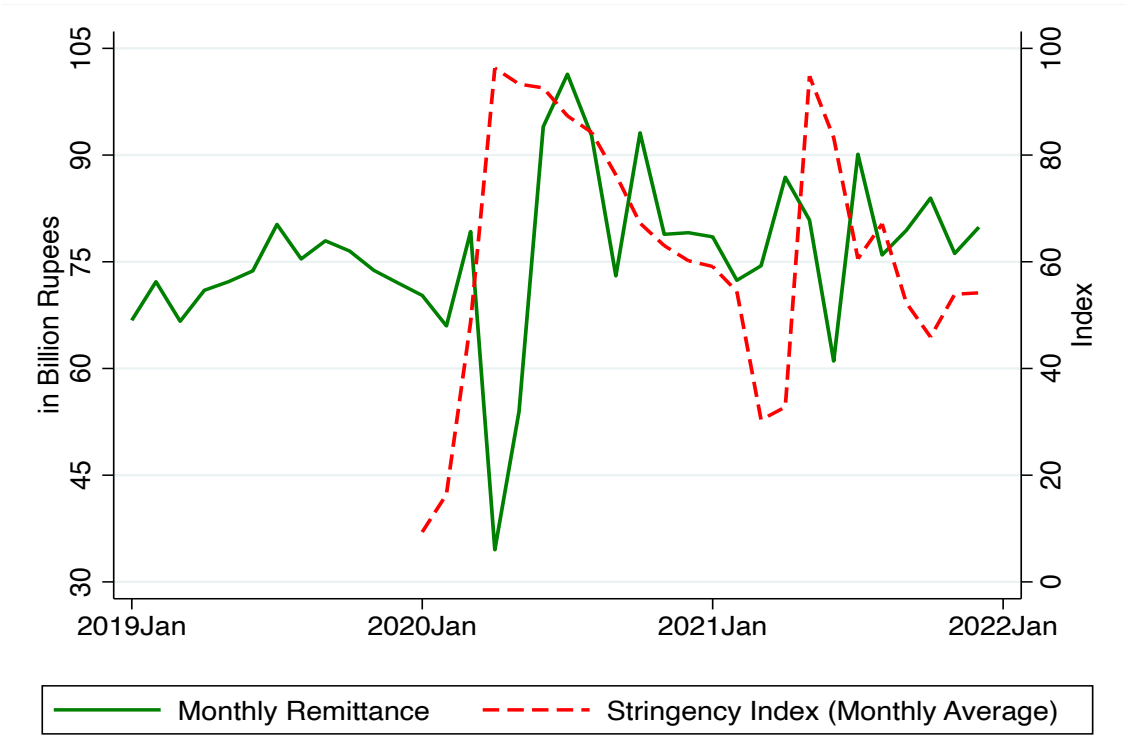


Figure 6 Stringency Index and Remittance inflow in Nepal

From above figure 3, we can see that remittances were significantly reduced when the home country's government introduced the nationwide lockdown and strict measures. In April 2020, the remittance inflow declined by 56.44 percent from the previous month's flow and became 34516.8 million rupees. However, despite the

restrictions, the declining trend ended within two months, and the remittance inflow upsurged. In figure 5, we can also notice a drop in remittance during the second lockdown measures in June 2021.

4.3.3 Interpretation of COVID-19 impact on Remittance flow

There may be multiple reasons behind the resilience of remittance inflows in developing countries during difficult times. From the above graphical representation, we can observe that remittance flow declined during the initial stage of the pandemic and under high stringent conditions. However, defying the odds, the declining trend ended soon and started to rise in remittance after two months. (Kpodar et al., 2021) presents a shift to formal channels from informal remittance channels due to travel restrictions and host countries' fiscal stimulus positively associated with the surge in remittance.

The initial decline in remittance was quite surprising. But, in developing countries, the remittance is mostly cash-based and needs to be present physically to withdraw money. For this, banking, financial institutions, and money transfer outlets must open. When there was a rise in COVID-19, the government implemented different containment measures to control the spread of the virus, and all kinds of financial services and outlets were closed. As a result, it may have dropped remittance initially.

