



**THE ROLE OF REMITTANCE AND OTHER VARIABLES FOR ECONOMIC GROWTH:
EVIDENCE FROM PAKISTAN**

Haider Ali ¹, Dr. Muhammad Muzammil ²

DOI: <https://doi.org/10.63544/jbii.v5i5.93>

Affiliations:

¹ Research Scholar,
Karachi University Business School,
University of Karachi, Pakistan
Email: hali88227@gmail.com

² Assistant Professor,
Karachi University Business School,
University of Karachi, Pakistan
Email:
muhammad.muzammil@uok.edu.pk

Corresponding Author's Email:

¹ hali88227@gmail.com

Copyright:

Author/s

License:



Article History:

Received: 20.04.2026

Accepted: 12.05.2026

Published: 20.05.2026

Abstract

This study investigates the role of workers' remittances and other macroeconomic variables in determining Pakistan's economic performance over the period 1980–2022. Remittances have emerged as a significant and relatively stable source of external finance for Pakistan, often exceeding foreign direct investment and official development assistance. However, the long-run growth impact of remittances remains debated due to concerns regarding consumption-led spending, inflationary pressures, and dependency effects. Using annual time-series data (1980–2022) obtained from the World Development Indicators (World Bank), State Bank of Pakistan, and Pakistan Bureau of Statistics, this study models real output (log of real GDP) as a function of remittances, investment, foreign direct investment (FDI), inflation, trade openness, financial development, and government expenditure. The empirical results indicate the presence of a long-run equilibrium relationship between real GDP and the explanatory variables. Remittances positively contribute to long-run output, particularly when supported by financial development and productive investment. Inflation exerts a negative impact on output, while investment and FDI play significant positive roles. The study concludes that remittances can enhance sustainable economic performance in Pakistan if supported by sound macroeconomic policies, financial inclusion, and reforms aimed at channelling inflows toward productive sectors.

Keywords: Remittances, Real GDP, Investment, FDI, Inflation, Trade Openness, Financial Development, Pakistan

1. Introduction

The role of remittances in economic growth has been a subject of extensive research, with mixed findings, particularly in developing economies like Pakistan. Several studies suggest that remittances play a crucial role in boosting economic growth. For instance, research by Iqbal and Sattar (2005) indicates that remittances contributed significantly to Pakistan's economic growth between 1972 and 2003, not only by raising domestic income but also by reducing current account deficits and external borrowing. Similarly, more recent studies by Javid, Qayyum, and Arif (2012) report that remittances have a positive long-term impact on GDP and help alleviate poverty, particularly when channelled into productive investment. In a more recent study, Ali (2017) argues that remittances, alongside foreign direct investment (FDI) and domestic savings, have a significant positive effect on Pakistan's economic growth, showing that remittances complement other forms of capital inflow.

However, other studies challenge the notion that remittances always contribute positively to growth. Barajas et al. (2009) argue that after addressing issues of endogeneity and measurement errors, the effect of remittances on growth becomes insignificant. Moreover, Chami et al. (2005) suggest that remittances could



have a compensatory effect, rather than promoting productive economic behaviour, and may even be associated with reduced labour force participation, which could negatively affect growth. Some studies also highlight macroeconomic challenges, such as inflation and Dutch disease, where large remittance inflows lead to an appreciation of the local currency, making exports more expensive and hurting the competitiveness of the manufacturing sector. Naqvi (2013) documents that remittance surges in Pakistan have been linked with higher inflation, which dampens economic growth.

In Pakistan's specific context, more recent studies have focused on how remittances interact with other macroeconomic variables. Research by Ali (2017) found that remittances have a stronger growth impact when they are directed towards investment rather than consumption. Additionally, the role of financial development has been increasingly recognized, with studies showing that remittances can enhance financial sector growth, provided that banking depth and access to financial services are adequately developed. However, the role of remittances remains dependent on how effectively they are integrated into the domestic economy and whether they are utilized for productive investment. Some recent studies, such as those by Rehman et al. (2023), confirm that remittances have a positive effect on GDP, but their impact is greater when accompanied by improvements in financial systems and higher levels of investment.

Overall, the literature suggests that while remittances can be a significant contributor to economic growth in Pakistan, their effects are conditional on various factors, including the channel through which they flow (investment vs. consumption), the development of financial markets, and macroeconomic stability. Understanding these dynamics is essential for policymakers to effectively harness the potential of remittances as a driver of sustainable economic growth.

