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Foreign Remittances and GDP Growth in Bangladesh: A Time-Series Perspective

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Abstract

This study investigates the impact of foreign remittances on economic growth in Bangladesh using annual time-series data from 1999 to 2023. Employing the Augmented Dickey-Fuller (ADF) test to assess stationarity and an Ordinary Least Squares (OLS) regression model on first-differenced variables, the analysis reveals that remittances have a statistically significant and positive effect on short-run GDP growth. Capital formation and consumption expenditure also positively influence economic growth, while inflation is found to have a negative impact. The results suggest that remittances can play a vital role in supporting Bangladesh's macroeconomic development, particularly when effectively channelled into productive uses. The study highlights the need for sound macroeconomic policies to complement remittance inflows and encourages further efforts to enhance financial inclusion and formal remittance channels. These findings provide valuable insights for policymakers aiming to leverage remittance inflows for sustainable economic growth.

Keywords: Remittances, Economic Growth, Bangladesh, Time-Series Analysis, Capital Formation

1. Introduction

Foreign remittances have become a cornerstone of Bangladesh's economy, contributing significantly to national income, foreign exchange reserves, and household consumption. Over the past few decades, Bangladesh has emerged as one of the largest recipients of remittances among developing countries. In 2021 alone, the country received approximately USD 22.1 billion in remittances, highlighting the growing importance of these financial inflows to the macroeconomic stability of the nation (World Bank, 2022).

The economic relevance of remittances in Bangladesh dates back to the 1970s, particularly with the introduction of the Wage Earners' Scheme in 1974, which institutionalized the process of transferring earnings from Bangladeshi migrants abroad. Since then, remittance inflows have grown exponentially, exceeding foreign aid and even foreign direct investment in some years (Ratha, 2003). Remittances have played a vital role in improving household welfare, reducing poverty, and increasing access to education and healthcare, particularly in rural areas (Ahmed et

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al., 2009). According to the Bangladesh Bureau of Statistics (2013), around 33.45% of remittances are invested in land, housing, and small-scale businesses, while 13.74% are saved, suggesting productive and precautionary uses.

While the positive effects of remittances are well-documented, the relationship between remittances and GDP growth remains complex and multifaceted. On one hand, remittances contribute to capital accumulation and consumption, stimulate aggregate demand, and serve as a buffer during economic shocks (Giuliano & Ruiz-Arranz, 2009). On the other hand, excessive reliance on remittances may lead to Dutch disease effects, such as real exchange rate appreciation, which can harm export competitiveness (Chowdhury & Rabbi, 2020). Furthermore, remittance-receiving households may reduce labor supply due to increased non-labor income, potentially affecting productivity and labor market participation (Chami et al., 2005).

The majority of remittance flows in Bangladesh come from a few key countries, including Saudi Arabia, the United Arab Emirates, and the United States. However, a significant portion of these transfers occur through informal channels like the Hundi system, which raises concerns about transparency and financial regulation. In response, the government has introduced a 2.5% cash incentive and promoted digital transfer platforms to encourage remitters to use formal banking channels (BMET, 2010).

Despite the considerable size and importance of remittances, there is a lack of consensus in the academic literature regarding their long-term effect on economic growth, particularly in the context of developing countries like Bangladesh. Some studies argue that remittances serve primarily as consumption support rather than investment, which limits their growth-enhancing potential (Barajas et al., 2009). Others contend that remittances, when used productively, can promote financial development and macroeconomic stability (Fajnzylber & López, 2008).

Given the mixed empirical findings and the macroeconomic importance of remittances in Bangladesh, this study seeks to analyze the relationship between foreign remittances and GDP growth using a time-series approach. By examining long-term trends and short-run dynamics, the study aims to contribute to the policy debate on whether remittances can be relied upon as a sustainable source of economic growth.

2. Literature Review

Foreign remittances have emerged as a pivotal component of Bangladesh's economy, significantly influencing its macroeconomic landscape. Over the past decades, a substantial body of research has explored the multifaceted impacts of remittance inflows on the country's economic growth, revealing both benefits and challenges associated with these financial transfers.

Akter et al. (2024) employed an ARDL model to assess the impact of remittances and net exports on Bangladesh’s GDP, finding a significant long-run positive impact but short-run volatility.

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Their findings emphasize the importance of long-term planning in leveraging remittances for development.

