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Remittances and Economic Growth: Empirical Insights from a Panel of SAARC Countries

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Abstract

Purpose: This study investigates the long-run cointegrating relationship between personal remittances and economic growth in eight SAARC member countries, testing whether remittance inflows exert a long-run impact on real GDP per capita after controlling for foreign direct investment, population growth, and unemployment.

Methods/Design: Using annual panel data from SAARC member countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) over 2000–2024, this study employed a cointegration framework to estimate long-run elasticities. Panel unit root tests (Levin-Lin-Chu) confirmed that all variables were integrated of order one [I(1)], justifying cointegration techniques. Pedroni and Kao cointegration tests provided robust evidence of a stable long-run equilibrium relationship among variables. To obtain consistent, efficient long-run parameter estimates that correct for endogeneity and serial correlation, the study employed the Fully Modified Ordinary Least Squares (FMOLS) method.

Findings: The long-run FMOLS estimates revealed that remittances exert a statistically significant positive effect on real GDP per capita, and FDI also showed a positive effect. In contrast, population growth exhibited a negative and significant effect, while unemployment remained statistically insignificant. The model demonstrated strong explanatory power, with an R-squared value of 94 percent, confirming that the selected variables accounted for a substantial share of Real GDP variation.

Conclusion: The findings of this study conclude that remittance inflows play an important and positive role in long-term economic growth within SAARC economies, independent of prevailing unemployment dynamics. This relationship underscores the need for macroeconomic frameworks that channel external financial flows toward capital formation rather than short-term consumption. Consequently, the evidence highlights the macro-critical role of remittances in sustaining growth paths across the region.

Implications: This study contributes to the SAARC literature by presenting a novel panel cointegration analysis based on a balanced dataset extending through 2024. By estimating remittance elasticities, the findings offer valuable insights for policy formulation, particularly in managing capital inflows to enhance long-term growth outcomes.

Keywords: *Economic Growth, FMOLS, Remittances, SAARC Countries, Panel Cointegration, .*

JEL Classification: F24, O47, C33

Introduction

Remittances have become a major source of external income, often surpassing foreign aid and investment, and now play an important role in shaping the long-term growth and development of many developing economies (Saadat et al., 2025). Their growing significance highlights the need to understand how remittance inflows contribute to economic stability, investment, and sustainable growth in the region.

South Asian economies have been significantly reshaped by sustained migration, evolving trade dynamics, and the increasing role of both private and official cross-border financial flows (Dutta & Saikia, 2024). Within the SAARC region, personal remittances have gradually evolved from serving primarily as a household coping mechanism to becoming a macro-critical source of income that affects aggregate demand, influences savings and investment decisions, and contributes to external sector stability (Barkat et al., 2024). At a broader level, evidence from meta-analytic studies indicates that remittances generally promote economic growth in less-developed economies, although the magnitude of their impact remains modest and heterogeneous across countries (Cazachevici et al., 2020).

Remittance induced demand propagates through input output linkages; when expenditures traverse sectors with high network centrality especially finance the spillovers to total output intensify (Dridi et al., 2019). Yet the developmental meaning of remittances, aid, and capital inflows in South Asia is contested and context dependent. One strand of evidence stresses stabilizing and growth-enhancing roles for remittances in Nepal and comparable economies (Adhikari et al., 2024; Panthi & Devkota, 2024), while another warns that consumption bias, import leakages, and real exchange-rate appreciation can attenuate or reverse long-run gains (Ait Benhamou & Cassin, 2020; Hossain et al., 2025).

Regional panel studies further demonstrate that macro-financial conditions shape outcomes. In contexts of weak institutions and instability, remittances correlate with lower per capita income, whereas under stronger governance and stability, the relationship becomes positive (Delessa, et al., 2024). FDI has demonstrated a positive long-run effect on output in Nepal, consistent with spillover channels emphasized in endogenous-growth frameworks (Dahal et al., 2024). Classic stabilization variables price dynamics, labor-market slack, and demographic pressure-shape the effectiveness of these flows. High inflation erodes real incomes and shortens planning horizons; unemployment signals under-utilized labor and weak demand; and rapid population growth can dilute capital unless matched by investment and productivity gains (Barkat et al., 2023).