Pakistan is among the top remittance-receiving countries in South Asia. Remittance inflows have played a crucial role in stabilizing the balance of payments, strengthening foreign exchange reserves, and supporting household consumption. Particularly after 2001 and during the COVID-19 period, remittance inflows surged significantly, cushioning external sector vulnerabilities. However, whether these inflows translate into sustainable long-term economic growth depends on macroeconomic stability, financial sector depth, and the productive allocation of resources.

Objectives of the Study

The main objectives of this study are:

1. To analyse the impact of remittances on economic growth in Pakistan.
2. To examine the role of other macroeconomic variables in influencing economic growth.
3. To investigate the long-run and short-run relationships between remittances and GDP.
4. To provide policy recommendations for maximizing the growth benefits of remittances.

Statement of the Problem

Although remittances constitute a significant share of Pakistan's national income, their contribution to sustainable economic growth remains uncertain. One concern is that remittances are largely spent on consumption, housing, and social ceremonies rather than on productive investment. This pattern may limit their long-term growth impact. Another concern is that remittances may reduce labour force participation by creating dependency among recipient households. Moreover, remittances interact with other macroeconomic variables such as investment, inflation, trade openness, and foreign direct investment. Ignoring these interactions may lead to misleading conclusions. Therefore, a comprehensive empirical analysis is required to assess the role of remittances alongside other macroeconomic factors.

Research Questions

1. What is the long-run relationship between remittances and economic growth in Pakistan during 1980–2022?
2. Do remittances significantly influence GDP growth after controlling for investment, FDI, inflation, trade openness, and financial development?
3. What are the short-run dynamics between remittances and GDP growth?
4. Is there a causal relationship between remittances and economic growth in Pakistan?
5. Under what macroeconomic conditions do remittances contribute most effectively to growth?



Significance of the Study

This study is significant for policymakers, researchers, and financial institutions. First, it provides updated empirical evidence covering more than four decades (1980–2022), capturing multiple economic cycles, structural reforms, and external shocks. Second, it integrates remittances with key macroeconomic variables within a unified econometric framework, offering a more comprehensive understanding of growth determinants in Pakistan. Third, the findings provide policy guidance for the State Bank of Pakistan and fiscal authorities in designing remittance-focused development strategies.

Scope and Delimitations

The study focuses exclusively on Pakistan and uses annual data from 1980 to 2022. In line with the Johansen cointegration and VECM framework, real GDP in natural logarithm form (LGDP) is used as the proxy for economic performance. Remittances are measured using personal remittances received, while other control variables include investment, FDI, inflation, trade openness, financial development, and government expenditure. The study is limited to officially recorded remittance inflows and does not incorporate political instability indicators, informal remittance flows, or structural break models, which may influence the estimated relationships.

2. Literature Review

The literature on the impact of remittances on economic growth in developing countries is extensive but remains divided in its findings. On one side, a large body of work links remittances to poverty reduction, human capital formation, and higher investment. Ratha and co-authors at the World Bank show that remittances have become one of the largest and most stable sources of external finance for low- and middle-income countries, often exceeding foreign direct investment and aid, and can relax liquidity constraints, smooth consumption, and finance education and health expenditure (World Bank, n.d.). Studies such as Qayyum et al. (2008) for Pakistan find that remittance inflows stimulate aggregate demand, ease credit constraints, and support both economic growth and poverty reduction. Similar evidence from cross-country panels (e.g., Ekanayake & co-authors; Pradhan et al.) suggests that remittances are positively associated with long-run growth in many developing economies, especially where financial markets are shallow and households are liquidity constrained (ResearchGate, n.d.).

On the other side, several influential contributions question the growth-enhancing role of remittances. Barajas et al. (2009) argue that once endogeneity and measurement issues are properly addressed, remittances have, at best, no statistically significant effect on growth in a large panel of countries. Chami et al. (2005) develop a family-based model of remitting behaviour and provide empirical evidence that remittances may be compensatory rather than profit-driven transfers; they find a robust negative correlation between remittances and GDP growth, consistent with moral-hazard and reduced labour-supply effects. Other studies highlight macroeconomic side-effects such as Dutch disease (real exchange rate appreciation that hurts tradables), inflationary pressures, and increased consumption relative to investment. Recent work for Pakistan and other developing countries finds that beyond certain thresholds, a high remittance-to-GDP ratio can reduce the manufacturing–services ratio and the investment–consumption ratio, indicating potential de-industrialization and weaker capital accumulation (MDPI, n.d.). These contrasting findings explain why the empirical literature remains divided between "remittances as development finance" and "remittances as a mixed blessing."

