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## Remittance inflows, institutional quality, and economic growth in Nepal

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**ADB Working Paper Series**

**REMITTANCE INFLOWS, INSTITUTIONAL QUALITY,  
AND ECONOMIC GROWTH IN NEPAL**

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**Abstract**

This study examines the impact of remittance inflows on the economic growth of Nepal using annual time series data spanning from 1993 to 2020. Moreover, it investigates the moderating role of institutional quality in this relationship. The analysis adopts the bound test approach of the cointegration and error correction model (ECM) within the autoregressive distributed lag model (ARDL) framework. The findings reveal a significant and positive influence of remittance inflows on Nepal's economic growth, despite their primary use being for consumption. Additionally, institutional quality is found to have a significant and positive association with economic growth. To support long-term economic growth, policymakers are recommended to enhance the productive utilization of remittances and strengthen institutional quality. However, it is important to note that the combined effect of remittance inflows and institutional quality may have a dampening impact on long-run economic growth, emphasizing the need for policymakers to cultivate synergy between remittance inflows and institutional development.

**Keywords:** remittance inflows, institutional quality, economic growth, ARDL

**JEL Classification:** C22, E51, F24, O43

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## 1. INTRODUCTION

Nepal as a lower-middle-income economy had a GNI per capita of 1,090 US dollars in 2019. A significant portion of its population, approximately 28.6%, lives in multidimensional poverty, and the majority of its people are still engaged in subsistence farming. The manufacturing sector in Nepal was adversely affected by the domestic civil war that took place from 1996 to 2006, leading many young individuals to seek employment opportunities abroad. As a result, around 2.2 million Nepalese currently reside outside the country, primarily as migrant workers. The civil war and subsequent outward migration have resulted in a decline in Nepal's industrial strength and agricultural productivity. Consequently, remittances from migrants have become a crucial source of income for households, impacting not only the country's economic activities but also the livelihoods of its people.

One positive aspect of remittances is that the money sent directly benefits the families of the migrants, helping to alleviate poverty and reduce future uncertainties (Adams and Page 2005; Giuliano and Ruiz-Arranz 2009). Remittances contribute to stabilizing aggregate output by increasing demand and consumption, promoting human capital through investments in health and education, and fostering entrepreneurship by transferring technical skills, knowledge, and seed capital (Acosta, Lartey, and Mandelman 2009; Chami, Hakura, and Montiel 2009; Azizi 2018; Kakhkharov 2019). Furthermore, remittances aid economic growth through capital formation (Lartey 2013). Existing studies indicate that 80% of remittances are used for daily consumption, followed by loan repayments, household property purchases, education expenses, capital formation activities, and other purposes in Nepal (Sapkota 2013). However, as a remittance-reliant economy, the inflows of remittance have led to an increase in imports and a deterioration of the trade balance due to a weak manufacturing sector in Nepal (Bhatta 2013). On the other hand, remittance inflows have been criticized for their potential negative effects on macroeconomic indicators and household activities in Nepal (Sapkota 2013). These negative impacts include increased consumption of imported goods, trade deficits, brain drain leading to a decline in innovation, and decreased competitiveness in the global market due to exchange rate appreciation. Moreover, high outward migration can lead to a shortage of skilled labor, resulting in higher wage rates and production costs (Beine, Docquier, and Rapoport 2001; Amuedo-Dorantes and Pozo 2004; Özden and Schiff 2006; Docquier, Lohest, and Marfouk 2007). Thus, outward migration and significant remittance inflows in developing countries like Nepal can have both positive and negative consequences (Sapkota 2013). In the context of Nepal, some studies argue that remittances are crucial for stabilizing household income, reducing poverty and inequality, and increasing the disposable income of low-income households (Acharya and Leon-Gonzalez 2012; Wagle 2012; Sapkota 2013). Remittances have also played a critical role in maintaining macroeconomic stability in Nepal (Shrestha 2008). However, others claim that an increase in remittances has had a negative impact on GDP per capita due to a lack of investment allocation in Nepal (Upreti 2017; Dhungel 2018).

In considering the existing literature, it is evident that previous studies have not adequately addressed the stabilizing effect of remittance inflows on consumption, which is a crucial factor for long-term economic growth in Nepal. Therefore, our research seeks to address this gap by examining how remittance income contributes to economic growth in Nepal.

In addition to the impact of remittances, there is a debate regarding the interconnection among remittances, institutions, and economic growth. A significant body of scholarly work has concluded that institutions play a vital role in determining the effect of remittance inflows on a recipient country's economic growth (Singh et al. 2011; Bettin and Zazzaro 2012). Strong institutional systems can channel remittance income into productive sectors and investments. Conversely, a surge in remittance inflows can lead to decreased loyalty toward the government among recipients, potentially resulting in the substitution of government goods with private alternatives. Such a scenario may contribute to citizen disengagement and facilitate corrupt activities by the government (Abdih et al. 2008).

Over the past three decades, Nepal has undergone several institutional changes. After more than two centuries of royal regime, political power shifted to political parties in 1991, accompanied by economic privatization and liberalization. In 2015, Nepal implemented a new constitution, establishing a federal system. Concurrently, the country has become highly dependent on remittances, which account for more than 27% of its total GDP since 2010. Hence, our second research question is aimed at exploring the role of institutional quality in mitigating the Dutch-disease effects of remittances in Nepal.

Existing studies on remittances in Nepal have primarily focused on poverty, inequality, household consumption, and economic growth at the micro and macro levels. However, these studies fail to capture the direct effects of remittance inflows and institutional quality on Nepal's economic growth using time series data. Therefore, our study aims to fill this gap by employing a dynamic estimation model. Firstly, we assess the direct impact of remittances on Nepal's economic growth. Subsequently, we examine how institutional quality acts as an intermediary factor, enhancing the efficiency of remittance inflows for economic growth in Nepal.

Our study contributes to the existing literature by examining the impact of remittance inflows on Nepal's economic growth using rigorous econometric methods. We find robust evidence that remittance inflows and institutional quality individually have a positive and significant effect on economic growth in Nepal. However, we uncover an interesting finding regarding the role of institutional quality in moderating this relationship. Specifically, we find that institutional quality has a negative and significant influence on the impact of remittances on economic growth, indicating a diminishing intermediation effect of institutions. Based on these findings, we emphasize policies for promoting productive utilization of remittance inflows, strengthening institutions, and fostering synergy between remittances and institutions with a view to long-term economic growth in Nepal.

The remaining part of this study is structured as follows: Section 2 offers a comprehensive review of the existing empirical literature; Section 3 outlines the data and variables utilized in the study; Section 4 elaborates on the econometric methods and empirical models employed; Section 5 presents the empirical findings and accompanying discussions; and lastly, Section 6 concludes the paper by providing policy recommendations based on the study's outcomes.

## **2. REVIEW OF EMPIRICAL LITERATURE**

The existing body of literature extensively argues that remittance inflows have a significant impact on economic development and poverty alleviation in receiving countries. Numerous studies have explored the various transmission channels through which remittances influence the economic activities of recipient economies. These

channels include investment and human capital formation (Sobiech 2019; Cazachevici, Havranek, and Horvath 2020).

One of the key findings in the literature is that remittances serve as an important external source of finance for many developing countries. By mitigating credit constraints and stimulating investment, remittances contribute positively to economic growth (Giuliano and Ruiz-Arranz 2009). This infusion of funds into the economy has the potential to address financing gaps, promote entrepreneurship, and foster the development of small and medium-sized enterprises (Amuedo-Dorantes and Pozo 2006; Woodruff and Zenteno 2007). Additionally, during times of economic recession, remittances can play a crucial role in bolstering domestic consumption. By increasing disposable income, remittances help alleviate the impact of depressed aggregate demand on the local economy (Yang and Choi 2007). Moreover, in countries where the credit market is weak, remittances can contribute to investment, particularly in areas such as education, housing, healthcare, and business development (Mundaca 2009; Aggarwal, Demirgüç-Kunt, and Pería 2011). This long-term investment in human capital and infrastructure can have positive spillover effects on economic growth.

