

Contribution of Remittances to GDP: Case of Nepal

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Introduction

The act of sending money, usually by migrants, to family members or other individuals in their home country is referred to as a "remittance". These monies are typically transferred, often over national borders, using a variety of methods, including banks, money transfer services, and online platforms.

Countries that typically receive remittances are often developing or less economically developed nations. These countries often have significant numbers of citizens working abroad, either temporarily or permanently, and sending money back to their families or societies. Remittances are particularly vital for countries where there is a large migrant community living and working abroad, such as many countries in South Asia, Latin America, and parts of other continent of the world.

Remittances play a crucial role in the lives of individuals and societies around the world which offers significant benefits to both recipients and the community at large. Basically remittance is directly helpful in economic support, poverty alleviation, healthcare, education, economic development, social and economic stability, investment, and economic stability. For example, any individuals and families receiving remittances will provide essential financial support to them. Such income can be used to cover basic needs such as food, shelter, education, and healthcare, thereby improving living standards and overall well-being.

Particularly, remittances are a lifeline for many households in developing countries, helping to alleviate poverty by supplementing income and providing a safety net during times of economic hardship. They can contribute to reducing the prevalence of extreme poverty and improving economic resilience.

As mentioned above, remittances often support investments in education and healthcare, enabling families to afford school fees, books, uniforms, and medical expenses. This, in turn, can lead to improved human capital development, better health outcomes, and increased opportunities for social mobility.

Among others, remittance has a direct relationship with economic development. The remittances inflows can stimulate local economies by increasing household purchasing power and driving demand for goods and services. They support small businesses, stimulate entrepreneurship, and contribute to job creation, which ultimately fosters economic growth and development at the community level.

Further, remittances represent a vital link between migrant workers and their home countries, which offers tangible benefits to individuals, families, and communities. Their importance extends beyond mere financial transactions, shaping social dynamics, supporting economic development, and promoting human welfare in the international level.

Nepal is receiving and entertaining a significant benefits from the substantial inflow of remittances each year, amounting to nearly a quarter of its Gross Domestic Product (GDP). This financial lifeline is playing a pivotal role in strengthening the country's economic

stability and resilience. With remittances contributing to a comfortable level of foreign currency reserves, Nepal can better navigate economic challenges and uncertainties, mitigating the risks associated with external shocks. Moreover, the direct and indirect impacts of remittances on the Nepalese GDP are profound, fueling consumption, investment, and overall economic growth. In reality, sustaining such a flow of funds is imperative for Nepal's continued prosperity and development.

Moreover, dependence on remittance inflows may pose risks, including potential vulnerabilities to external economic fluctuations and changes in global migration patterns. Therefore, policies and strategies aimed at enhancing the resilience and diversification of Nepal's economy are essential. By fostering an enabling environment for job creation, entrepreneurship, and investment, Nepal can reduce its reliance on remittances and build a more robust and self-sustaining economy for the future.

While remittances undoubtedly contribute significantly to economic growth in any country, they are just one piece of the puzzle. Numerous variables, both internal and external, exert influence on a nation's GDP. Factors such as inflation rates, private sector credit availability, the expansion of broad money supply, and the scale of government capital expenditure all play crucial roles in shaping the economic landscape. Each of these variables interacts with the others in complex ways, affecting consumption patterns, investment decisions, and overall economic activity. Thus, achieving sustainable and robust economic growth requires a comprehensive understanding of these interrelated factors and the formulation of targeted policies to address them effectively.

In addition to remittances, other key determinants of economic growth include the level of deposits in the banking system and the efficiency of financial intermediation. A well-functioning banking sector, characterized by healthy levels of deposits and effective allocation of capital, can channel resources towards productive investments, stimulating economic expansion. Moreover, policies that encourage savings mobilization and promote financial inclusion can enhance the resilience of the financial system and foster broader-based economic growth. Therefore, while remittances represent an essential source of income for many countries, policymakers must adopt a holistic approach to economic management, addressing various economic variables to sustain long-term prosperity and stability.