However, the rise in remittance may be due to an altruistic motive to support family back home. A long time ago, (Lucas & Stark, 1985) “distinguished the role of altruism and self-interest in sending remittances and discovered the strong support of insurance motives for remittances from data collected in the African country Botswana

during the drought epidemic.” Similarly, (Shimada, 2011) postulated that “migrants remit for altruistic reasons to boost family members' consumption at home.” Household members in their home country are more likely to consume than invest if they are highly altruistic toward migrants. Remittances act as automatic stabilizers, smoothing consumption, and output, particularly in low-income families” (M. R. Chami et al., 2009).

So, it seems many Nepali migrants working in foreign countries support their families back in their home countries and continue sending remittances.

If remittance flow is more compensatory, that means if people send for altruistic reasons to help the families in their home country, it should be negatively correlated with the home country's GDP or countercyclical (M. R. Chami et al., 2009). In addition, (Ratha, 2007) provides evidence that " When the economy suffers from a natural disaster, political conflict, or financial crisis, remittances tend to increase in the recipient country. Remittances serve as an effective informal stabilization fund, and they tend to act countercyclically, increasing during times of distress in the receiving countries.”

(Frankel, 2009) also tested whether emigrants' remittances are countercyclical and found that “Remittances rise when the country of origin (the recipient of the remittances) is in relative recession and fall when the origin country's relative income is above-trend.” As the graphical presentation in figure 4 also confirms the countercyclical nature of remittance inflows in Nepal, we may pretend the rise of remittance during the COVID-19 pandemic is also to support the low-income families back in their home country.

In addition to this, "On a different edge, "despite record unemployment in remittances sending economies a significant increase in formal remittances in Mexico" (Dinarte et al., 2021). In such conditions, the fiscal measures used in the host nations to mitigate the crisis were effective in partly offsetting economic costs. (Chudik et al., 2021) postulated that "fiscal policy plays a key role in mitigating the effects of the pandemic." Regarding the COVID-19 scenario, (Kpodar et al., 2021) also claimed host countries introduced the fiscal stimulus that is positively associated with remittances as the economic impact of the pandemic was cushioned by the budgetary response.

Following the literature and observing the upward trend of remittance in the pandemic, remittance income is becoming invaluable support to Nepalese families when the home country is in trouble and facing a crisis. Figure 4 shows that remittance flow upsurged when Nepal faced a devastating earthquake in 2015. Figure 5, which represents the monthly remittance inflow during the COVID-19 pandemic, also demonstrated a rise in remittance when the home economy and families back home are facing trouble. So, the remittance flow during pandemic times worked as disaster relief to smooth consumption and compensate for income at home.

CHAPTER 5 CONCLUSIONS

The study attempted to investigate the relationship between worker remittances and macroeconomic variables from 1980 to 2019 and remittance flow during COVID-19 in Nepal. The ARDL model was used to determine the impact of remittances on growth. In addition, graphical analysis to determine monthly remittance inflow patterns during COVID-19 in Nepal is being investigated.

Various pull and push factors are responsible for Nepal's high migration trend and remittances. Initially, this study replicates the work of (Jebran et al., 2016) and (Makun, 2018) in determining the impact of remittances on economic growth. Then, using two different lag selection techniques, we tested our model with real GDP and GDP per capita as dependent variables.

There is a long-run economic relationship between the selected variables when using the (Makun, 2018) study model for our study. The study spans the years 1990 to 2019. In that study, the dependent variable was real GDP, and the explanatory variables were import, remittance, and Foreign Direct Investment. At a 5% significance level, there is a significant positive relationship between real GDP and remittances, imports, and foreign direct investment over the long term. However, it demonstrates a negative relationship between these variables in the short term.

There is no long-term economic relationship between the selected variables in Field's second replication study model (Jebran et al., 2016). In this model, with GDP per capita as the dependent variable, remittance has a positive relationship with the

longer period and a negative relationship with the shorter period. Still, the relationship is insignificant in both cases.