However, it is important to consider the potential downsides of remittance inflows. One notable concern is the increase in imports that often accompanies a rise in remittances. As recipient households experience higher incomes, their consumption patterns may shift toward imported goods, leading to trade imbalances (Barajas et al. 2009). Moreover, the outmigration of skilled labor can have adverse consequences for the domestic economy in the long run, resulting in brain drain and a shortage of human capital (Beine, Docquier, and Rapoport 2001; Ratha 2005; Acosta, Lartey, and Mandelman 2009). These factors can potentially hinder economic development and sustainability. Some studies have shown that heterogeneity exists in the relationship between remittance and economic growth. The pattern of utilizing remittance income on investment activities varies across the economies, which explains the impact of remittance on long-term economic growth (Francois et al. 2022).

Furthermore, the impact of remittances on economic growth is contingent on the strength of the transmission channels and the quality of institutions within the recipient country. Weak transmission channels can lead to adverse behavioral effects, such as conspicuous consumption and unproductive investments in nontradable sectors, which ultimately hamper economic growth (Chami, Fullenkamp, and Jahjah 2005). Consequently, some studies have found a negative relationship between remittance inflows and economic growth (Chami, Fullenkamp, and Jahjah 2005; Barajas et al. 2009; Rao and Hassan 2011).

Institutions play a vital role in channeling remittance inflows towards productive sectors. The quality of institutions, encompassing aspects such as governance, corruption control, government effectiveness, and property rights protection, significantly influences the mobilization of remittances and their impact on growth (Catrinescu et al. 2009). Strong institutions foster a favorable environment for economic activities, promoting investment, capital mobility, and market-friendly policies (Sabir, Rafique, and Abbas 2019). Various institutional quality components play an important role in enhancing macroeconomic resilience in developing economies (Beirne and Panthi 2022). Improved regulatory mechanisms, effective government policies, and political stability can help control corruption and minimize investment risks, thus encouraging the positive utilization of remittance inflows (Abdih et al. 2012).

The extent of institutional quality also determines the ability of a country to mobilize both external and internal resources effectively. On the other hand, a consistent flow of remittances may positively influence the development of democratic institutions,



highlighting the interplay between remittances and political institutions (Williams 2017). Moreover, the strength of political, economic, and legal institutions, such as the level of corruption, government policies and programs, law enforcement ability, political stability and peace, regulation quality, and accountability, are key components that determine the capacity to mobilize external and internal resources (Barajas et al. 2009; Singh et al. 2011). Thus, the synergy between remittance inflows and the quality of domestic institutions can enhance economic growth (Imad 2017). Some studies have argued that higher remittance inflows can cause deterioration of institutional quality. The surge in remittance inflows can lead to decreased loyalty towards the government among recipients, potentially resulting in the substitution of government goods with private alternatives. However, this phenomenon could be country-specific as some countries improve institutions through remittances as it provides a long-term external source of funds facilitating macroeconomic stability and improves democratic institutions as well (Williams 2017).

An efficient institutional environment not only facilitates the productive utilization of remittance inflows but also contributes to the growth of the financial sector. The intermediation of remittances through financial institutions can lead to increased bank deposits and available credit, further promoting economic activities (Sobiech 2019). Therefore, examining the intermediary effects of institutional qualities in remittance-reliant economies can provide insights into the effectiveness of remittance inflows on economic growth activities.

Shifting the focus to the Nepalese economy, empirical studies have shed light on the specific impacts of remittances in this context. Pant (2011) points out that remittances have played a significant role in reducing poverty, improving living standards, and supporting education at the household level, including access to higher education (Thieme and Wyss 2005). Furthermore, remittance inflows have contributed to a decrease in horizontal inequality across Nepal due to outmigration occurring from various regions of the country. Remitted funds even reach rural and remote areas, as well as lower castes and ethnic groups, thereby reducing disparities (Wagle 2012).

In the Nepalese context, remittances have emerged as the primary source of foreign exchange reserves, consistently maintaining a surplus in the balance of payments (Sapkota 2013; Pant and Budha 2016). However, it is worth noting that remittances have also impacted the country's export competitiveness negatively. Labor shortages, wage rate increases, and exchange rate appreciation have posed challenges to the export sector, leading to a rapid trade deficit (Bhatta 2013; Sapkota 2013).

Nonetheless, the income generated by migrants has created employment opportunities and fostered the emergence of new entrepreneurs at the community level. Research suggests that the rapid outward migration from Nepal has had adverse effects on agricultural yield due to labor shortages (Tuladhar, Sapkota, and Adhikari 2014). However, other studies argue that remittance-receiving households exhibit a higher level of productivity in the agricultural sector as they can invest in modern agricultural inputs (Kapri and Ghimire 2020). Notably, these studies have yet to consider the buffering effect of institutional quality on the relationship between remittances and economic growth.

In summary, the literature supports the notion that remittance inflows have the potential to contribute significantly to economic development and poverty alleviation. However, the outcomes depend on various factors, including the strength of transmission channels, the quality of institutions, and the specific context of the recipient country. In the case of Nepal, remittances have played a vital role in reducing poverty, improving living standards through stabilized consumption, and addressing horizontal inequalities. However, challenges such as trade deficits and labor shortages need to be addressed.

Additionally, further research is needed to explore the role of institutional quality as a mediator of the relationship between remittances and economic growth in Nepal.

### 3. DATA AND VARIABLES

#### 3.1 Data

This study uses annual time series data from 1993 to 2020. Data other than institutional quality components are obtained from the World Bank's World Development Indicators (WDIs). Six components of institutions are obtained from Worldwide Governance Indicators (WGIs). This time frame was selected because Nepal experienced numerous sociopolitical and economic changes during this period. As mentioned earlier, the Nepalese economy initiated financial reform and adopted a liberalization and privatization policy in the late 1980s. At the same time, from 1996 to 2006, the nation faced political instability and domestic violence. However, after 2006, the country was able to rebuild its institutions. Since the political transition after the end of the civil war was prolonged, the economy gradually shifted from a subsistence agricultural-based economy to a remittance-based economy during this period.

#### 3.2 Variables

##### 3.2.1 Remittance Inflows

Remittance inflows (REM) are the key explanatory variable in this study, which is measured as the inward personal remittance ratio to GDP. It consists of transfers of an individual or employee's income and compensation to their home country.

##### 3.2.2 Economic Growth

We measure economic growth using the real GDP per capita (GDPPC) constant at 2015 US dollar. This study follows Mankiw's (1995) neoclassical economic growth model to examine the long-term relationship. Economic growth for one year is expressed as:

$$\Delta \ln GDPPC_t = \ln GDPPC_t - \ln GDPPC_{t-1} \quad (1)$$

in which  $\ln GDPPC$  is the natural logarithm of per capita real GDP (2015 US dollar), and  $t$  represents the time series observations.