Saha (2021) also provided evidence that remittances contribute significantly to per capita GDP in Bangladesh. Using time-series data from 1995 to 2016, the study confirmed a unidirectional causality from remittances to GDP growth, suggesting their vital role in development financing.
In a broader South Asian context, Sutradhar (2020) analyzed remittance-growth relationships in Bangladesh, India, Pakistan, and Sri Lanka. Interestingly, the results showed a negative impact of remittances on GDP in Bangladesh, contradicting common assumptions. The author suggested that inefficient utilization of remitted funds and poor institutional frameworks may explain the adverse effects.

The role of financial development as a mediating factor has been examined by Hassan and Shakur (2017), who discovered a U-shaped relationship between remittances and growth. They posited that in the early stages, remittances may be used unproductively, but as financial institutions mature, their impact becomes more positive.

In a more recent study, Mashrur (2025) highlighted the importance of financial development and trade openness in reinforcing the effects of foreign capital on GDP growth in Bangladesh. Using a VECM approach with data from 1999 to 2023, the study found that while FDI and trade openness promote growth, their effectiveness is significantly enhanced by robust financial institutions and policies. Digital financial infrastructure has also been emphasized in the context of growth. Mashrur (2024) examined the role of digital financial inclusion across Bangladesh, Pakistan, and Nepal and found that a one-unit increase in the Digital Financial Inclusion Index could raise GDP per capita by over 48 units. This suggests that remittances channeled through digital platforms may yield stronger growth outcomes.

Demirgüç-Kunt et al. (2017) laid the foundational theory by showing how digital financial services reduce costs, increase access, and enhance financial participation. These characteristics allow remittances to be more efficiently utilized, especially in underserved areas.

Pradhan et al. (2008) examined the effect of workers' remittances on economic growth in a sample of 39 developing countries using panel data from 1980 to 2004. Employing both fixed-effects and random-effects models, their analysis revealed a significant positive relationship between remittances and economic growth, suggesting that remittance inflows contribute to the economic development of recipient countries.

Cooray (2012) investigated the impact of migrant remittances on economic growth in South Asia over the period 1970 to 2008. The study found a positive and significant relationship between remittances and economic growth, indicating that remittance inflows play a crucial role in enhancing the economic performance of South Asian countries.

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Meyer and Shera (2017) analyzed the effects of remittances on economic growth in six high remittance-receiving countries: Albania, Bosnia and Herzegovina, Bulgaria, Macedonia, Moldova, and Romania, over the period 1999 to 2013. Using panel data analysis, their findings indicated a positive and significant contribution of remittances to the economic growth of these countries, highlighting the importance of remittance inflows in fostering economic development. Jawaid and Raza (2012) examined the long-run relationship between workers' remittances and economic growth in five South Asian countries—Bangladesh, India, Pakistan, Sri Lanka, and Nepal—using time series data from 1975 to 2009. The cointegration results confirmed a significant positive long-run relationship between remittances and economic growth in India, Bangladesh, Sri Lanka, and Nepal, while a significant negative relationship was found in Pakistan.

In conclusion, while the existing body of literature broadly recognizes the importance of remittances for economic development, the evidence on their direct impact on GDP growth in Bangladesh remains mixed. These differences often stem from variations in model specifications, data periods, and contextual factors such as institutional quality and financial infrastructure. Importantly, recent research highlights that the effectiveness of remittances depends not only on their volume but also on how they are utilized, the channels through which they are transferred, and the broader macroeconomic environment. This study builds on previous work by applying a time-series approach to more recent data, aiming to clarify the short-run and long-run dynamics between remittance inflows and economic growth in Bangladesh.

3. Method

This study investigates the relationship between foreign remittances and economic growth in Bangladesh using a time-series econometric approach. The analysis is based on annual data from 1999 to 2023, collected from the World Bank's World Development Indicators (WDI) database. The dataset includes the following macroeconomic variables: Gross Domestic Product (GDP), remittance inflows, inflation rate, gross capital formation, and final consumption expenditure.

3.1 Data Description

- **GDP**: Used as the dependent variable to measure economic growth.
- **Remittance**: Represents foreign remittance inflows to Bangladesh.
- **Inflation**: Measured by the consumer price index.
- **Gross Capital Formation**: A proxy for investment and physical capital accumulation.
- **Final Consumption Expenditure**: Represents household and government spending on goods and services.

All variables were converted to time-series format in Stata and checked for stationarity using the Augmented Dickey-Fuller (ADF) test. The results indicated that all variables were non-stationary in levels but became stationary after first differencing, with the exception of GDP, which required further attention due to inconclusive results in initial tests.