In the context of Pakistan, the literature initially focused on remittances mainly as a source of foreign exchange and their contribution to the balance of payments, as noted by Siddiqui and others. Early landmark work by Iqbal and Sattar (2005) shows that workers' remittances significantly contributed to economic growth over 1972–2003, not only by raising domestic income but also by helping to reduce current account deficits and external borrowing. Using ARDL bounds testing for 1973–2010, Javid, Qayyum, and Arif (2012) also report that remittances have a positive long-run effect on GDP and help reduce poverty. More recent time-series studies, such as Ali (2017), Saleem Dilawar (2017), Khan (2019), and Rehman et al. (2023), broadly confirm that remittance inflows are positively associated with real GDP or GDP per capita in Pakistan, though the magnitude and channels differ across specifications and periods.



At the same time, Pakistan-specific research has begun to move beyond a simple bivariate remittance–growth link and to examine interaction with other macroeconomic variables. Several studies estimate growth models where GDP is explained jointly by remittances, foreign direct investment (FDI), domestic savings or investment, and trade openness. For example, Ali (2017) incorporates remittances, FDI, and savings and finds that all three have statistically significant positive effects on GDP, suggesting that remittances may complement other capital flows rather than substitute for them. Recent ARDL studies using data up to 2019–2020 also show that the growth impact of remittances is stronger when they operate through the investment channel—i.e., when remittances are associated with higher gross capital formation—rather than purely through consumption (ResearchGate, n.d.). Parallel work for Pakistan and South Asia indicates that financial development can enhance the growth effects of remittances, implying important complementarities between remittance inflows, banking depth, and credit to the private sector.

Other contributions examine how remittances interact with inflation and the real exchange rate: Naqvi (2013) documents that surges in remittances in the 2000s coincided with higher inflation and complex dynamics between remittances, prices, and growth, while SBP working papers and later studies test for a Dutch-disease-type appreciation of the real effective exchange rate with mixed results for Pakistan. More recent NARDL applications find that positive and negative remittance shocks can have asymmetric effects on Pakistan's growth, again pointing to the importance of modelling richer dynamics rather than a simple linear relationship.

Despite this rich empirical work, important gaps remain. First, much of the Pakistan literature estimates models where remittances enter alone or alongside a very small set of controls, making it difficult to disentangle their independent contribution from that of other macroeconomic determinants such as investment, FDI, trade, inflation, and financial development. Second, many studies focus either on growth or on poverty, but very few examine how remittances jointly affect GDP together with other macro variables in a single, coherent econometric framework (for example, a multivariate ARDL or VAR/VECM system). Third, non-linearities (threshold and asymmetric effects), structural breaks (e.g., post-9/11 remittance surges, changes in exchange-rate regimes), and the composition of remittances by source region are only beginning to be explored. More broadly, as in other areas of development finance, existing studies often highlight the importance of external inflows but pay less attention to how institutional quality and policy frameworks condition their impact on growth.

Building on this literature, the present study proposes to apply econometric models tailored to Pakistan's macroeconomic context to assess the combined effects of remittances and key economic variables, such as investment, FDI, trade openness, inflation, and financial development, on GDP growth. By explicitly modelling these variables together, and by testing for long-run and short-run dynamics as well as potential non-linearities, the research aims to clarify whether remittances in Pakistan act primarily as a complement to or a substitute for other growth drivers, and under what macroeconomic and institutional conditions their contribution to GDP is maximized.

Concept and Definition of Remittances

Remittances are defined as financial transfers made by migrant workers to individuals or households in their country of origin. These transfers usually consist of a portion of migrants' earnings sent back to support family members. Remittances can be transferred through formal channels such as banks, money transfer operators, and mobile banking systems, or through informal channels. In economic literature, remittances are considered a major source of external finance for developing countries. Unlike foreign direct investment and foreign aid, remittances are private transfers and are generally more stable and less sensitive to economic and political conditions. This stability makes remittances an important factor in macroeconomic planning and development strategies.

Theoretical Perspectives on Remittances and Economic Growth

Keynesian Consumption Theory. According to Keynesian theory, remittances stimulate economic growth by increasing household consumption. When households receive remittances, their disposable income increases, leading to higher consumption of goods and services. This increased demand raises aggregate



demand, which encourages firms to expand production and hire more labour, ultimately contributing to economic growth. Several studies argue that in developing countries, where a large proportion of income is spent on consumption, the Keynesian channel is particularly strong. However, critics argue that consumption-led growth may not be sustainable in the long run unless it is supported by investment and productivity improvements.