In addition, the roles of financial inclusion and institutional quality in translating remittances into productive savings and investment are acknowledged conceptually but are infrequently integrated into macro-panel designs (Khan et al., 2025; Dridi et al., 2019). Comparative research outside SAARC likewise shows that structural features such as financial depth, labor-market structure, and sectoral composition mediate the sign and magnitude of the remittance-growth link (Abdulai, 2023; Hossain et al., 2025). Taken together, these insights reveal a persistent gap: few SAARC-wide studies extend through 2024 using balanced panels and report FMOLS-based long-run elasticities, and Nepal-specific time-series results remain mixed, leaving regional external validity uncertain (Cazachevici et al., 2020; Dutta & Saikia, 2024; Panthi & Devkota, 2024; Khan et al., 2025).

Against this backdrop, this study examines whether a long-run cointegrating relationship exists between

personal remittances and economic growth in SAARC economies over 2000–2024, and estimates the long-run growth elasticity of remittances after controlling for FDI, population growth, and unemployment. Therefore, the primary objective of this study is to investigate the long-run relationship between remittances and economic growth in SAARC countries, taking GDP per capita (RGDP) as the dependent variable and remittances (REMIT), unemployment (UNEMP), population growth (POP GROWTH), and foreign direct investment (FDI) as explanatory variables. By analyzing these macroeconomic indicators within a panel framework, the study analyzes the extent to which remittance inflows and other structural and demographic factors shape the long-run growth trajectory of SAARC economies, thereby providing empirical insights relevant for regional development and policy formulation. The paper next reviews the literature and hypotheses, presents data and methods, reports results, and concludes with implications and future research avenues.

Literature Review and Hypotheses Development

Mainstream growth theory provides two complementary vantage points for our empirical specification. In the neoclassical Solow-Swan tradition, persistent growth in income per capita reflects capital deepening and exogenous technological progress; population growth dilutes capital per worker, and price instability distorts intertemporal decisions. Endogenous-growth perspectives emphasize channels through which policy and external finance - remittances, FDI, and ODA raise productivity via learning-by-doing, human capital, technology diffusion, and market-deepening effects (Dahal et al., 2024; Barkat et al., 2024). From the migration side, the new economics of labor migration posits that households deploy remittances to smooth consumption and relax credit constraints; the macro payoff depends on how effectively financial intermediaries transform inflows into savings and productive credit (Panthi & Devkota, 2024; Dridi et al., 2019). Offsetting forces Dutch-disease pressures, savings crowd-out, and labor-supply responses can attenuate the growth effect absent strong institutions and macro-stability (Ait Benhamou & Cassin, 2020; Hossain et al., 2025).

Dependent variable: GDP growth

The study adopted real GDP growth as the dependent variable. This choice parallels recent Nepal-focused work and regional panels that emphasize growth rates to capture cyclical dynamics and facilitate cross-country comparability (Adhikari et al., 2024; Panthi & Devkota, 2024; Abdulai, 2023). In SAARC, growth trajectories since 2000 reflect migration cycles, trade openness and episodic shocks; external inflows (remittances, FDI, ODA) appear with varying signs depending on macro-financial contexts (Dridi et al., 2019; Barkat et al., 2024).

Personal remittances and GDP growth

Multi-country evidence shows that remittances can stimulate economic activity when the financial system intermediates them into deposits and credit, enlarging investment and sectoral demand (Dridi et al., 2019; Dutta & Saikia, 2022). For Nepal, multiple studies report statistically significant positive long-run coefficients on remittances in growth equations (Adhikari et al., 2024; Panthi & Devkota, 2024). Nevertheless, signs are not uniform across settings: Ghana's ARDL results, Bangladesh time-series evidence, and an SSA panel underscore that macro stability, institutions and inflation dynamics condition the sign and size of remittance effects (Abdulai, 2023; Hossain et al., 2025; Delessa et al., 2024). A meta-analysis synthesizing dozens of estimates finds a generally positive but modest and heterogeneous average effect (Cazachevici et al., 2020). Financial inclusion emerges as a key contingency, with recent

multi-country work showing that inclusion amplifies remittances' growth contribution (Khan et al., 2025). Evidence-based relationship and hypothesis. Given SAARC's high remittance ratios and growing formal account ownership, the modal expectation is a positive long-run remittance - growth association under supportive macro-financial conditions. Based on the above literature review, this study proposes the following hypothesis:

H1: Personal remittances have a positive effect on GDP growth.