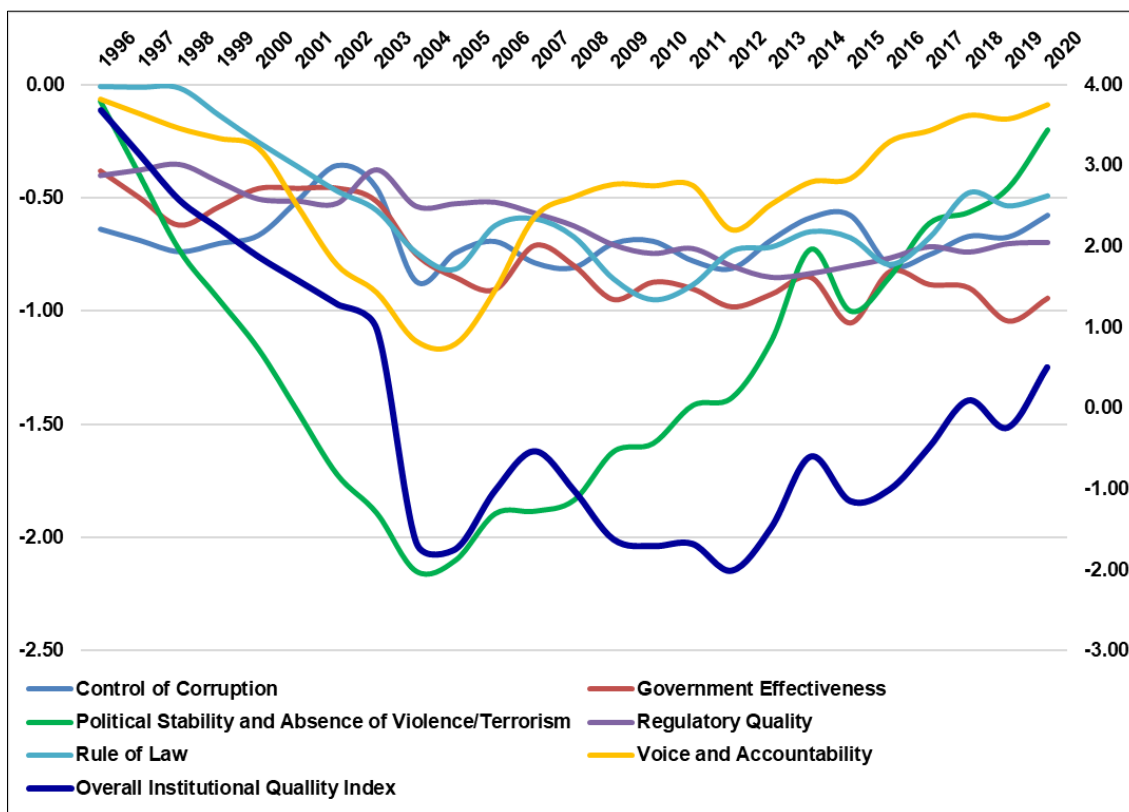
##### 3.2.3 Institutional Quality Index

Following Demetriades and Law (2006), this study employs a set of six governance indicators sourced from the World Governance Indicators (WGIs) to gauge institutional quality in Nepal. These indicators encompass various dimensions, such as corruption control, government effectiveness, regulatory quality, rule of law, voice, and accountability, along with political stability and the absence of violence and terrorism. Each indicator provides valuable insights into different aspects of governance, including the impact of corruption on investment, the ability of the government to implement policies, the effectiveness of regulations, the strength of the legal system, responsiveness to public voices, and the level of political stability and peace.

The original institutional quality indicators are scaled from  $-2.5$  to  $+2.5$  (see Figure 1, left axis). According to the WGI database, higher values refer to better institutional quality and vice versa. The observations for the fiscal years 1997, 1999, and 2001 are

unavailable. Therefore, linear interpolation is being practiced, fulfilling those missing observations for all six indicators before calculating the final institutional index. The final institutional index is obtained by using principal component factor analysis (PCA) of these six sub-indicators. The original series of these six indicators are scaled from -2.5 to +2.5, with a total score of 5. Therefore, we added 5 to the PCA score and divided it by 10 to convert the score from 0 to 1 (see Figure 1, right axis). Appendix 2 presents the institutional quality index's eigenvectors of principal component factor analysis (PCA).

**Figure 1: Institutional Quality of Nepal**



Source: Authors' creation using data from the WGI, World Bank.

### 3.2.4 Other Control Variables

The study incorporates several standard control variables to capture important factors influencing economic growth. Gross domestic savings (GDS) serves as an indicator of long-term growth and stability, reflecting its significant role in explaining economic growth. Trade openness (TRD), measured by the value of merchandise trade (import plus export), represents the magnitude of the real sector and its influence on domestic growth. The size of the government is considered through the general government's final consumption expenditure, providing insights into the budgetary dimension of economic growth. To account for price distortions, the annual rate of GDP deflator is used as a measure of inflation (INF).

To ensure comparability, all variables are measured as ratios to GDP except inflation. To normalize the data, a natural logarithm transformation is applied, allowing for the examination of individual coefficients as elasticities. The selected variables, their symbols, and concise definitions are provided in Table 1, while Appendix 1 showcases

the trend of these variables at their level values. Notably, remittance income experienced a surge after 2002, coinciding with the peak of the domestic civil war, as many individuals migrated abroad, particularly to Gulf countries like Malaysia, Qatar, the UAE, and Saudi Arabia. This period witnessed a significant impact on economic growth. However, following the reconstruction efforts after Nepal's devastating earthquake and the promulgation of new constitutions in 2015, outward migration and remittance inflows began to decline.

**Table 1: List of Variables, Their Indication, and Short Definition**

Variables	Indicator	Definition
Economic Growth	lnGDPPC	Natural logarithm of GDP per capita (constant at 2015 US\$)
Remittance Inflows	lnREM	Natural logarithm of personal remittances received (ratio to GDP)
Institutional Quality	lnINS	Natural logarithm of the institutional quality index (0 to 1)
Control Variable: 1	lnGDS	Natural logarithm of gross domestic savings (ratio to GDP)
Control Variable: 2	lnTRD	Natural logarithm of merchandise trade (ratio to GDP)
Control Variable: 3	lnGOV	Natural logarithm of general government final consumption expenditure (ratio to GDP)
Control Variable: 4	lnINF	Inflation, GDP deflator (annual rate)
Economic Growth Dummy	DumEG	Dummy variable to represent an economic crisis (Binary value of 0 and 1)

Source: Authors' collection from WDIs, World Bank.

## 4. ECONOMETRIC METHODS AND EMPIRICAL MODELS

This study aims to investigate the impact of remittance inflows on economic growth and analyzes the intermediation function of institutional quality using dynamic regression models. First, to confirm the presence of cointegration and establish the long-run level relationship, the bound test approach within the autoregressive distributed lag (ARDL) model framework developed by Pesaran and Shin (1998) and Pesaran, Shin, and Smith (2001) is utilized. Second, the short-run causality is examined using the error correction model (ECM) under the ARDL model. The speed of adjustment towards long-run equilibrium is assessed by analyzing the sign and significance of the one period-lagged error correction term, denoted as ECT (-1).

### 4.1 Bound Test Approach under ARDL Model

The analytical framework known as the ARDL model is widely used for investigating the association between a dependent variable and independent regressors in various time series scenarios. By incorporating both current and lagged values of the regressors, the ARDL model allows for the analysis of contemporaneous and historical cases. The ARDL model utilizes ordinary least squares (OLS) regression equations and applies to time series variables of different natures, including stationary, nonstationary, and mixed. Moreover, it incorporates an F-test to assess the presence of long-run form and cointegration and offers a concise linear transformation to derive a short-run dynamic error correction and establish a long-run equilibrium (Shrestha and Bhatta 2018).