Literature Review

Ojha (2019) examines the significance of remittances and their impact on Nepal's GDP. Adopting a descriptive and analytical research design with a quantitative approach, the study focuses into the role of remittances as a crucial source of foreign currency earnings. The remittances are found to be integral to the economic development of the country, positively affecting GDP, per-capita income, and capital formation.

Pradhan et. al. (2008) analyzed how workers' remittances influence economic growth in 39 developing countries from 1980 to 2004, with a dataset comprising 195 observations. Employing a standard growth model, both fixed-effects and random-effects approaches are utilized. The findings indicate a strong overall fit with the fixed-effects method, as opposed to the random-effects model, which is statistically rejected. Remittances exhibit a positive impact on growth.

Mundaca (2009) has examined the impact of workers' remittances and financial intermediation on economic growth within a theoretical framework. The findings suggest that remittances can have significant positive long-term effects on growth. Using panel data from Latin American and Caribbean countries and controlling for various factors, including long-term investment and demographics, the empirical analysis indicates that financial intermediation enhances the growth response to remittances. The study concludes that improving access to financial services could optimize the utilization of remittances, thereby fostering economic growth in these nations.

Chaudhary (2022), in his paper assessed the contribution of remittances to Nepal's GDP and private gross fixed capital formation using the ARDL bound test approach. The findings reveal a positive impact of remittances on GDP but a negative impact on private gross fixed capital formation. The paper concludes that remittances do not serve as a source of capital flows in Nepal; instead, they function as compensatory transfers to recipient households. In the paper, a policy focused on remittances is recommended to channel remittances into productive activities such as self-employment and financial investment.

Objective

The major goal of this research is to determine the true role of remittance inflows on economic development. To capture Nepalese economic development, GDP will be used as the study's dependent variable. Furthermore, the study will focus on other relevant economic variables that could have affected GDP growth.

Methodology

In this study, only secondary sources of data have been utilized to analyze the relationship between various economic indicators. The data and information have been carefully collected from a range of reputable financial institutions, including Ministry of Finance (MoF), Nepal Rastra Bank (NRB), the International Monetary Fund (IMF), and the World Bank (WB). These institutions provide reliable and comprehensive datasets that are essential for conducting an in-depth econometric analysis.

The data from MoF and NRB offer valuable insights into the domestic financial landscape, including information on fiscal as well as monetary policy, inflation rates, and national economic performance. Meanwhile, the IMF and the WB contribute a global perspective, supplying data on international economic trends, comparative studies, and benchmarks that are crucial for understanding the broader economic context in which Nepal operates.

To explore the relationship between dependent and independent variables, econometric tools have been employed. This approach involves the application of statistical methods to economic data to test hypotheses and forecast future trends. By using econometric models, the study aims to quantify the impact of independent variables such as remittances, government expenditure, money supply and bank deposit on the dependent variable, GDP growth. These models help in identifying significant relationships and drawing conclusions about causality and correlation among the variables.

Overall, this research design ensures a robust analysis by leveraging high-quality secondary data and refined econometric techniques. This combination enables a comprehensive

understanding of the factors influencing economic growth and provides a solid foundation for policy recommendations.

Hypothesis

The primary hypothesis of this study is that remittances, as the major independent variable, will have a positive relationship with GDP. As mentioned earlier that the remittances are financial transfers sent by migrant workers back to their home countries, often supporting household income and increasing overall consumption. This influx of funds can stimulate economic activities, increase demand for goods and services, and contribute to overall economic growth. Therefore, it is anticipated that higher levels of remittances will correlate with an increase in the GDP of Nepal.

Another significant hypothesis is that the capital expenditure of the government will also positively influence the GDP. Government's capital expenditure includes investments in infrastructure, support for public activities, and development projects. These investments are crucial for creating jobs, enhancing productivity, and improving the overall economic environment. By increasing capital expenditure, the government can stimulate economic activities, attract private investments, and foster sustainable economic growth, leading to a positive impact on the GDP.