In two replication models, there were opposite results. There is a long-term cointegration when real GDP is dependent and other macroeconomic variables, but there is no cointegration between the selected variables when GDP per capita income is a proxy for economic growth.

Our study model analyzes both the scenarios, real GDP, and GDP per capita, as dependent variables with official development assistance (ODA), exports, domestic credit to private sectors, and workers' remittances as the explanatory variables.

First, no long-run cointegration exists when the optimum lag length is one, and real GDP is the dependent variable; all the variables are positively associated and insignificant except exports. In addition, other variables have a positive relationship in the long term except for remittance when GDP per capita is taken as a dependent. However, in a shorter time, all variables are insignificant.

In the same situation, real GDP is assumed to be dependent, and the Akaike information criterion (AIC) is used as the default to choose the lag size. The variables of interest have long-run cointegration. However, all the variables have an insignificant relationship. Furthermore, there are inconclusive results when we choose the lag length using Akaike information as default criteria and GDP per capita as a dependent. But remittance has a significant positive relationship with GDP per capita income in the longer term at a 5% significance level.

After that, the diagnostic test is conducted using Ramsey's RESET test, heteroscedasticity, and stability test. Except in the case when real GDP was dependent and lag length was one, all scenarios have no omitted variable under the RESET test. In all conditions, there is a constant variance of residuals. And the recursive CUSUM plot reflects that those models are stable.

In the second part of the study, the graphical representation reflects the rise in monthly remittance flow in Nepal when there is an increase in COVID-19 cases in the home country. In the initial stage, remittance inflow in Nepal declined, but it rebounded immediately and increased more than the monthly average. In addition, the remittances inflow was compared with the stringency condition of the home country. The graph confirms that there was an increase in remittance flow when there was a high stringency condition in Nepal.

The initial decline in remittances in Nepal may be due to the closure of banking and financial institutions in the home country. At the same time, with the rise in remittance during the pandemic, remittance income is becoming invaluable support to Nepalese families when the home country is in trouble and facing a crisis. We also observed the countercyclical nature of remittance in Nepal, and remittance flow upsurged when Nepal faced a devastating earthquake in 2015. In this study, the remittance flow during the pandemic time worked as disaster relief to smooth consumption and compensate for income at home.

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Web Sources for Data

1. <https://databank.worldbank.org/source/world-development-indicators>
2. <https://www.nrb.org.np/category/economic-bulletin/?department=red>
3. <https://covidtracker.bsg.ox.ac.uk/>
4. <https://covid19.who.int/>

ANNEXURES

Annexure I

The definition of variables is retrieved from World Development Indicators, World Bank (WB) and The Organization for Economic Co-operation and Development (OECD)

i. Real GDP (RGDP)

GDP is the sum of gross value added by all resident producers in the country plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. (WB)

ii. GDP Per Capita (GDPPC)

GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. (WB)

iii. Worker's Remittances

Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in-kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not residents and of residents employed by nonresident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal transfers and compensation of employees. (WB)

iv. Exports

Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. (WB)

v. Official Development Assistance (ODA)

Official development assistance (ODA) is defined as government aid that promotes and specifically targets the economic development and welfare of developing countries. (OECD)

vi. Domestic Credit to Private Sectors (DCP) as a percentage of GDP

Domestic credit to the private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit-taking corporations except for central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. (WB)

Annexure-II: (Pesaran et al., 2001) Critical Values at 1%, 5%, and 10%. (F Statistics)

Significance Level	Critical Value	
	Lower Bound	Upper Bound
1%	3.74	5.06
5%	2.86	4.01
10%	2.45	3.52

Annexure III: Replication of (Makun, 2018) Model to Nepal

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H0: no levels relationship

F = **16.298**

t = **-7.958**

. ardl lnrgdppp lnrmtp lnIMP lnFDIP, lags (1) ec btest

ARDL(1,1,1,1) regression

Sample: 1997 thru 2019, but with a gap Number of obs = 15
R-squared = 0.9380
Adj R-squared = 0.8760
Log likelihood = 54.62379 Root MSE = 0.0093