Our study's first model investigates the relationship between economic growth and remittance inflows in Nepal. Real GDP per capita serves as the dependent variable, while the remittance inflows ratio to GDP, institutional quality, and other control variables are

explanatory variables. The estimation model, expressed under the ARDL p, q, r, s, t, u, v framework, is as follows:

$$\begin{aligned} \Delta \ln GDPPC_t = & \alpha + \sum_{i=1}^p \lambda_{1i} \Delta \ln GDPPC_{t-i} + \sum_{j=0}^q \lambda_{2j} \Delta \ln REM_{t-j} + \\ & \sum_{k=0}^r \lambda_{3k} \Delta \ln INS_{t-k} + \sum_{l=0}^s \lambda_{4l} \Delta \ln GDS_{t-l} + \sum_{m=0}^t \lambda_{5m} \Delta \ln TRD_{t-m} + \\ & \sum_{n=0}^u \lambda_{6n} \Delta \ln GOV_{t-n} + \sum_{o=0}^v \lambda_{7o} \Delta \ln INF_{t-o} + \delta_1 \ln GDPPC_{t-1} + \\ & \delta_2 \ln REM_{t-1} + \delta_3 \ln INS_{t-1} + \delta_4 \ln GDS_{t-1} + \delta_5 \ln TRD_{t-1} + \\ & \delta_6 \ln GOV_{t-1} + \delta_7 \ln INF_{t-1} + \gamma DumEG_t + \varepsilon_t \end{aligned} \quad (2)$$

in which  $\Delta \ln GDPPC$  is the first-differenced value of real GDP per capita as a measure of economic growth.  $\ln REM$  and  $\ln INS$  are the indicators of the remittance inflows ratio to GDP and institutional quality.  $\ln GDS$ ,  $\ln TRD$ ,  $\ln GOV$ , and  $\ln INF$  are the control variables.  $\lambda_1 - \lambda_7$  provides the short-run coefficients and  $\delta_1 - \delta_7$  provides the long-run coefficients.  $DumEG$  is a dummy variable of economic growth used to control the effects of a structural break as a fixed regressor, which is a binary number of zero until the break year 2001 and one after the break year, i.e., 2002. The automatically selected optimum number of lags based on Akaike's (1974) information criterion (AIC) is represented by p, q, r, s, t, u, v.

Our second yet main model assumes that institutional quality is an intermediation channel of remittance inflows to economic growth. Therefore, this study examines economic growth as a function of the joint product of remittance inflows and institutional quality. Real GDP per capita serves as the dependent variable, while the remittance inflows ratio to GDP, institutional quality, their interactions, and other control variables are explanatory variables. The estimation model, expressed under the ARDL p, q, r, s, t, u, v, w framework, is as follows:

$$\begin{aligned} \Delta \ln GDPPC_t = & \alpha + \sum_{i=1}^p \lambda_{1i} \Delta \ln GDPPC_{t-i} + \sum_{j=0}^q \lambda_{2j} \Delta \ln REM_{t-j} + \sum_{k=0}^r \lambda_{3k} \Delta \ln INS_{t-k} + \\ & \sum_{l=0}^s \lambda_{4l} \Delta (\ln REM \times \ln INS)_{t-l} + \sum_{m=0}^t \lambda_{5m} \Delta \ln GDS_{t-m} + \sum_{n=0}^u \lambda_{6n} \Delta \ln TRD_{t-n} + \\ & \sum_{o=0}^v \lambda_{7o} \Delta \ln TRD_{t-o} + \sum_{p=0}^w \lambda_{8p} \Delta \ln INF_{t-p} + \delta_1 \ln GDPPC_{t-1} + \delta_2 \ln REM_{t-1} + \\ & \delta_3 \ln INS_{t-1} + \delta_4 (\ln REM \times \ln INS)_{t-1} + \delta_5 \ln GDS_{t-1} + \delta_6 \ln TRD_{t-1} + \\ & \delta_7 \ln GOV_{t-1} + \delta_8 \ln INF_{t-1} + \gamma DumEG_t + \varepsilon_t \end{aligned} \quad (3)$$

in which  $\Delta \ln GDPPC$  is the first-differenced value of real GDP per capita as a measure of economic growth.  $\ln REM$  and  $\ln INS$  are the indicators of the remittance inflows ratio to GDP and institutional quality. The interaction term between remittance inflows and institutional quality is expressed as  $\ln REM \times \ln INS$  to examine their joint effect on

economic growth.  $\lnGDS$ ,  $\lnTRD$ ,  $\lnGOV$ , and  $\lnINF$  are the control variables.  $\lambda_1 - \lambda_8$  provides the short-run coefficients and  $\delta_1 - \delta_8$  provides the long-run coefficients.  $DumEG$  is a dummy variable of economic growth used to control the effects of a structural break as a fixed regressor, which is a binary number of zero until the break year 2001 and one after the break year, i.e., 2002. The automatically selected optimum number of lags based on Akaike's (1974) information criteria (AIC) is represented by  $p, q, r, s, t, u, v, w$ .

The presence of a long-term relationship or cointegration is determined using the bound test approach. Both the model equations under ARDL specification are deterministic with unrestricted constant and no trend. By comparing the F-statistic to the upper-bound critical value, we establish the collective significance of the regressor coefficients in the long-run cointegration. Upon confirming the cointegrating relationship between the dependent variable and independent regressors, Equations (2) and (3) assume the following expression in terms of level relationship:

$$\lnGDPPC_t = \alpha + \delta_1 \ln REM_t + \delta_2 \ln INS_t + \delta_3 \ln GDS_t + \delta_4 \ln TRD_t + \delta_5 \ln GOV_t + \delta_6 \ln INF_t + \varepsilon_t \quad (4)$$

$$\lnGDPPC_t = \alpha + \delta_1 \ln REM_t + \delta_2 \ln INS_t + \delta_3 (\ln REM_t \times \ln INS_t) + \delta_4 \ln GDS_t + \delta_5 \ln TRD_t + \delta_6 \ln GOV_t + \delta_7 \ln INF_t + \varepsilon_t \quad (5)$$

in which  $\lnGDPPC$  is the level value of real GDP per capita.  $\ln REM$  and  $\ln INS$  are the indicators of the remittance inflows ratio to GDP and institutional quality. The interaction term between remittance inflows and institutional quality is expressed as  $\ln REM \times \ln INS$  to examine their joint long-run effect on GDP per capita.  $\ln GDS$ ,  $\ln TRD$ ,  $\ln GOV$ , and  $\ln INF$  are the control variables.  $\delta_1 - \delta_7$  provides the long-run coefficients.

## 4.2 Error Correction Model (ECM) under the ARDL Model

When a cointegrating relationship is present between two variables, it implies the existence of either unidirectional or bidirectional causality (Engle and Granger 1987). Consequently, this study proceeds to verify the causality between proxies of remittance inflows, institutional quality, and economic growth using the error correction model (ECM). The ECM analysis focuses on three key variables: proxies of remittance inflows, institutional quality, and the proxy of economic growth. Thus, the ECM equations of Equations (2) and (3) under ARDL for the short-run relationship take the following forms:

$$\begin{aligned} \Delta \ln GDPPC_t = & \alpha + \sum_{i=1}^p \lambda_{1i} \Delta \ln GDPPC_{t-i} + \sum_{j=0}^q \lambda_{2j} \Delta \ln REM_{t-j} + \\ & \sum_{k=0}^r \lambda_{3k} \Delta \ln INS_{t-k} + \sum_{l=0}^s \lambda_{4l} \Delta \ln GDS_{t-l} + \sum_{m=0}^t \lambda_{5m} \Delta \ln TRD_{t-m} + \\ & \sum_{n=0}^u \lambda_{6n} \Delta \ln GOV_{t-n} + \sum_{o=0}^v \lambda_{7o} \Delta \ln INF_{t-o} + \lambda_8 ECT1_{t-1} + \varepsilon_t \end{aligned} \quad (6)$$