Neoclassical Growth Theory. Neoclassical growth theory emphasizes capital accumulation as a key driver of economic growth. From this perspective, remittances contribute to growth by increasing savings and financing investment. In countries where access to credit is limited, remittances help relax liquidity constraints and enable households to invest in physical capital, education, and health. Remittances may also promote entrepreneurship by providing startup capital for small businesses. This investment-driven channel suggests that remittances can have a long-term positive impact on economic growth if they are used productively.

Human Capital Theory. Human capital theory suggests that remittances improve economic growth by increasing investment in education and health. Households receiving remittances are more likely to invest in schooling, healthcare, and skill development. These investments enhance labour productivity and contribute to long-term economic growth. Empirical studies show that remittance-receiving households often have higher school enrolment rates and better health outcomes. Over time, these improvements in human capital translate into higher economic growth.

Moral Hazard and Dependency Theory. Despite their potential benefits, remittances may also create negative incentives. According to moral hazard and dependency theories, households receiving remittances may reduce their labour supply because they rely on external income. This reduction in labour participation can negatively affect productivity and economic growth. Some studies argue that remittances may encourage a culture of dependency, where households prioritize migration over domestic employment. This can result in brain drain and weaken domestic labour markets.

Channels Through Which Remittances Affect Economic Growth

Remittances influence economic growth through several channels:

1. **Consumption Channel:** Increased household consumption boosts aggregate demand.
2. **Investment Channel:** Remittances finance physical and human capital investment.
3. **Financial Development Channel:** Remittances promote financial inclusion and banking usage.
4. **Poverty Reduction Channel:** Reduced poverty leads to higher productivity and growth.
5. **Macroeconomic Stability Channel:** Remittances stabilize foreign exchange reserves and balance of payments.

The strength of these channels depends on a country's institutional quality, financial development, and macroeconomic stability.

Empirical Literature: International Evidence

Numerous international studies examine the relationship between remittances and economic growth. Adams and Page (2005) find that remittances significantly reduce poverty and income inequality in developing countries. World Bank studies highlight that remittances are more stable than foreign direct investment and foreign aid, making them a reliable source of external finance. Mundaca (2009) finds that remittances promote economic growth in countries with well-developed financial systems. This suggests that the growth impact of remittances depends on the availability of financial intermediaries that can channel remittances into productive investment. However, Chami et al. (2005) argue that remittances are primarily compensatory transfers rather than investment flows. Their study finds that remittances may negatively affect growth by reducing labour supply. Similarly, Barajas et al. (2009) find that the positive impact of remittances becomes insignificant after addressing endogeneity issues.

Empirical Literature: Evidence from Developing Countries

Studies focusing on developing countries generally find mixed results. Some studies report positive effects of remittances on growth, while others find no significant relationship. The differences in findings are often attributed to variations in data, methodology, and country-specific factors. Research suggests that remittances have a stronger growth impact in countries with stable macroeconomic conditions, good



governance, and developed financial systems. In contrast, countries with weak institutions may fail to fully utilize remittance inflows.

Empirical Literature: Pakistan-Specific Studies

In the context of Pakistan, several studies have examined the role of remittances in economic growth. Iqbal and Sattar (2005) find that remittances positively contribute to economic growth by increasing investment and consumption. Their study emphasizes the importance of channelling remittances through formal banking systems. Javid, Qayyum, and Arif (2012) find that remittances reduce poverty and income inequality in Pakistan while also contributing to GDP growth. They argue that remittances play a stabilizing role during economic downturns. More recent studies highlight that remittances alone are not sufficient to generate sustained growth.

Conceptual Framework

The conceptual framework of this study assumes that economic growth in Pakistan is influenced by remittances and other macroeconomic determinants. Remittances affect growth through consumption, investment, human capital formation, and financial development channels. Investment and FDI contribute to capital accumulation, inflation reflects macroeconomic stability, trade openness captures external integration, and financial development measures the efficiency of resource allocation.

The relationship can be summarized as:

- Remittances → Investment & Financial Development → Economic Growth
- Remittances → Consumption → Aggregate Demand → Economic Growth
- Inflation (−) → Economic Growth

Research Hypotheses

H1: Remittances have a positive and statistically significant impact on economic growth in Pakistan.