Furthermore, it is hypothesized that other independent variables such as money supply and bank deposits will also have a positive relationship with GDP. An increase in money supply typically leads to lower interest rates, encouraging borrowing and investment. Similarly, higher bank deposits provide financial institutions with more capital to lend, fostering business expansions and consumer spending. Both these factors are essential for economic growth, as they enhance liquidity, boost economic activities, and ultimately contribute to an increase in GDP. Thus, it is expected that money supply and bank deposits will positively correlate with Nepal's GDP growth.

Model

The model of this paper is presented below:

$$\mathbf{GDP}_t = \alpha + \beta_1 \mathbf{REM}_t + \beta_2 \mathbf{CE}_t + \beta_3 \mathbf{MS}_t + \beta_4 \mathbf{DBFI}_t + \beta_5 \mathbf{DUM}_t + \epsilon_t$$

Where,

GDP = GDP at annual amount

α = Intercept term

REM = Remittance at annual amount

CE = Capital Expenditure of the Government at annual amount

MS = Money Supply (M2) at annual amount

DBFI = Total Deposit of BFIs at an annual amount

DUM = Dummy Variable

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Coefficients of REM, CE, MS, DBMI and DUM respectively

t = period at annual rate

ϵ = Error term

To determine the actual relationship between the dependent variable (GDP) and the independent variables (remittances, capital expenditure, money supply, and bank deposits), a regression analysis is conducted. Specifically, the Ordinary Least Squares (OLS) method is

employed for this purpose. Because OLS is a widely used technique in econometrics for estimating the parameters of a linear regression model. It minimizes the sum of the squared differences between the observed and predicted values, providing the best linear unbiased estimates of the relationships among variables.

In this analysis, instead of using the percentage change of the data, the actual level (amount) of the variables has been utilized in the model. This approach allows for a more direct interpretation of how changes in the absolute values of remittances, capital expenditure, money supply, and bank deposits affect the GDP. By analyzing the data at their levels, the study aims to capture the tangible impact of these financial flows on economic growth, providing clearer insights into the magnitude of these relationships.

While capturing the remittance data, I observed a significant jump in 2001. To address this anomaly and ensure that the results are not skewed by this sudden increase, I decided to use a dummy variable to control for the big jump in that year.

Additionally, the logarithm of the data has been taken to smoothen the results and address potential issues with heteroscedasticity and non-linearity. We know that the Log-transforming helps stabilize the variance and makes the relationship between the variables more linear. This transformation allows for a more robust and reliable estimation of the regression model, ensuring that the findings accurately reflect the underlying economic dynamics.

Graphical Representation of Data

The different graphical representation of data is presented below:

Figure 1 (presented in percentage change)