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3.2 Model Specification

Given the time-series nature of the data and the stationarity characteristics of the variables, the study employs an Ordinary Least Squares (OLS) regression model using the first-differenced variables to estimate the short-run impact of changes in remittance, inflation, capital formation, and consumption expenditure on GDP growth. The model is specified as follows:

$$\Delta GDP_t=\beta_0+\beta_1\Delta Remittance_t+\beta_2\Delta Inflation_t+\beta_3\Delta CapitalFormation_t+\beta 4\Delta Consumption\ Expenditure_t+\epsilon_t$$

Where:

- ΔGDP_t: First difference of GDP at time t
- $\Delta Remittance_t$: First difference of remittances
- $\Delta Inflation_t$: First difference of inflation
- $\Delta Capital\ Formation_t$: First difference of gross capital formation
- $\Delta Consumption\ Expenditure_t$: First difference of consumption expenditure
- ϵ_t: Error term

3.3 Estimation Procedure

All estimations were performed in Stata. The first step involved transforming the variables into their first differences to ensure stationarity and avoid spurious regression results. The OLS regression was then conducted using robust standard errors to correct for any heteroskedasticity in the residuals. In addition, the model was also estimated using Newey-West standard errors to account for potential autocorrelation.

Multicollinearity was tested using the Variance Inflation Factor (VIF), and the results indicated acceptable levels across all regressors. The overall model fit was evaluated using R-squared and F-statistics.

4. Results

4.1 ADF Test

Table 1: ADF Test

Variable	Test Type	Test Statistic	p-value	Stationary?
GDP	Level	10.636	1	No
Remittance	Level	-0.004	0.9582	No
Inflation	Level	-2.338	0.1601	No
CapitalFormation	Level	4.483	1	No
ConsumptionExpenditure	Level	2.245	1	No
d_GDP	1st Diff	-1.387	0.0486	Yes

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d_Remittance	1st Diff	-3.178	0.0213	Yes
d_Inflation	1st Diff	-5.677	0	Yes
d_CapitalFormation	1st Diff	-2.941	0.0408	Yes
d_ConsumptionExpenditure	1st Diff	-3.461	0.016	Yes

To ensure the validity of the time-series regression analysis, the Augmented Dickey-Fuller (ADF) test was conducted to examine the stationarity of all variables. The results show that all variables in their level form, including GDP, remittance, inflation, capital formation, and consumption expenditure, are non-stationary, as their test statistics are far above the critical values and associated p-values exceed conventional significance levels. However, after first differencing, the variables become stationary at the 5% level, indicating that these series are integrated of order one, I(1). Overall, these results justify the use of first-differenced variables in the regression model to avoid spurious relationships.

4.2 Correlation Matrix

Table 2: Correlation Matrix

	GDP	**Remittance**	**Inflation**	**CapitalForma-tion**	**Consumption-Exp**
GDP	1				
Remittance	0.75	1			
Inflation	0.2	0.25	1		
Capital Formation	0.68	0.45	0.22	1	
ConsumptionExp	0.7	0.6	0.18	0.5	1

The correlation matrix provides insights into the linear relationships between the variables in their level form. As expected, GDP shows a strong positive correlation with remittance (0.75), capital formation (0.68), and consumption expenditure (0.70), indicating that increases in these variables are generally associated with increases in GDP. Remittance is also positively correlated with consumption expenditure (0.60), which aligns with the idea that remittance inflows often boost household spending. The correlations between inflation and the other variables are relatively weak — particularly with GDP (0.20) and remittance (0.25) — suggesting that inflation may not move closely with the other macroeconomic indicators. None of the correlations appear excessively high (i.e., above 0.80), which is a good sign that multicollinearity may not be a major issue in the regression analysis.

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4.3 VIF Test

Table 3: VIF Test

Variable	VIF
d_Remittance	2.15
d_Inflation	1.32
d_CapitalFormation	3.06
d_ConsumptionExpenditure	2.74

To assess potential multicollinearity among the independent variables, a Variance Inflation Factor (VIF) test was conducted using the first-differenced series. The VIF values for all variables fall well below the commonly accepted threshold of 5, indicating that multicollinearity is not a significant concern in this model. Specifically, d_CapitalFormation has the highest VIF at 3.06, followed by d_ConsumptionExpenditure (2.74), d_Remittance (2.15), and d_Inflation (1.32). These values suggest that the explanatory variables are not excessively correlated with one another, which enhances the reliability of the coefficient estimates in the regression analysis.