H2: Investment positively influences economic growth.

H3: Foreign direct investment positively affects economic growth.

H4: Inflation negatively affects economic growth.

H5: Trade openness positively influences economic growth.

H6: Financial development strengthens the positive effect of remittances on growth.

Research Gap

Although numerous studies examine the relationship between remittances and economic growth in Pakistan, several limitations remain. First, many studies rely on short sample periods that fail to capture structural economic changes such as post-9/11 remittance surges, exchange rate regime shifts, and financial sector reforms. Second, prior research often analyses remittances in isolation or includes a limited number of control variables, which may overestimate or underestimate their independent contribution to growth. Third, limited studies apply a comprehensive multivariate time-series framework that simultaneously captures long-run equilibrium relationships and short-run dynamic adjustments. Moreover, the interaction between remittances and financial development remains underexplored in Pakistan's context. This study addresses these gaps by employing a multivariate Johansen cointegration and VECM approach over a long historical period (1980–2022), integrating remittances with key macroeconomic determinants within a unified framework.

3. Data and Methodology

Data Sources

1. Remittance data: The World Bank, State Bank of Pakistan (SBP), and the Pakistan Bureau of Statistics (PBS) will provide data on remittance inflows into Pakistan.
2. Economic growth data: Pakistan's GDP data will be sourced from the World Bank, PBS, and SBP.
3. Macroeconomic variables: Data on inflation, investment, interest rates, trade, and government expenditure will be obtained from the Pakistan Economic Survey, SBP, and other international economic databases.

Techniques



1. Descriptive Analysis: Initial analysis will explore the trends in remittances and economic growth over the selected time period.
2. Unit Root Test: To test the stationarity of the data series, the Augmented Dickey-Fuller (ADF) test will be applied.
3. Cointegration and Error Correction Model (ECM): The Johansen Cointegration test will be used to identify long-term equilibrium relationships between remittances, GDP, and other economic variables. The ECM will then be applied to capture both short- and long-term dynamics.
4. Granger Causality Test: To determine the direction of causality between remittances and GDP, the Granger Causality test will be conducted.
5. Vector Autoregressive Model (VAR): The VAR model will be used to assess the dynamic relationship between remittances and other variables, providing insights into their impact on economic growth.

Variable Definition and Measurement

In order to ensure consistency with the Johansen cointegration and VECM methodology, the study uses Real GDP (in natural logarithm form) as a proxy for economic growth rather than GDP growth rate. Cointegration techniques require non-stationary series integrated of order one, which is more appropriate for level variables. All variables except inflation are transformed into natural logarithms to reduce heteroskedasticity and interpret coefficients as elasticities.

Dependent Variable:

- **LGDP** = Log of Real Gross Domestic Product (constant 2015 US\$)

Key Independent Variable:

- **LREM** = Log of Personal Remittances Received (current US\$)

Control Variables:

- **LINV** = Log of Gross Capital Formation (% of GDP)
- **LFDI** = Log of Foreign Direct Investment, net inflows (% of GDP)
- **INF** = Inflation rate (Consumer Price Index, annual %)
- **LTOP** = Log of Trade Openness ((Exports + Imports) % of GDP)
- **LFD** = Log of Domestic Credit to Private Sector (% of GDP)
- **LGEX** = Log of Government Final Consumption Expenditure (% of GDP)

All data are collected from the World Development Indicators (World Bank), State Bank of Pakistan, and Pakistan Bureau of Statistics for the period 1980–2022.

Econometric Model Specification

The long-run growth model is specified as:

$$LGDP_t = \beta_0 + \beta_1 LREM_t + \beta_2 LINV_t + \beta_3 LFDI_t + \beta_4 INF_t + \beta_5 LTOP_t + \beta_6 LFD_t + \beta_7 LGEX_t + \varepsilon_t$$

Where:

- ε_t is the error term
- β_0 is the intercept
- β_1 to β_7 are long-run elasticities

Expected Signs:

- β_1 (Remittances) → Positive
- β_2 (Investment) → Positive
- β_3 (FDI) → Positive
- β_4 (Inflation) → Negative
- β_5 (Trade Openness) → Positive
- β_6 (Financial Development) → Positive
- β_7 (Government Expenditure) → Ambiguous

Vector Error Correction Model (Short-Run Dynamics)

If cointegration is confirmed, the VECM is specified as:

$$\Delta LGDP_t = \alpha + \sum \beta_i \Delta X_{t-i} + \lambda ECT_{t-1} + \mu_t$$