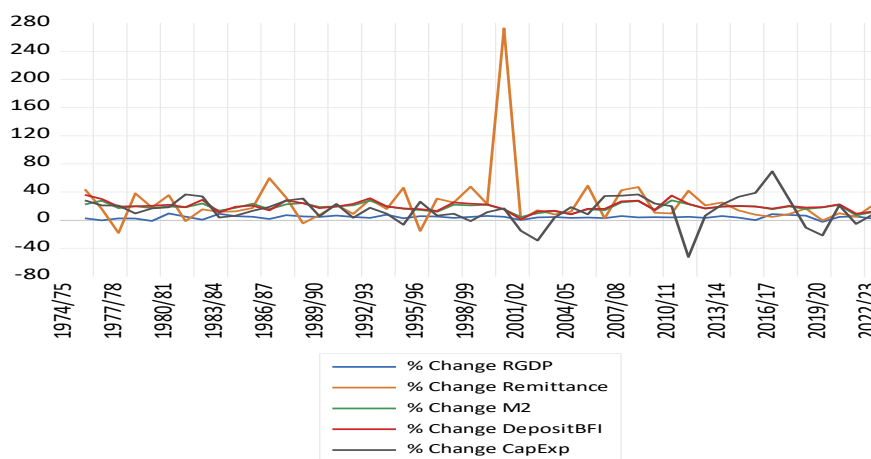
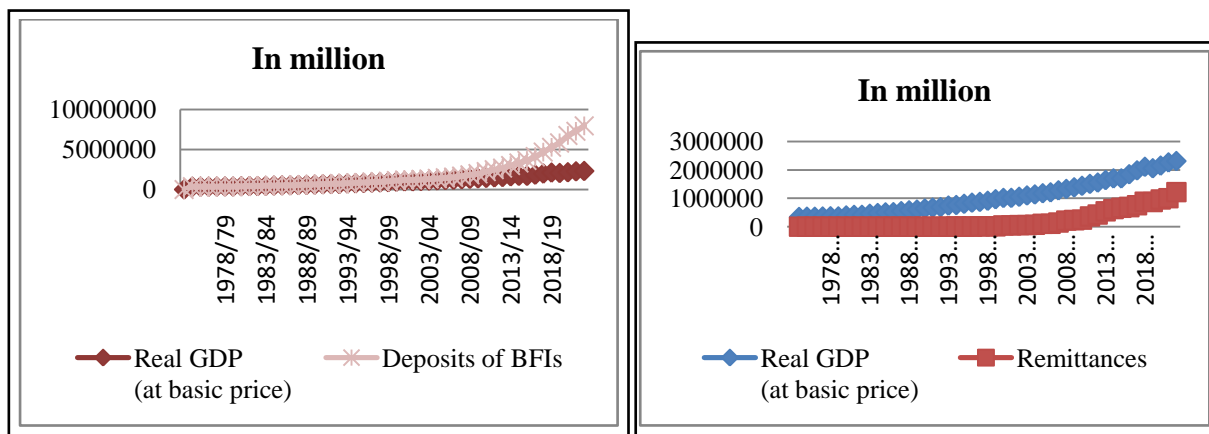


Figure 2 (presented in change of amount)



Result

The econometric result of this study is presented in appendix – 1. The result shows that the independent variable CE (capital expenditure) is statistically insignificant because the p-value is very high, indicating that the probability of occurrence of error is 68 percent. Similarly, the dummy variable has also exhibited that its p-value is statistically insignificant. In addition to this, the Durbin-Watson Statistics, which is 1.28, indicates the presence of negative autocorrelation between the residuals.

Furthermore, there could be the possibility of the existence of a multicollinearity problem, meaning the occurrence of high intercorrelations between two or more independent variables. Among the chosen independent variables of the model, one may have captured some portion of another. For example, Money Supply captures the data of Bank Deposit. Moreover, Money Supply is also correlated with the Capital Expenditures of the government.

Therefore, I decided to employ two different methods: first, to drop the possibly correlated variables, and second, to include Inflation (CPI) and then run the regression using the maximum likelihood method with an Auto-Regressive model of order 1 (AR1). The AR(1) model refers to a model where the current value of the time series is regressed on its immediately preceding value. Theoretically, the AR(1) model captures the idea that the current value of the series is partly determined by its previous value.

In addition to this, the hypothesis of choosing inflation as an independent variable is that inflation plays a significant role in shaping a country's GDP. While moderate inflation is considered a sign of a healthy economy, as it indicates growing demand and economic activity, excessive inflation can have adverse effects on GDP growth. Inflation affects GDP through various channels. Firstly, it influences consumer purchasing power, as rising prices erode the real value of money, leading to reduced consumer spending and lower aggregate demand, ultimately impacting GDP negatively. Additionally, inflation affects investment decisions and the cost of borrowing, as investors and businesses may delay investments or borrow less due to uncertain future prices. Therefore, policymakers aim to maintain price stability by implementing monetary and fiscal policies to control inflation within a target range conducive to sustainable GDP growth.

It is also important to discuss SIGMASQ (σ^2) in regression analysis. In the context of an AR(1) model or any time series model, σ^2 is the estimated variance of the residuals, which provides a measure of the unexplained variability in the model. It is crucial for assessing the fit of the model and the precision of the parameter estimates. Similarly ϵ_t is the residuals of the model.