$$\begin{aligned} \Delta \ln GDPPC_t = & \alpha + \sum_{i=1}^p \lambda_{1i} \Delta \ln GDPPC_{t-i} + \sum_{j=0}^q \lambda_{2j} \Delta \ln REM_{t-j} + \\ & \sum_{k=0}^r \lambda_{3k} \Delta \ln INS_{t-k} + \sum_{l=0}^s \lambda_{4l} \Delta (\ln REM \times \ln INS)_{t-l} + \\ & \sum_{m=0}^t \lambda_{5m} \Delta \ln GDS_{t-m} + \sum_{n=0}^u \lambda_{6n} \Delta \ln TRD_{t-n} + \sum_{o=0}^v \lambda_{7o} \Delta \ln GOV_{t-o} + \\ & \sum_{p=0}^w \lambda_{8p} \Delta \ln INF_{t-p} + \lambda_9 ECT2_{t-1} + \varepsilon_t \end{aligned} \quad (7)$$

in which  $\Delta$  denotes the first-differenced value. The coefficients  $\lambda_1$ – $\lambda_9$  capture the short-term dynamics. The selection of the number of lags  $p, q, r, s, t, u, v, w$  is determined automatically using Akaike's (1974) information criteria (AIC). The terms  $ECT1_{t-1}$  and  $ECT2_{t-1}$  represent the lagged values of the error correction terms. Notably, the coefficient associated with the one period-lagged error correction term (ECT) confirms the presence of long-run causality and specifies the speed at which adjustments toward equilibrium occur.

## 5. EMPIRICAL RESULTS AND DISCUSSIONS

### 5.1 Descriptive Statistics

Table 2 shows the descriptions of the variables. All indicators except for institutional quality (INS) have 28 years of observations (1993 to 2020). The maximum real GDP per capita is around 1,070 US dollars, and the minimum is 464. Significant changes exist in the proxies of remittance inflows and institutional quality index over the period. The maximum remittance inflows are 27.63% and a minimum of 0.98% of GDP. The institutional quality index also varies over the period. The maximum value of the institutional quality index is 0.87, and the minimum is 0.30. The extent of trade openness ranges from 36.22% to 64.04% of GDP. The highest recorded inflation rate (GDP deflator) stands at 26.68%, while the lowest is 3.07% throughout the observed period. This indicates that although Nepal experienced several sociopolitical fluctuations during the aforementioned time frame, the economy did not encounter severe inflationary or deflationary pressures. Hence, the results obtained from the model estimation using these specific variables offer valuable insights into the relationship between remittance

inflows, institutional quality, and economic growth in Nepal.

**Table 2: Summary of Statistics**

Detail	GDPPC	REM	INS	GDS	TRD	GOV	INF
Mean	698.94	14.54	0.50	10.92	47.97	8.74	7.73
Median	637.54	16.43	0.45	10.71	46.19	8.67	7.12
Maximum	1,069.79	27.63	0.87	15.66	64.04	10.78	26.68
Minimum	464.25	0.98	0.30	3.64	36.22	7.53	3.07
Std. Dev.	183.45	10.14	0.17	3.03	6.60	0.72	4.88
Observations	28	28	25	28	28	28	28

Source: Authors' calculations.

## 5.2 Correlation Matrix

As presented in Table 3, the remittance inflows ratio to GDP positively correlates with real GDP per capita by 78%. However, institutional quality exhibits a negative correlation of 49% with real GDP per capita. A negative and high correlation of 82% exists between two critical variables, namely remittance inflows and institutional quality, which is used as an interaction term. This can create multicollinearity issues. To identify these concerns, the Lagrange Multiplier (LM) test is employed. Additionally, other factors like gross domestic savings, trade openness, and inflation rate demonstrate a negative association with real GDP per capita.

**Table 3: Correlation Matrix**

Correlation	lnGDPPC	lnREM	lnINS	lnGDS	lnTRD	lnGOV	lnINF
lnGDPPC	1.00						
lnREM	0.78	1.00					
lnINS	-0.49	-0.82	1.00				
lnGDS	-0.35	-0.54	0.44	1.00			
lnTRD	-0.55	-0.83	0.78	0.67	1.00		
lnGOV	-0.36	-0.18	0.05	0.20	0.26	1.00	
lnINF	-0.02	0.05	-0.33	-0.10	-0.18	0.18	1.00

Source: Authors' calculations.

## 5.3 Test of Stationarity

In this analysis, multivariate time series data are employed within the framework of ARDL estimation. The unique aspect of the ARDL model is its ability to handle variables with different levels of integration, allowing for a combination of stationary and nonstationary variables. However, all variables must exhibit the same level of integration when considering their first-differenced values (Pesaran, Shin, and Smith 2001). Therefore, the stationary and nonstationary characteristics of the series are assessed using three commonly employed unit root test methods: the Augmented Dickey and Fuller (1979) (ADF) test, the Phillips and Perron (1988) (PP) test, and the Kwiatkowski et al. (1992) (KPSS) test.



Table 4 presents a summary of the results from the unit root tests, considering two distinct model specifications. The first model solely incorporates intercepts, while the second model includes both trends and intercepts. The findings reveal that the selected variables exhibit a combination of properties, with some displaying stationary and others showing nonstationary when measured at their level values. However, all variables demonstrate stationary when observed in their first-differenced values within the intercept specification. These outcomes confirm that the variables share the same order of integration at their first-differenced value, denoted as  $I(1)$ . Consequently, these results offer compelling evidence to employ the ARDL bound test method.

**Table 4: Summary of Unit Root Test**

Variables	Test Method	Intercept Only		Trend and Intercept	
		Level	First Difference	Level	First Difference
lnGDPPC	ADF-Fisher t-Stat	-2.976	-4.444***	-1.707	-4.341**
	PP-Fisher adj. t-Stat	0.476	-4.066***	-1.563	-3.875**
	KPSS LM-Stat	0.665*	0.180***	0.170*	0.113***
lnREM	ADF-Fisher t-Stat	-1.121	-4.546***	-0.953	-4.670***
	PP-Fisher adj. t-Stat	-1.121	-4.546***	-1.065	-4.666***
	KPSS LM-Stat	0.567*	0.212***	0.147*	0.121**
lnINS	ADF-Fisher t-Stat	-1.988	-4.021***	-1.045	-4.933***
	PP-Fisher adj. t-Stat	-1.977	-3.944***	-0.533	-8.190***
	KPSS LM-Stat	0.401**	0.417**	0.186*	0.479
lnGDS	ADF-Fisher t-Stat	-3.576**	-5.681***	-4.159	-5.648***
	PP-Fisher adj. t-Stat	-3.589**	-10.274***	-4.179	-9.454***
	KPSS LM-Stat	0.505*	0.216***	0.207*	0.183*
lnTRD	ADF-Fisher t-Stat	-1.714	-4.816***	-3.294	-4.721***
	PP-Fisher adj. t-Stat	-1.741	-4.532***	-2.948	-4.154**
	KPSS LM-Stat	0.432*	0.128***	0.125**	0.105***
lnGOV	ADF-Fisher t-Stat	-2.561	-4.921***	-2.612	-4.826***
	PP-Fisher adj. t-Stat	-2.657	-4.932***	-2.612	-4.840***
	KPSS LM-Stat	0.154*	0.057***	0.097	0.057***
lnINF	ADF-Fisher t-Stat	-3.502**	-8.244***	-3.435	-8.134***
	PP-Fisher adj. t-Stat	-3.587**	-8.516***	-3.525	-8.897***
	KPSS LM-Stat	0.111***	0.107***	0.112***	0.104***