D.lnrgdppp	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
ADJ						
lnrgdppp						
L1.	-1.274845	.1602055	-7.96	0.000	-1.653671	-.896019
LR						
lnrmtp	.0210914	.0042126	5.01	0.002	.0111303	.0310526
lnIMP	.2906412	.0052971	54.87	0.000	.2781156	.3031668
lnFDIP	.0119458	.0030504	3.92	0.006	.0047327	.019159
SR						
lnrmtp						
D1.	-.0829052	.0317187	-2.61	0.035	-.1579079	-.0079024
lnIMP						
D1.	-.1526522	.0418079	-3.65	0.008	-.2515122	-.0537923
lnFDIP						
D1.	-.0146904	.0032748	-4.49	0.003	-.022434	-.0069467
_cons	4.928132	.6143693	8.02	0.000	3.475379	6.380884

Annexure V: Real GDP (Producer's Price) as the dependent variable

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H0: no levels relationship

F = **0.473**

t = **-1.019**

. ardl lnrgdppp lnrmr lnODA lnexport lnDCP, lags (1) ec btest

ARDL(1,1,1,1,1) regression

Sample: 1981 thru 2019 Number of obs = 39
R-squared = 0.4450
Adj R-squared = 0.2727
Log likelihood = 104.8274 Root MSE = 0.0191

D.lnrgdppp	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
ADJ						
lnrgdppp L1.	-.0867271	.0851138	-1.02	0.317	-.2608043	.0873502
LR						
lnrmr	.0615305	.0777366	0.79	0.435	-.0974586	.2205196
lnODA	.0029602	.2030019	0.01	0.988	-.4122253	.4181458
lnexport	.0207654	.0908489	0.23	0.821	-.1650415	.2065723
lnDCP	.4586548	.3983184	1.15	0.259	-.3559978	1.273307
SR						
lnrmr D1.	-.0040649	.0160632	-0.25	0.802	-.0369177	.028788
lnODA D1.	-.0107258	.0140137	-0.77	0.450	-.039387	.0179353
lnexport D1.	.0494803	.0123027	4.02	0.000	.0243184	.0746422
lnDCP D1.	-.0047205	.0326648	-0.14	0.886	-.0715276	.0620865
_cons	.436552	.3755122	1.16	0.254	-.3314567	1.204561

Annexure-VII: Real GDP as dependent variables and AIC as default criteria

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H0: no levels relationship

F = 6.707

t = -0.543

. ardl lnrgdppp lnrmr lnODA lnexport lnDCP, aic ec btest

ARDL(3,3,4,4,4) regression

Sample: 1984 thru 2019

Number of obs = 36

R-squared = 0.9416

Adj R-squared = 0.8429

Root MSE = 0.0084

Log likelihood = 139.20143

D.lnrgdppp	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
ADJ						
lnrgdppp						
L1.	-.0425706	.0783994	-0.54	0.596	-.2119421	.126801

LR						
lnrmr	.3041065	.4658052	0.65	0.525	-.7022045	1.310417
lnODA	-.2575092	.7157968	-0.36	0.725	-1.803894	1.288876
lnexport	.7754595	1.412857	0.55	0.592	-2.276831	3.82775
lnDCP	-1.048616	2.484641	-0.42	0.680	-6.416356	4.319125
SR						
lnrgdppp						
LD.	-.1381265	.1498553	-0.92	0.373	-.4618692	.1856162
L2D.	-.4535584	.15159	-2.99	0.010	-.7810487	-.1260681
lnrmr						
D1.	.0048551	.0098607	0.49	0.631	-.0164477	.0261578
LD.	-.015445	.0100133	-1.54	0.147	-.0370774	.0061873
L2D.	-.0301037	.0102792	-2.93	0.012	-.0523107	-.0078968
lnODA						
D1.	.0391371	.014864	2.63	0.021	.0070254	.0712489
LD.	.0703211	.0136609	5.15	0.000	.0408085	.0998337
L2D.	.050503	.011797	4.28	0.001	.0250172	.0759889
L3D.	.0719521	.0107965	6.66	0.000	.0486277	.0952764
lnexport						
D1.	.0450255	.0097473	4.62	0.000	.0239676	.0660833
LD.	-.0351666	.0119239	-2.95	0.011	-.0609267	-.0094065
L2D.	-.0113673	.011765	-0.97	0.352	-.0367841	.0140494
L3D.	.0158659	.0093795	1.69	0.115	-.0043973	.036129
lnDCP						
D1.	.0077968	.0234839	0.33	0.745	-.042937	.0585306
LD.	.1373816	.0319026	4.31	0.001	.0684601	.206303
L2D.	-.0652989	.0271414	-2.41	0.032	-.1239343	-.0066634
L3D.	-.0356907	.0201243	-1.77	0.100	-.0791665	.0077852
_cons	.1336904	.3503203	0.38	0.709	-.6231305	.8905113