Now the new model looks like:

$$\text{GDP}_t = \alpha + \beta_1 \text{REM}_t + \beta_2 \text{CPI}_t + \beta_3 \text{AR1}_t + \sigma^2 + \epsilon_t$$

Where, **CPI** = Consumer Price Index representing the inflation of Nepal

The new result is represented in appendix – 2. The p-value of the result tells us that the variables are statistically significant, meaning that the probability of occurrence of error is quite low. Similarly, the coefficient of determination (R^2) usually provides a measure of how well the independent variables explain the variability of the dependent variable. Specifically, R^2 represents the proportion of the variance in the dependent variable that is explained by the independent variables included in the model. This means the value of R^2 , which is 0.99, indicates that the independent variables are more effective in explaining the variability in the dependent variable, suggesting a better fit of the regression model to the data.

In addition to this, the Durbin-Watson statistics, which is exactly 2.0, tells us that the variables are free from autocorrelation. Therefore, this result is statistically significant for describing the relationship between the dependent and independent variables.

Interpretation of the Result:

As per the econometric model, the result can be described that the econometric result of this study is presented below:

As per the hypothesis, the REM and CPI are positively correlated with the GDP of Nepal. While interpreting the result we can draw the conclusion that 1 percent change in remittance causes 0.043 percent change in GDP of Nepal. More precisely, 1 percent increase in remittance is causing the positive impact on GDP by 0.043 percent. Similarly, 1 percent increase in CPI is contributing GDP by 0.41 percent.

Conclusion:

Based on the results of the analysis, it is evident that both remittances and the Inflation have a significant positive correlation with the GDP of Nepal. The findings reveal that a 1 percent change in remittance leads to a 0.043 percent change in Nepal's GDP. This implies that an increase in remittance contributing to its growth by 0.043 percent. Similarly, the analysis indicates that a 1 percent increase in the inflation is associated with a 0.41 percent rise in GDP. These findings underscore the importance of remittance inflows and inflation control as key factors driving economic growth in Nepal.

The impact of remittances on GDP appears to be positive but very weak. To better understand this, we calculated the correlation coefficient between these two variables, which is 0.98 (appendix – 3). This high correlation suggests that while there is a relationship between remittances and GDP, remittances are not contributing strongly to GDP growth. The primary

reason for this is that much of the remittance income is being used for importing goods and services rather than being invested in productive sectors within the country. Consequently, the potential of remittances to stimulate economic growth is diminished, as the money sent home by workers abroad is not effectively boosting domestic production or creating new job opportunities.

To support this findings firstly, the "Nepal Development Update" from the World Bank also highlights that remittances play a crucial role in Nepal's economy by supporting private consumption. However, it notes that despite the rise in remittances, there has been a consistent increase in imports of consumption goods. This suggests that remittance inflows are used to finance the import of goods and services, rather than being directed towards productive investments that could contribute more robustly to GDP growth. Secondly, the Kathmandu Post article "Escaping the Remittance Trap" emphasizes that Nepal's economy heavily relies on remittance inflows, which significantly fuel its consumption-led growth model. This consumption is largely import-heavy, with imports constituting 41% of Nepal's GDP in 2019. The article indicates that remittances stabilize Nepal's economy by supporting high levels of consumption, which in turn drives import demand.

I, therefore, recommend that future scholars conduct an in-depth study on the relationship between remittances and imports.

In conclusion, the study highlights the significant role played by remittances and inflation in shaping Nepal's economic landscape. The positive correlation observed between remittances, CPI, and GDP underscores their importance as key determinants of economic growth. The results suggest that policymakers should continue to prioritize measures that encourage remittance inflows while implementing effective strategies to manage inflation. By fostering an environment conducive to remittance inflows and maintaining price stability, Nepal can further enhance its economic growth path and achieve sustainable development goals.