Notes: \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

## 5.4 Determining Structural Breaks

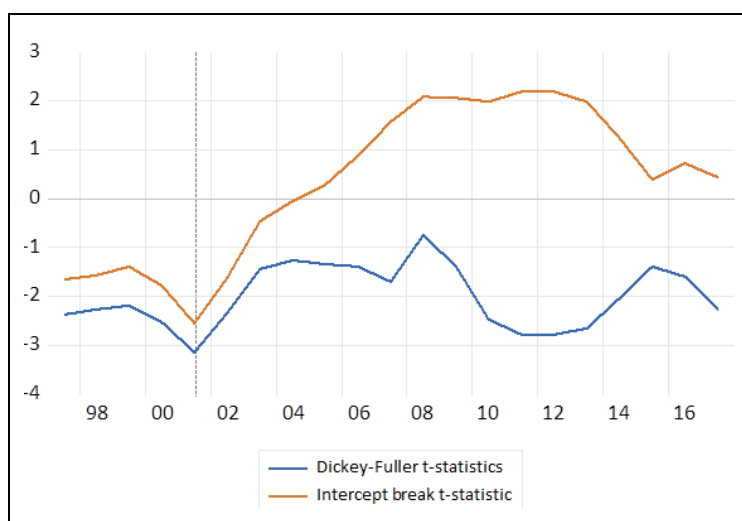
As mentioned previously, the domestic civil war in Nepal between 1996 and 2006 had a considerable impact on the country's economy. Despite implementing a liberalization policy, the manufacturing sector faced challenges in achieving satisfactory growth. Thus, it becomes imperative to investigate whether Nepal experienced notable disruptions in its overall economic performance. Consequently, this study delves into examining the presence of significant structural breaks in the economic growth proxy, specifically real GDP per capita. Employing the intercept t-statistics developed by Qu and Perron (2007), we detect the structural break years of real GDP per capita.

**Table 5: Intercept Breaks of Economic Growth**

Null Hypothesis: lnGDPPC has a unit root		Trend Specification: Trend and intercept	
Break Specification: Intercept only		Break Type: Innovational outlier	
Break Date: 2001		Break Selection: Minimize intercept break t-statistic	
Lag Length: 0 (Automatic – based on Akaike information criterion, maximum lag = 2)			
		<b>t-Statistic</b>	<b>Prob.*</b>
Augmented Dickey-Fuller test statistic		-3.134	0.630
Test critical values:	1% level	-5.151	
	5% level	-4.644	
	10% level	-4.376	

Source: Authors' calculations.

**Figure 2: Minimum Intercept Break t-Statistics of Economic Growth**



Source: Authors' adaptation from EViews 13.

Values in Table 5 and the graph reaching the lowest point in Figure 2 suggest a structural break in economic growth in 2001. The graph shows that Nepal’s economic downfall (negative growth) and political insurgency reached a peak in 2001 due to a domestic civil war, causing a lack of confidence among consumers and investors, and the government also struggled to boost capital expenditure.

### 5.5 ARDL Bound Test Cointegration Results

Table 6 presents ARDL-bound test results. In Equations (2) and (3), the analysis examines the relationship between the dependent variable (real GDP per capita, as a proxy for economic growth) and the independent regressors, remittance inflows, and institutional quality. The obtained F-statistics value surpasses the upper bound, suggesting a long-run association between the ratio of remittance inflows to GDP and economic growth. Additionally, when incorporating both remittance inflows and institutional quality, along with their interaction terms, as independent regressors, the calculated F-statistics value once again exceeds the upper bound. Consequently, the results of the bound tests affirm the co-movement of remittance inflows, institutional quality, and real GDP per capita in Nepal over the long term. These findings indicate the

presence of at least one directional causality between real GDP per capita, remittance inflows, and institutional quality.

**Table 6: ARDL Bound Test for the Existence of a Level Relationship**

Model	Dependent Variable	Regressors	ARDL (AIC)	F-Stat.	Lower and Upper Bound Value						Outcomes
					10%		5%		1%		
					I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	
1	lnGDPPC	lnREM lnINS lnGDS lnTRD lnGOV lnINF DumEG*	(1,1,1,1,0,0,1)	5.427	2.12	3.23	2.45	3.61	3.15	4.43	Cointegrated
2	lnGDPPC	lnREM lnINS lnREMxlnINS lnGDS lnTRD lnGOV lnINF DumEG*	(1,1,1,0,1,0,0,0)	7.837	2.03	3.13	2.32	3.50	2.96	4.26	Cointegrated

Notes: \* represents fixed regressors.

Source: Authors' calculations.

## 5.6 Long-Run Estimation Results

Upon establishing the existence of a cointegrating relationship between the proxies of remittance inflows and institutional quality and economic growth, we proceeded to estimate the long-run level relationship based on Equations (4) and (5). The outcomes of the long-run estimation, with the dependent variable representing the level value of real GDP per capita (lnGDPPC), are presented in Table 7.

In both Model 1 and Model 2, lnREM has a positive coefficient that is statistically significant at the 1% level. This suggests that an increase in the remittance inflows ratio to GDP is associated with a higher level of real GDP per capita (lnGDPPC). This finding indicates that remittances can play a positive role in promoting economic growth.

In Model 1, lnINS does not show statistical significance, whereas, in Model 2, lnINS has a positive and statistically significant coefficient at the 1% level. This implies that higher institutional quality is associated with a higher level of real GDP per capita (lnGDPPC). Transparent and accountable institutions can provide a conducive environment for economic activity and contribute to sustained economic growth.

In Model 2, the interaction term between lnREM and lnINS is included and has a negative and statistically significant coefficient at the 1% level. This suggests that the combined effect of remittance inflows and institutional quality has a dampening effect on real GDP per capita. This finding indicates that although remittances and institutional quality individually contribute to economic growth, their joint effect may result in a trade-off or a more complex relationship. In other words, the complementary relationship between remittance inflows and institutional quality also suggests that increasing remittance inflows may have deteriorating effects on the institutional quality of Nepal. This finding highlights the critical role of institutional quality in moderating the economic growth effects of remittance inflows in Nepal.

Furthermore, the impact of trade openness on real GDP per capita is found to be insignificant. This could potentially be attributed to Nepal's import-based economic characteristics. On the other hand, gross domestic savings demonstrate a positive influence on economic growth. Additionally, the ratio of government final consumption expenditure, serving as a proxy for the size of the government relative to GDP, exhibits a negative and significant effect on the economic growth of Nepal.

**Table 7: Long-Run Estimation Results for Economic Growth**

Lag selection method: Akaike info criterion (AIC, Automatic)		
Sample: 1993–2020		
Dependent Variable:	lnGDPPC	lnGDPPC
Sample:	1993–2020	1993–2020
Selected Lags:	(1, 1, 1, 1, 0, 0, 1)	(1, 1, 1, 0, 1, 0, 0, 0)
Variable	Model 1	Model 2
lnREM	0.664*** (0.108)	0.428*** (0.077)
lnINS	0.311 (0.191)	1.513*** (0.312)
lnREM×lnINS		−0.981*** (0.236)
lnGDS	0.291* (0.136)	0.376*** (0.086)
lnTRD	0.816 (0.467)	0.041 (0.263)
lnGOV	−1.197*** (0.363)	−1.021*** (0.209)
lnINF	0.208** (0.090)	0.058 (0.040)
LM Test: F-Stat. (Prob.)	2.050 (0.183)	2.411 (0.152)
Ramsay Test: F-Stat. (Prob.)	1.516 (0.246)	0.006 (0.942)
Included observations	24	24

Notes: \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10%, respectively. Standard errors are in parenthesis.