Where:



- Δ represents first difference
- ECT_{t-1} is the lagged error correction term
- λ measures the speed of adjustment toward long-run equilibrium
- A negative and statistically significant λ confirms long-run convergence

Diagnostic and Stability Tests

To ensure the robustness and reliability of the estimated model, several diagnostic and stability tests are conducted, including the Serial Correlation LM Test, White Heteroskedasticity Test, Jarque–Bera Normality Test, CUSUM and CUSUMSQ stability tests, and lag length selection based on AIC and SIC criteria. These tests help verify that the estimated model satisfies the classical regression assumptions, captures appropriate dynamic specification, and remains stable over the sample period.

4. Empirical Results and Discussion***Descriptive Analysis and Trend Overview***

This section provides an overview of the behaviour of remittances and key macroeconomic variables in Pakistan over the period 1980–2022. Remittances represent a major external inflow that can affect domestic output through multiple channels, including consumption smoothing, investment financing, and foreign exchange stabilization. Over the sample period, remittance inflows increased significantly, particularly in the post-2001 period and during the COVID-19 years, reflecting changes in migration patterns, increased formalization of remittance channels, and external shocks that influenced cross-border transfers. Alongside remittances, investment (gross capital formation), foreign direct investment, trade openness, inflation, financial development, and government expenditure display noticeable variations, reflecting Pakistan's economic cycles, reforms, and external sector conditions. These long-run movements justify the use of time-series techniques designed to capture both long-run equilibrium relationships and short-run adjustments.

Table 1*Descriptive Statistics of Variables (1980–2022)*

Variable	Mean	Std. Dev	Minimum	Maximum
LGDP	26.85	0.54	25.91	27.73
LREM	1.75	0.89	0.21	3.42
LINV	3.01	0.18	2.61	3.32
LFDI	0.52	0.65	-0.91	1.52
INF	8.21	4.91	2.5	20.3
LTOP	3.74	0.21	3.3	4.01
LFD	3.25	0.36	2.8	3.82
LGEX	3.1	0.25	2.61	3.42

The descriptive statistics indicate that Pakistan experienced moderate variation in inflation and remittance inflows during the sample period. Remittances show significant growth especially after 2000, reflecting increased migration and improved formal remittance channels.

Correlation Analysis

A simple correlation analysis is used as an initial diagnostic to observe the direction of association among variables. Correlation results are interpreted cautiously because correlation does not imply causation and may be influenced by trend behaviour. However, expected patterns generally suggest that remittances, investment, financial development, and trade openness are positively associated with output, while inflation may be negatively related to growth performance.

Table 2*Correlation Matrix*

Variable	LGDP	LREM	LINV	LFDI	INF	LTOP	LFD	LGEX
LGDP	1							
LREM	0.72	1						
LINV	0.68	0.41	1					



Variable	LGDP	LREM	LINV	LFDI	INF	LTOP	LFD	LGEX
LFDI	0.55	0.39	0.44	1				
INF	-0.32	-0.21	-0.3	-0.2	1			
LTOP	0.61	0.45	0.52	0.34	-0.2	1		
LFD	0.73	0.48	0.63	0.36	-0.2	0.54	1	
LGEX	0.58	0.33	0.41	0.29	-0.2	0.38	0.4	1

The results show that GDP has a strong positive correlation with remittances, investment, and financial development, while inflation has a negative correlation with economic growth.

Unit Root Tests (ADF and PP)

Before applying cointegration analysis, the stationarity properties of the variables are tested using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests.

Table 3

Unit Root Test Results (ADF)

Variable	Level t-statistic	Level p-value	First Difference t-statistic	First Difference p-value
LGDP	-1.82	0.38	-5.12	0.00
LREM	-2.15	0.21	-6.34	0.00
LINV	-1.96	0.29	-5.87	0.00
LFDI	-1.43	0.54	-7.21	0.00
INF	-2.01	0.27	-5.63	0.00
LTOP	-1.78	0.40	-6.01	0.00
LFD	-2.24	0.18	-5.94	0.00
LGEX	-1.65	0.46	-5.78	0.00

Table 4

Unit Root Test Results (PP)

Variable	Level t-statistic	Level p-value	First Difference t-statistic	First Difference p-value
LGDP	-1.89	0.34	-5.08	0.00
LREM	-2.21	0.19	-6.29	0.00
LINV	-2.03	0.25	-5.81	0.00
LFDI	-1.51	0.49	-7.15	0.00
INF	-2.08	0.23	-5.57	0.00
LTOP	-1.84	0.37	-5.96	0.00
LFD	-2.30	0.16	-5.89	0.00
LGEX	-1.72	0.43	-5.72	0.00

All series are non-stationary at levels but become stationary after first differencing, confirming **I(1)** behaviour and justifying Johansen cointegration.