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Appendix – 1

Dependent Variable: LOG(RGDP)

Method: Least Squares

Date: 05/10/24 Time: 10:58

Sample: 1975 2023

Included observations: 49

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.235323	0.152138	21.26575	0.0000
LOG(REM)	0.020481	0.010800	1.896325	0.0646
LOG(CA)	-0.006715	0.016305	-0.411833	0.6825
LOG(MS)	1.067137	0.177404	6.015279	0.0000
LOG(DBFI)	-0.796914	0.166865	-4.775808	0.0000
DUM2001	0.014961	0.027894	0.536367	0.5945
R-squared	0.998252	Mean dependent var	6.776777	
Adjusted R-squared	0.998049	S.D. dependent var	0.600660	
S.E. of regression	0.026532	Akaike info criterion	-4.306634	
Sum squared resid	0.030270	Schwarz criterion	-4.074982	
Log likelihood	111.5125	Hannan-Quinn criter.	-4.218746	
F-statistic	4911.575	Durbin-Watson stat	1.284660	
Prob(F-statistic)	0.000000			

Appendix – 2

Dependent Variable: LOG(RGDP)

Method: ARMA Maximum Likelihood (BFGS)

Date: 05/10/24 Time: 10:56

Sample: 1975 2023

Included observations: 49

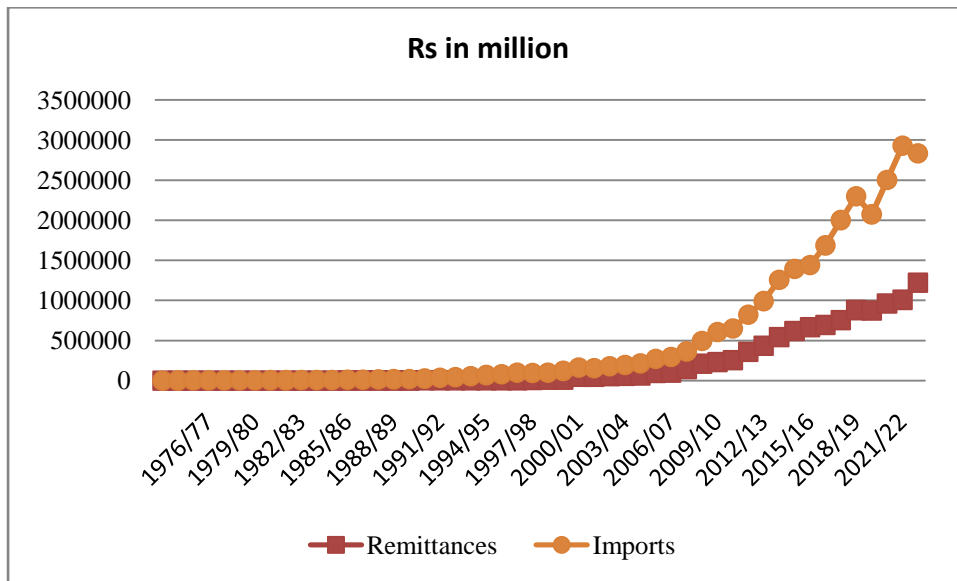
Convergence achieved after 7 iterations,

Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.074510	0.039782	127.5590	0.0000
LOG(REM)	0.043268	0.015159	2.854274	0.0066
LOG(CPI)	0.405545	0.037612	10.78230	0.0000
AR(1)	0.678439	0.107943	6.285133	0.0000
SIGMASQ	0.000741	0.000145	5.125282	0.0000
R-squared	0.997904	Mean dependent var	6.776777	
Adjusted R-squared	0.997714	S.D. dependent var	0.600660	
S.E. of regression	0.028721	Akaike info criterion	-4.153364	
Sum squared resid	0.036295	Schwarz criterion	-3.960321	
Log likelihood	106.7574	Hannan-Quinn criter.	-4.080123	
F-statistic	5237.680	Durbin-Watson stat	2.000953	
Prob(F-statistic)	0.000000			
Inverted AR Roots	.68			

Appendix – 3

Trend line



Correlation Matrix (For FY 2074/75 to FY 2022/23)

Correlation Coefficient		
	Remittances	Imports
Remittances	1	0.98
Imports	0.98	1