Source: Authors' calculations.

## 5.7 Short-Run Estimation Results

To analyze the short-run dynamics between remittance inflows and economic growth, we employ the error correction model (ECM) as expressed in Equations (6) and (7). This model allows us to capture partial adjustment behavior and estimate short-run elasticities. The selection of optimal lags for estimation is crucial in determining the short-run coefficients in the ECM. In this study, we limit the optimum lags to 1, determined through an examination of each variable's optimum lags using the standard VAR method.<sup>1</sup>

The estimation results, presented in Table 8, reveal the relationship between the first-differenced value of real GDP per capita ( $\Delta \ln \text{GDPPC}$ ) as the dependent variable and first-differenced values of remittance inflows, institutional quality index, their interaction term, and other control variables as independent regressors. The findings indicate a positive impact of remittance inflows on real GDP per capita in the short run, suggesting their short-run elasticity to economic growth. Similarly, institutional quality demonstrates a positive influence on real GDP per capita in the short run, signifying its short-run elasticity to economic growth. That said an increase in remittance inflows and institutional quality enhances economic growth in the short term within Nepal.

<sup>1</sup> The results of optimum lag selection criteria under standard VAR for each variable are available upon request.

However, the interaction between remittance inflows and the overall institutional quality index does not exhibit short-run effects due to null lags under ARDL. This implies that institutions do not immediately respond to the short-term impact of remittance inflows in driving economic growth in Nepal. Moreover, the results suggest that gross domestic savings are likely to impact real GDP per capita positively in the short run. Additionally, the fixed regressor representing the dummy variable for economic growth (DumEG) is included to examine the impact of the civil war. The findings indicate a negative and significant relationship between political transition and economic growth.

**Table 8: Short-Run Estimation Results for Economic Growth**

<b>Dependent Variable:</b>	<b><math>\Delta \ln \text{GDPPC}</math></b>	<b><math>\Delta \ln \text{GDPPC}</math></b>
Sample:	1993–2020	1993–2020
Fixed Regressors:	DumEG	DumEG
Selected Lags:	(1, 1, 1, 1, 0, 0, 1)	(1, 1, 1, 0, 1, 0, 0, 0)
<b>Variable</b>	<b>Model 1</b>	<b>Model 2</b>
Constant	0.183*** (0.022)	0.416*** (0.040)
$\Delta \ln \text{REM}$	0.027*** (0.009)	0.023*** (0.006)
$\Delta \ln \text{INS}$	0.001 (0.010)	0.149*** (0.016)
$\Delta \ln \text{GDS}$	0.048*** (0.004)	0.064*** (0.004)
$\Delta \ln \text{INF}$	0.008** (0.003)	
DumEG	-0.034*** (0.005)	-0.042*** (0.004)
ECT (-1)	-0.092*** (0.012)	-0.125*** (0.012)
R-squared	0.923	0.949
Adjusted R-squared	0.896	0.935
SE of regression	0.003	0.003
Sum squared resid.	0.000	0.000
Log-likelihood	106.672	111.570
F-statistic	34.007	66.805
Prob(F-stat)	0.000	0.000
Akaike info criterion	-8.306	-8.797
Durbin-Watson stat.	2.540	2.776
No. of observations	24	24

Notes: \*\*\*, \*\*, and \* indicate significance at 1%, 5%, and 10%, respectively. Standard errors are in parenthesis.

Source: Authors' calculations.

Finally, the statistically significant coefficient of the one-year lagged error correction term confirms the cointegrating relationship between economic growth, remittance inflows, institutional quality, and other control variables. The negative and significant coefficient of the one-period lagged error correction term, observed in both Model 1 (0.092) and Model 2 (0.125), indicates a notable speed of adjustment towards long-run convergence following a shock.

## 6. CONCLUSION AND POLICY RECOMMENDATION

In conclusion, this study makes a valuable contribution to understanding the relationship between remittance inflows and economic growth in Nepal, while also examining the role of institutional quality in their relationship. By utilizing annual time series data spanning from 1993 to 2020 and employing the cointegration and error correction model (ECM) within the autoregressive distributed lag model (ARDL) framework, this analysis provides robust insights into these dynamics. The results of this study highlight the significant impact of remittance inflows and institutional quality on Nepal's economic growth. Furthermore, the study explores whether institutional quality enhances the effect of remittance inflows on economic growth. Importantly, the findings emphasize the substantial role played by both remittance inflows and institutional quality in driving long-term GDP per capita growth in Nepal.

The analysis reveals that remittance inflows have a positive and significant influence on economic growth, despite their primary utilization in consumption activities. This suggests that remittances contribute to economic growth through various channels, such as the expansion of the service sector and the stabilization of consumption patterns. These findings shed light on the important role of remittance inflows in driving economic growth in Nepal.

However, the study suggests that redirecting remittances towards investments, rather than solely focusing on consumption, would have an even more substantial effect on economic growth. This highlights the importance of implementing policies and mechanisms that encourage and facilitate the productive utilization of remittances. By directing a portion of remittances towards investments, such as entrepreneurship and business ventures, Nepal can harness its full potential to stimulate economic growth, create employment opportunities, and enhance overall productivity.

Furthermore, the study underscores the significant positive impact of institutional quality on Nepal's economic growth. Strengthening institutions, including improving governance, promoting the rule of law, and enhancing regulatory frameworks, is essential to create a conducive environment for economic activities and attract investments. Policymakers should prioritize long-term institutional reforms that address issues such as corruption, bureaucratic inefficiencies, and regulatory bottlenecks. By improving the quality and effectiveness of institutions, Nepal can enhance business confidence, facilitate the implementation of public policies, and foster an environment conducive to sustainable economic growth.

It is worth noting that there is a negative relationship between institutional quality and the impact of remittances on economic growth. This suggests that as institutional quality improves, its influence as an intermediary lowers the impact of remittance inflows on economic growth. Policymakers must carefully manage this interaction, ensuring that institutional development complements the positive effects of remittances. Effective coordination between remittance utilization strategies and institutional reforms is crucial to maximize the benefits of both factors and minimize any potential adverse effects.

In summary, this study highlights several policy recommendations for Nepal to unlock the full potential of remittances and foster sustained economic growth. These include promoting the productive utilization of remittances through investment, strengthening institutional quality, maintaining political stability, establishing an efficient financial system, combating corruption, and enforcing the rule of law. By adopting these measures, Nepal can create a favorable environment for long-term economic growth, enhance productivity and competitiveness, and pave the way for a prosperous future and sustainable development.

**Disclosure of Conflict of Interest**

There is no potential conflict of interest.