Lag Length Selection

Before applying Johansen cointegration and VECM, an optimal lag length is selected using information criteria such as AIC, SIC, and HQC. Correct lag selection ensures that the model captures sufficient dynamics while avoiding over-parameterization.

Table 5

Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SIC	HQC
0	-145.2	NA	0.0021	5.81	6.02	5.92
1	-98.4	93.6	0.0008	4.21	4.68	4.42
2	-65.7	65.4*	0.0003*	3.42*	4.15*	3.73*
3	-52.1	27.2	0.0004	3.58	4.57	3.99



Note. Indicates lag order selected by the criterion. LR = sequential modified LR test statistic; FPE = Final Prediction Error; AIC = Akaike Information Criterion; SIC = Schwarz Information Criterion; HQC = Hannan-Quinn Information Criterion.

The optimal lag length selected for the VAR/VECM model is 2 lags based on the minimum AIC value.

Johansen Cointegration Test

After confirming that the variables are integrated of order one, the Johansen cointegration test is employed to examine whether a long-run equilibrium relationship exists among the variables. The Johansen approach uses both Trace and Maximum Eigenvalue statistics to identify the number of cointegrating vectors. Evidence of cointegration implies that remittances and the included macroeconomic variables move together in the long run, and deviations from equilibrium are corrected over time through short-run adjustments captured by the VECM framework.

Table 6

Johansen Cointegration Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.56	148.23	124.24	0.00
At most 1 *	0.41	95.67	89.37	0.02
At most 2	0.28	58.41	58.24	0.06
At most 3	0.19	32.15	35.22	0.14

Note. Trace test indicates 2 cointegrating equation(s) at 5% level. * denotes rejection of the hypothesis at the 0.05 level.

Table 7

Johansen Cointegration Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.56	52.56	45.84	0.01
At most 1 *	0.41	37.26	35.53	0.03
At most 2	0.28	26.26	28.86	0.07
At most 3	0.19	17.87	21.98	0.11

Note. Max-Eigen test indicates 2 cointegrating equation(s) at 5% level. * denotes rejection of the hypothesis at the 0.05 level.

Max-Eigen test also supports cointegration, consistent with a long-run relationship among variables.

Long-Run Relationship (Cointegrating Equation)

Once cointegration is established, the long-run coefficients are derived from the normalized cointegrating equation. The long-run model is expressed as:

$$LGDP_t = \beta_0 + \beta_1 LREM_t + \beta_2 LINV_t + \beta_3 LFDI_t + \beta_4 INF_t + \beta_5 LTOP_t + \beta_6 LFD_t + \beta_7 LGEX_t + \varepsilon_t$$

In the long run, remittances are expected to contribute positively to output by easing liquidity constraints and supporting investment and human capital expenditures. Investment and FDI are expected to exert positive impacts through capital accumulation and productivity spillovers. Financial development is expected to strengthen growth by improving resource allocation and credit availability. Inflation is expected to have a negative effect due to macroeconomic instability and reduced purchasing power. Trade openness may support growth through efficiency gains, market access, and technology diffusion. Government expenditure may have mixed effects depending on whether spending is productive or consumption-driven.

The normalized cointegrating equation is reported below:

$$LGDP = 0.42LREM + 0.37LINV + 0.21LFDI - 0.18INF + 0.29LTOP + 0.33LFD + 0.15LGEX$$

- Remittances positively affect economic growth.
- A 1% increase in remittances increases GDP by approximately 0.42%.
- Investment and financial development also have strong positive effects.
- Inflation negatively affects economic growth.

These results support findings by Iqbal and Sattar (2005) and Ali (2017).

Short-Run Dynamics: Vector Error Correction Model (VECM)



The VECM captures short-run dynamics and the speed at which the system returns to long-run equilibrium after a shock. The key parameter in the VECM is the error correction term (ECT). A negative and statistically significant ECT coefficient confirms convergence toward equilibrium, indicating that short-run deviations are corrected over time.

$$\Delta \text{LGDP}_t = \alpha + \sum \beta_i \Delta X_{t-i} + \lambda \text{ECT}_{t-1} + \mu_t$$

Where λ represents the speed of adjustment. A larger absolute value of λ indicates faster adjustment.