Population growth and GDP growth

Demographic forces are theoretically ambiguous. In the Solow framework, higher population growth dilutes capital per worker; in endogenous-growth settings, larger markets may raise innovation potential and scale (Solow, 1956). Absent strong investment and human-capital formation, many developing-country panels find that faster population growth associates with slower contemporaneous GDP growth (Delessa et al., 2024). Ghana's long-run estimates show a positive sign, suggesting that the demographic dividend can dominate under specific conditions (Abdulai, 2023).Additionally, population dynamics have been widely recognized as a key macroeconomic determinant of economic performance in developing economies (Kelley & Schmidt, 2005).

The expansion of the working-age population tends to increase per-capita growth through higher labor participation and savings, validating the "demographic dividend" (Cruz & Ahmed, 2018). Cross-country panel evidence also reveals that the direction and magnitude of the population–growth nexus vary across development regimes and institutional contexts (Cayssials et al., 2024). Moreover, findings from aging economies demonstrate that rising old-age dependency can slow GDP growth by reducing labor supply and productivity (Maestas et al., 2023), whereas sub-Saharan African data show that population growth contributes positively when accompanied by industrial and structural transformation (Gbehe et al., 2024). Based on the above literature review, this study proposes the following hypothesis:

H2: Population growth has a positive effect on GDP growth.

Foreign direct investment (FDI) and GDP growth

Foreign direct investment (FDI) typically boosts growth by adding capital, transferring technology, and spreading management know-how especially where finance, skills, and trade openness are strong (Balasubramanyam et al., 1996, Borensztein et al., 1998; Li & Liu, 2005). Nepal's recent time-series work aligns with this view, reporting a statistically significant long-run positive association between FDI and real GDP, alongside openness effects that are typical in export-oriented developing economies (Dahal et al., 2024). At the same time, the international literature cautions that FDI's impact is not unconditional: when endogeneity, fixed effects, and broad controls are handled, average effects can weaken, implying that domestic financial depth, skills, and sectoral composition condition the payoff. Taken together, the empirical record for Nepal and comparable economies suggests a predominantly positive but context-dependent FDI growth linkage that is strongest in stable, open, and finance-enabled environments. Based on the above literature review, this study proposes the following hypothesis:

H3: Foreign direct investment has a positive effect on GDP growth.

Unemployment and GDP growth

Okun's regularity implies an inverse relation between output growth and unemployment (Shakya & Gonpu, 2021). Yet jobless growth episodes arise where productivity improvements or sectoral composition changes delink growth from employment; Ghana's long-run model even reports a positive unemployment coefficient and a negative interaction with remittances, interpreted as altered labor-supply incentives (Abdulai, 2023). Similarly, studies in South Asian economies have found that structural transformation, labor migration, and underemployment patterns distort the conventional Okun's law relationship (Xuen et al., 2017).

In the SAARC region, where outward migration is structural, headline unemployment still proxies slack and structural mismatch rather than short-term cyclical unemployment (Sahoo & Sahoo, 2019). Empirical evidence from South Asian countries economies shows that high remittance inflows, labor outflow, and low domestic job absorption capacity may allow GDP growth to increase even without proportional employment expansion (Ghose, 2019). Therefore, the relationship between unemployment and growth in such economies may appear positive rather than negative, reflecting structural inefficiencies and labor market rigidities. Based on the above literature review, this study proposes the following hypothesis:
H4: Unemployment has a positive effect on GDP growth.

Methodology

The study has been based on positivism philosophy with deductive approach using quantitative observable macro indicators and statistical testing to evaluate theory-driven hypotheses. Employing a descriptive as well as explanatory panel design, the study performed unit-root and cointegration tests (Levin et al., 2002; Pedroni, 1999; Kao, 1999). Then, the long-run elasticities using Fully Modified Ordinary Least Squares (FMOLS) has been estimated as it corrects endogeneity and serial correlation to retrieve consistent parameters in cointegrated panels.

The study utilizes annual panel data from all SAARC member countries over the period 2000-2024. Data on real GDP per capita, remittances, unemployment, population growth, and FDI are obtained from the World Development Indicators (World Bank, 2024). GDP per capita (RGDP) serves as the dependent variable, while remittances (REMIT), unemployment (UNEMP), population growth (POP GROWTH), and foreign direct investment (FDI) are included as explanatory variables.