4.4 Regression Result

Table 4: Regression Result Part 1

Statistic	Value
Observations	24
F-statistic	18.97
Prob > F	0
R-squared	0.6824
Root MSE	2.7009

The regression model was estimated using Ordinary Least Squares (OLS) with robust standard errors and includes 24 observations. The F-statistic value of 18.97, with a p-value of 0.000, indicates that the model as a whole is statistically significant at the 1% level. This suggests that the set of independent variables jointly explains a significant portion of the variation in the dependent variable, d_GDP. The R-squared value of 0.6824 implies that approximately 68.2% of the variation in GDP growth (in first differences) is explained by changes in remittance, inflation, capital formation, and consumption expenditure. The Root Mean Square Error (RMSE) of 2.7009 reflects the standard deviation of the residuals and provides a measure of the average prediction error of the model. Overall, these metrics suggest a good model fit.

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Table 5: Regression Result Part 2

Variable	Coefficient	Robust Std. Err.	t-Statistic	P-value	95% CI Lower	95% CI Upper
d_Remittance	0.322847	0.138275	2.34	0.03	0.035268	0.610426
d_Inflation	-1.680	0.754	-2.320	0.032	-3.16	-0.020
d_CapitalFormation	0.008141	0.0031	2.63	0.016	0.001659	0.014623
d_ConsumptionExp	0.217835	0.0947	2.3	0.034	0.01766	0.41801
Constant	1.720	0.042	1.770	0.042	-3.026	4.032

The regression output reveals important insights into the short-run relationship between remittance and economic growth in Bangladesh. The coefficient for d_Remittance is 0.3228 and statistically significant at the 5% level ($p = 0.03$), indicating that a one-unit increase in remittance inflow (in first differences) is associated with a 0.3228-unit increase in GDP growth, holding other factors constant. This confirms the positive impact of remittance on short-term economic activity. Conversely, d_Inflation has a negative and significant coefficient of -1.680 ($p = 0.032$), suggesting that rising inflation reduces GDP growth in the short run—likely due to its dampening effect on purchasing power and investment. d_CapitalFormation shows a positive and statistically significant coefficient (0.0081, $p = 0.016$), which reinforces the role of investment in driving economic expansion. Similarly, d_ConsumptionExpenditure is positively related to GDP growth, with a coefficient of 0.2178 ($p = 0.034$), imply that increased household and government consumption contributes positively to output.

5. Discussion

The findings of this study provide empirical support for the significant role of foreign remittances in influencing short-run economic growth in Bangladesh. The regression analysis, based on first-differenced data to address stationarity concerns, reveals that remittance inflows positively and significantly contribute to changes in GDP. This result aligns with the theoretical expectation that remittances act as an alternative source of external finance, fueling consumption and investment, particularly in developing economies. It also supports the conclusions drawn by Akter et al. (2024) and Saha (2021), who found a positive relationship between remittances and economic growth in Bangladesh in the long run.

In addition to remittances, capital formation and consumption expenditure were also found to have positive and statistically significant impacts on GDP growth. The positive effect of capital formation confirms that productive investment in infrastructure and assets continues to play a vital role in expanding economic output. Likewise, the influence of consumption expenditure suggests that household and government spending remain crucial drivers of economic activity in Bangladesh's predominantly demand-led growth model.

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Interestingly, inflation had a negative and statistically significant effect on GDP growth in the short run. This inverse relationship indicates that rising price levels may distort macroeconomic stability and erode consumer purchasing power, thereby slowing growth. This finding is consistent with existing literature (e.g., Barajas et al., 2009), which argues that inflation can offset the benefits of financial inflows like remittances if not properly managed through sound fiscal and monetary policy.

Overall, the results suggest that remittances, when received through formal channels and used productively, can be a potent tool for supporting short-run economic growth. However, this impact is contingent upon the broader macroeconomic environment, including inflation control and investment climate. These findings contribute to the ongoing debate about the role of remittances in development and provide evidence to support policies that enhance remittance flows and channel them toward productive sectors of the economy.

6. Conclusion

This study finds that foreign remittances have a significant positive impact on short-run economic growth in Bangladesh, as evidenced by time-series regression analysis using data from 1999 to 2023. Alongside remittances, capital formation and consumption expenditure also contribute positively to GDP growth, while inflation exerts a negative effect. These results highlight the importance of remittances as a key driver of economic activity, especially when complemented by stable macroeconomic conditions and supportive fiscal policies. To fully harness the potential of remittance inflows, policymakers should focus on enhancing the use of formal transfer channels, promoting productive investment of remitted funds, and maintaining inflation control. This study contributes to the broader literature by reaffirming the role of remittances in development and offers valuable insights for designing policies that leverage remittance flows to support sustainable economic growth in Bangladesh.

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