Annexure VIII GDP Per capita as dependent variables, and AIC as default criteria

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H0: no levels relationship

F = **3.459**

t = **-2.832**

. ardl lngdppc lnrmr lnODA lnexport lnDCP , aic ec btest

ARDL(1,2,0,0,2) regression

Sample: 1984 thru 2019

Number of obs = 36

R-squared = 0.4796

Adj R-squared = 0.2995

Log likelihood = 53.415183

Root MSE = 0.0646

D.lngdppc	Coefficient	Std. err.	t	P> t	[95% conf. interval]	
ADJ						
lngdppc						
L1.	-.1685504	.0595143	-2.83	0.009	-.2908839	-.0462169
LR						
lnrmr	.4639043	.1720745	2.70	0.012	.1102002	.8176085
lnODA	-.4604226	.3005742	-1.53	0.138	-1.078262	.1574166
lnexport	-.2809142	.1697995	-1.65	0.110	-.6299421	.0681137
lnDCP	.701499	.6152029	1.14	0.265	-.5630687	1.966067
SR						
lnrmr						
D1.	-.037156	.0514673	-0.72	0.477	-.1429487	.0686366
LD.	-.1022209	.0515952	-1.98	0.058	-.2082763	.0038345
lnDCP						
D1.	-.0360426	.1154286	-0.31	0.757	-.2733096	.2012244
LD.	.2402431	.1213325	1.98	0.058	-.0091595	.4896457
_cons	1.054677	.3238277	3.26	0.003	.3890401	1.720315

Annexure IX: Monthly Remittance Inflow January 2018 to December 2021

Year	Month	Amount in NPR '000	Year	Month	Amount in NPR '000
2018	Jan	55062.8	2020	Jan	70273.5
2018	Feb	60805.6	2020	Feb	65986.0
2018	Mar	70506.4	2020	Mar	79252.8
2018	Apr	68521.5	2020	Apr	34516.8
2018	May	66303.1	2020	May	53971.8
2018	Jun	73051.0	2020	Jun	93977.6
2018	Jul	75327.6	2020	Jul	101368.5
2018	Aug	73954.2	2020	Aug	92714.7
2018	Sep	80247.7	2020	Sep	73018.3
2018	Oct	87969.8	2020	Oct	93125.8
2018	Nov	70087.2	2020	Nov	78861.5
2018	Dec	64323.5	2020	Dec	79085.9
2019	Jan	66773.3	2021	Jan	78503.4
2019	Feb	72199.7	2021	Feb	72394.1
2019	Mar	66636.7	2021	Mar	74438.4
2019	Apr	70996.6	2021	Apr	86882.6
2019	May	72201.1	2021	May	80869.9
2019	Jun	73722.4	2021	Jun	61041.4
2019	Jul	80254.9	2021	Jul	90118.5
2019	Aug	75401.5	2021	Aug	75959.7
2019	Sep	77949.9	2021	Sep	79414.5
2019	Oct	76510.5	2021	Oct	83947.8
2019	Nov	73798.2	2021	Nov	76166.6
2019	Dec	72019.7	2021	Dec	79871.0

Source: Nepal Rastra Bank (Central Bank of Nepal), 2022