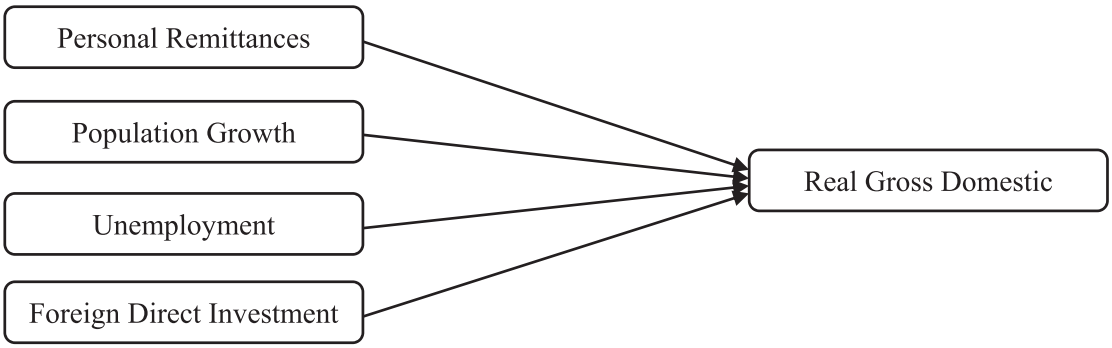
Table 1. *Description of Variables*

Indicator Name	Variable	Dataset
GDP per capita (current US$)	RGDP	WDI
Personal remittances, received (% of GDP)	REMIT	WDI
Unemployment, total (% of total labor force)	UNEMP	WDI
Population growth (annual %)	POP GROWTH	WDI
Foreign direct investment, net inflows (% of GDP)	FDI	WDI

On the other hand, the variables are I(1), the next step is to examine whether a long-run equilibrium relationship exists among them. This study applies Pedroni (1999) and Kao (1999) cointegration tests. Pedroni's test provides both "within-dimension" and "between-dimension" statistics based on estimated

residuals from the long-run regression, while Kao's test is a residual-based approach assuming cross-sectional homogeneity.

Figure1: *Conceptual framework*



The general form of the panel regression model can be expressed as:

$$RGDP\_it = \alpha\_i + \beta 1\ REMIT\_it + \beta 2\ UNEMP\_it + \beta 3\ POPGROWTH\_it + \beta 4\ FDI\_it + \varepsilon\_it$$

The evidence of cointegration is established, the study proceeds to estimate the long-run coefficients using the Fully Modified Ordinary Least Squares (FMOLS) method developed by Pedroni. FMOLS is preferred over conventional OLS because it corrects for endogeneity and serial correlation in the cointegrated panel framework, thereby yielding efficient and unbiased parameter estimates. The model includes country-specific fixed effects to control for unobserved heterogeneity across nations.

Results and Findings

The results of the Levin-Lin-Chu (LLC) panel unit root test reported in Table 2 indicate that all variables under consideration GDP per capita (RGDP), personal remittances (REMIT), unemployment (UNEMP), population growth (POP GROWTH), and foreign direct investment (FDI) are non-stationary in their levels but become stationary after first differencing. This finding establishes that the series are integrated of order one, I(1).

Table 2: *Outcomes of the Stationary Tests: Levin-Lin-Chu (LLC)*

Test Variables	Level		1st difference		Result
	t-statistics	P values	t-statistics	P values	
RGDP	-1.4865	0.0686	-5.2879	0.0000	I(1) (Stationary at first difference)
REMIT	-1.7802	0.0375	-7.5786	0.0000	I(1) (Stationary at first difference)
POP GROWTH	-1.0050	0.8426	-3.6801	0.0001	I(1) (Stationary at first difference)
FDI	-1.9370	0.0264	-6.1849	0.0000	I(1) (Stationary at first difference)
UNEMP	-0.3537	0.3618	-4.2374	0.0000	I(1) (Stationary at first difference)

Note: Authors' Estimation

The I(1) property of the variables satisfies the preliminary condition for the application of cointegration techniques, as it suggests that although the variables may drift in the short run, there exists the possibility of a stable long-run equilibrium relationship among them.

The results of the Pedroni panel cointegration test presented in Table 3 provide strong evidence of a long-run equilibrium relationship among the selected variables. Out of the seven statistics, four (Panel PP-statistic, Panel ADF-statistic, Group PP-statistic, and Group ADF-statistic) which suggests majority shows the existence of a stable long-run association among variables.