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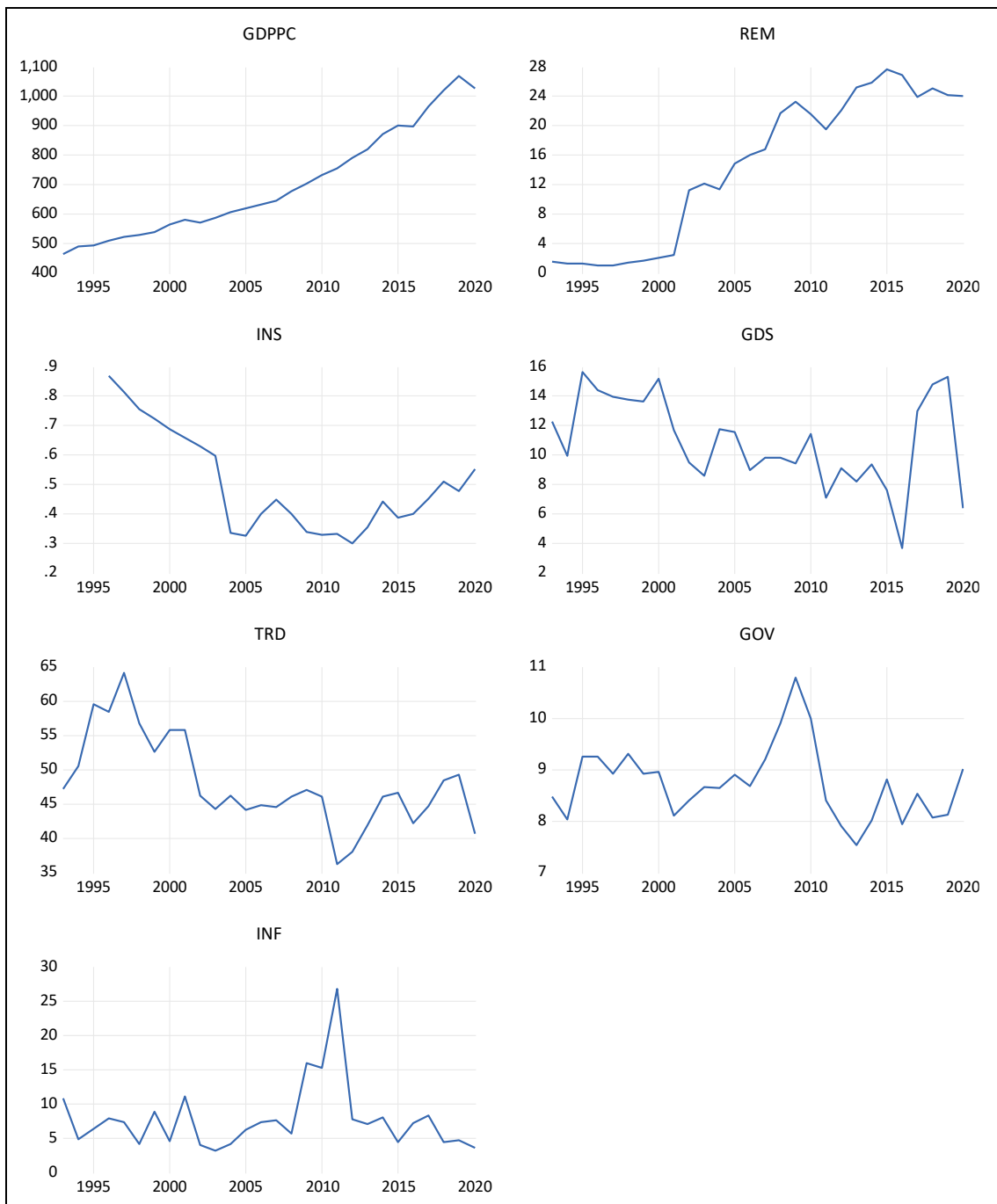


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## APPENDIX 1: GRAPHICAL REPRESENTATIONS OF SELECTED VARIABLES



Source: Authors' adaptation from EViews 13, using WDIs, World Bank data.

## APPENDIX 2: EIGENVALUES, EIGENVECTORS, AND CORRELATIONS OF PRINCIPAL COMPONENT FACTOR ANALYSIS (PCA)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	2.78	0.80	0.46	2.78	0.46
2	1.97	1.08	0.33	4.75	0.79
3	0.90	0.70	0.15	5.65	0.94
4	0.20	0.10	0.03	5.84	0.97
5	0.10	0.03	0.02	5.94	0.99
6	0.06	–	0.01	6.00	1.00

Eigenvectors (loadings):						
Variable	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6
CC	0.25	–0.12	0.94	–0.11	0.16	–0.02
PSAV	0.30	0.59	0.06	–0.22	–0.44	0.56
GE	0.49	–0.33	–0.03	0.74	–0.29	0.16
RQ	0.44	–0.40	–0.29	–0.39	0.47	0.42
RL	0.57	0.04	–0.16	–0.33	–0.27	–0.68
VA	0.28	0.60	–0.06	0.36	0.64	–0.14

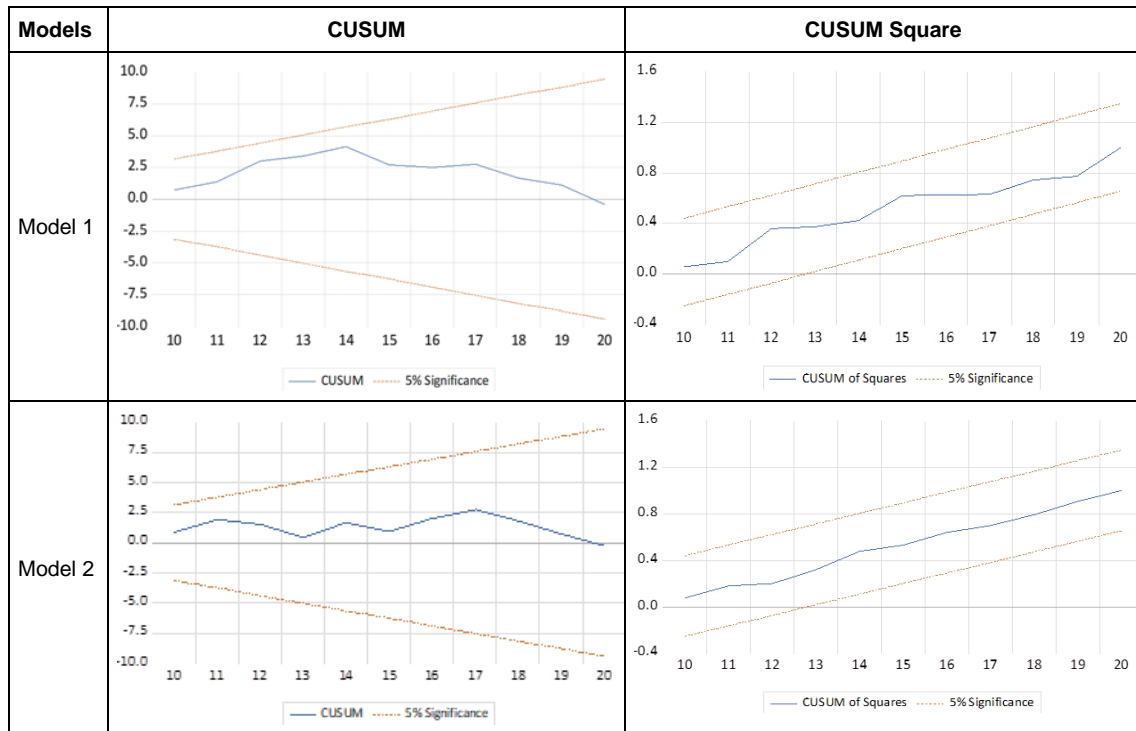
  

Ordinary correlations:						
	CC	PSAV	GE	RQ	RL	VA
CC	1.00					
PSAV	0.11	1.00				
GE	0.37	0.01	1.00			
RQ	0.18	–0.10	0.81	1.00		
RL	0.26	0.53	0.71	0.71	1.00	
VA	0.00	0.89	0.02	–0.12	0.47	1.00

Note: CC: Control of Corruption; PSAV: Political Stability and Absence of Violence/Terrorism; GE: Government Effectiveness; RQ: Regulatory Quality; RL: Rule of Law; VA: Voice and Accountability.

Source: Authors' adaptation from EViews 13.

## APPENDIX 3: PLOTS OF CUSUM AND CUSUM SQUARE TESTS



Source: Authors' adaptation from EViews 13.