Table 3: *Outcomes of the Cointegration Test. (Pedroni's cointegration test)*

Dimension	Statistic
Panel v-Statistic	0.9591
Panel rho-Statistic	-0.9254
Panel PP-Statistic	-9.8777
Panel ADF-Statistic	-8.5448
Group rho-Statistic	0.2867
Group PP-Statistic	-10.4892
Group ADF-Statistic	-8.3014

Note: Authors' Estimation

The Kao residual-based cointegration test reported in Table 4 further supports this conclusion. The ADF statistic of -2.064 is significant at the 5 percent level ($p = 0.0195$), allowing rejection of the null hypothesis of no cointegration. This finding corroborates the evidence from the Pedroni test and strengthens the inference that the variables share a common long-run trajectory despite being individually non-stationary.

Table 4. *Outcomes of the Kao Cointegration Test.*

	t-Statistic	Prob.
ADF	-2.064172	0.0195

Note: Authors' Estimation

Likewise, the joint interpretation of both tests confirms that the variables move together in the long run, thereby justifying the application of long-run estimators of Fully Modified OLS (FMOLS) to derive consistent parameter estimates. The presence of cointegration validates the econometric framework by establishing that remittances and other explanatory variables exert long-run influences on economic growth in the panel under study

Table 5 presents the descriptive statistics of the variables used in the study. The average GDP per capita (RGDP) is 24.28 with a standard deviation of 2.28, while remittances (REMIT) average 5.87 with a relatively higher variation of 6.59. Unemployment (UNEMP) shows a mean of 6.16 and moderate variability, whereas population growth (POPGROWTH) has a mean of 1.59 with lower dispersion.

Table 5: *Descriptive Statistics*

	RGDP	REMIT	UNEMP	POPGROWTH	FDI
Mean	24.2846	5.8718	6.1678	1.5906	1.9032
Std. Dev.	2.2876	6.5966	3.1463	1.0927	2.9704
Skewness	0.1386	1.9693	0.2306	0.6451	2.7734
Kurtosis	2.1473	6.5260	2.2946	5.2050	10.5323

Note: Authors' Estimation

Foreign direct investment (FDI) averages 1.90 with the highest variability among the variables. In terms of distributional properties, RGDP, UNEMP, and POPGROWTH are close to normal, while REMIT and FDI display positive skewness and high kurtosis, indicating the presence of extreme values.

Table 6 reports the correlation matrix of the study variables. With respect to the dependent variable, RGDP, remittances (REMIT) show a weak positive correlation (0.15), while unemployment (UNEMP) has a slight negative correlation (-0.06).

Table 6: *Correlations*

	RGDP	REMIT	UNEMP	POPGROWTH	FDI
RGDP	1				
REMIT	0.1512	1			
UNEMP	-0.0644	0.4198	1		
POPGROWTH	-0.2489	-0.4636	0.0774	1	
FDI	-0.2802	-0.3554	0.0035	0.3563	1

Note: Authors' Estimation

Furthermore, population growth (POPGROWTH) is more strongly and negatively correlated with RGDP (-0.25), and foreign direct investment (FDI) also exhibits a negative association (-0.28). Overall, the pairwise correlations indicate that remittances move in the same direction as economic growth, whereas higher unemployment, population growth, and FDI are weakly associated with lower levels of GDP per capita.

The regression results presented in Table 8 reveal the long-run associations between the explanatory variables and RGDP. The coefficient of remittances is positive and statistically significant at the 5 percent level, indicating that higher remittance inflows are associated with higher levels of output per capita.

Table 8: *Outcomes of the FMOLS*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REMIT	0.0624	0.0251	2.4873	0.0138
UNEMP	0.0284	0.0408	0.6961	0.4873
POP GROWTH	-0.3684	0.0933	-3.9497	0.0001
FDI	0.1360	0.0409	3.3230	0.0011
R-squared	0.941886	Mean dependent var		24.33327
Adjusted R-squared	0.938295	S.D. dependent var		2.274896
S.E. of regression	0.565095	Sum squared resid		56.8412
Long-run variance	0.692173			

Note: Authors' Estimation

Similarly, the coefficient of unemployment is positive but statistically insignificant, suggesting that variations in unemployment do not exhibits a meaningful long-run influence on GDP per capita within the model specification. In contrast, population growth carries a negative and highly significant coefficient, which implies that higher population growth is associated with reductions in output per capita over the long run.

Moreover, foreign direct investment is found to have a positive and statistically significant effect on GDP per capita at the 1 percent level. This result indicates that FDI inflows are positively associated with long-run economic growth in the panel of countries. The overall explanatory power of the model is very strong, with an R-squared value of 0.94, showing that the selected variables collectively explain a substantial proportion of the variation in RGDP. The results confirm the presence of meaningful long-run.

Discussion

The results of this study are consistent with mainstream growth theory, which provides two complementary perspectives. In the neoclassical Solow-Swan framework, the negative and significant association between population growth and GDP per capita reflects the capital dilution effect, whereby rapid demographic expansion reduces capital per worker. It also slows long-run growth unless balanced by investment and productivity gains (Solow, 1956; Delessa et al., 2024). At the same time, the positive role of remittances and foreign direct investment supports the endogenous growth tradition, which highlights how external financial flows enhance productivity through channels such as capital accumulation and technology transfer (Dahal et al., 2024; Barkat et al., 2024). In the SAARC context, the unemployment rate is a weak measure of labor-market slack because large informal sectors and outward migration distort the statistic (Shakya & Gonpu, 2021). Remittances smooth household income and can weaken the usual Okun-type co-movement between output and unemployment (Abdulai, 2023; Panthi & Devkota, 2024). Episodes of productivity-led 'jobless growth' further delink output from unemployment in developing, migration-intensive economies (Delessa et al., 2024; Hossain et al., 2025). These mechanisms are consistent with the finding of the study that the unemployment coefficient is not statistically significant in the long-run FMOLS estimates.

When placed in the context of existing literature, the findings both reinforce and contrast earlier evidence. The positive contribution of remittances accords with studies in Nepal and South Asia that find long-run growth-enhancing effects of remittance inflows (Adhikari et al., 2024; Panthi & Devkota, 2024), and also aligns with broader meta-analytic evidence showing a modest but generally positive impact in developing economies (Cazachevici et al., 2020). However, the results contrast with evidence from Bangladesh and Sub-Saharan Africa, where weak institutions, macroeconomic instability, and Dutch disease effects have sometimes turned the remittance–growth relationship insignificant or negative (Hossain et al., 2025; Delessa et al., 2024). Similarly, the positive influence of FDI is consistent with endogenous growth expectations and recent empirical work in Nepal (Dahal et al., 2024), while the negative impact of population growth reflects findings from developing-country panels where demographic pressures have outweighed potential market-size benefits (Abdulai, 2023).

The results suggest that while remittances and FDI are important growth enablers, their effectiveness in SAARC depends critically on institutional quality, macroeconomic stability, and the capacity to manage

demographic and labor-market challenges. The studies could use household or regional data to see how remittances affect poverty, education, and small businesses in SAARC countries. They could also include other factors like governance, financial development, and institutional quality to better explain the remittance growth link. In addition, using methods such as DOLS or panel VECM and studying the effects of global events like COVID-19 would give a clearer picture of both short- and long-term impacts.

Conclusion

This study examined the long-run relationship between remittances and economic growth in SAARC economies within a panel framework, using real GDP as the dependent variable and remittances, foreign direct investment, unemployment, and population growth as explanatory variables. The findings provide consistent evidence that remittance inflows and FDI contribute positively to long-run growth, while population growth exerts a negative influence, and unemployment remains statistically insignificant in explaining growth dynamics. Collectively, these results highlight the macro-critical role of remittances and capital inflows in shaping the development trajectories of South Asian economies, reinforcing the need for policies that can channel such external resources into productive sectors and sustainable growth pathways.

The study offers several actionable policy recommendations. SAARC governments and central banks should promote remittance-backed savings and investment products that encourage recipients to channel inflows into formal financial systems rather than consumption alone. Financial institutions can design diaspora investment schemes to mobilize migrant savings for infrastructure, renewable energy, and SME financing. Additionally, integrating remittance-receiving households into formal credit and insurance markets can strengthen financial inclusion and enhance the developmental multiplier effect of remittances. Strengthening digital payment infrastructure and cross-border financial cooperation would further facilitate efficient remittance transfers and investment flows within the region.

The dataset is restricted to selected macroeconomic indicators and does not account for institutional quality, financial inclusion, or structural heterogeneity across SAARC economies, factors that are increasingly recognized as crucial in mediating the remittance growth nexus. Moreover, the reliance on aggregate panel data may mask country-specific dynamics, such as varying absorptive capacities and sectoral differences. Future research should extend the analysis by incorporating institutional, financial, and sectoral variables into panel designs, employing alternative estimation methods such as dynamic panel models, and exploring heterogeneous country-level effects through comparative case studies. Such directions would provide a deeper understanding of the mechanisms through which remittances interact with domestic structures to influence long-run growth outcomes in the region.

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