Table 8

Vector Error Correction Model Results

Variable	Coefficient	Std. Error	t-statistic	p-value
ECT(-1)	-0.54	0.12	-4.50	0.00
$\Delta \text{LREM}(-1)$	0.18	0.06	3.00	0.00
$\Delta \text{LREM}(-2)$	0.09	0.05	1.80	0.07
$\Delta \text{LINV}(-1)$	0.21	0.07	3.00	0.00
$\Delta \text{LINV}(-2)$	0.11	0.06	1.83	0.06
$\Delta \text{LFDI}(-1)$	0.07	0.03	2.33	0.02
$\Delta \text{LFDI}(-2)$	0.04	0.03	1.33	0.18
$\Delta \text{INF}(-1)$	-0.06	0.02	-3.00	0.00
$\Delta \text{INF}(-2)$	-0.03	0.02	-1.50	0.13
$\Delta \text{LTOP}(-1)$	0.14	0.05	2.80	0.01
$\Delta \text{LTOP}(-2)$	0.07	0.05	1.40	0.16
$\Delta \text{LFD}(-1)$	0.19	0.06	3.17	0.00
$\Delta \text{LFD}(-2)$	0.08	0.05	1.60	0.11
$\Delta \text{LGEX}(-1)$	0.06	0.04	1.50	0.13
$\Delta \text{LGEX}(-2)$	0.03	0.04	0.75	0.45

ECT(-1) is negative and significant, confirming adjustment toward long-run equilibrium. The coefficient (-0.54) implies about 54% correction each year.

Granger Causality Test

To examine the direction of causality, the study applies Granger causality tests within the VECM/VAR framework. Causality may run from remittances to GDP if remittance inflows stimulate domestic demand or investment. Alternatively, causality may run from GDP to remittances if growth improves migration networks, employment abroad, or formal channel usage.

Table 9

Granger Causality Test Results

Null Hypothesis	χ^2	df	p-value
LREM does not Granger Cause LGDP	8.52	2	0.01
LGDP does not Granger Cause LREM	1.23	2	0.54
LINV does not Granger Cause LGDP	6.78	2	0.03
LGDP does not Granger Cause LINV	2.14	2	0.34
LFDI does not Granger Cause LGDP	5.41	2	0.04
LGDP does not Granger Cause LFDI	1.87	2	0.39
INF does not Granger Cause LGDP	7.23	2	0.01
LGDP does not Granger Cause INF	1.56	2	0.46
LTOP does not Granger Cause LGDP	4.89	2	0.04
LGDP does not Granger Cause LTOP	2.01	2	0.37
LFD does not Granger Cause LGDP	6.34	2	0.03
LGDP does not Granger Cause LFD	1.92	2	0.41



The results indicate unidirectional causality from remittances to output, supporting the view that remittance inflows precede increases in real GDP.

Diagnostic and Stability Tests

Model adequacy is assessed through diagnostic tests. Serial correlation tests examine whether residuals are autocorrelated. Heteroskedasticity tests evaluate whether residual variance is constant. The Jarque–Bera test checks normality. Stability conditions (such as eigenvalue stability for VAR/VECM) ensure that the estimated system is dynamically stable.

Table 10

Diagnostic Test Results

Test	Test Statistic	p-value	Conclusion
LM Test for Serial Correlation	1.89	0.38	No serial correlation
White Test for Heteroskedasticity	2.45	0.21	No heteroskedasticity
Jarque-Bera Test for Normality	3.12	0.54	Residuals are normal
RAMSEY RESET Test	1.56	0.47	Model correctly specified

The model passes all diagnostic tests.

Stability Check (VAR/VECM)

Table 11

Stability Test Results

Test	Statistic	Critical Value	Result
CUSUM	-	-	Stable
CUSUMSQ	-	-	Stable
Eigenvalue Stability Condition	All eigenvalues < 1	-	Stable

The estimated VECM satisfies key diagnostic conditions and is dynamically stable over the sample period.

5. Discussion of Findings

The empirical findings provide evidence that remittances are an important macroeconomic variable associated with Pakistan's long-run output performance. The long-run relationship supports the view that remittances can contribute to growth when they complement domestic investment and when financial systems effectively channel inflows into productive uses. This aligns with studies emphasizing the positive growth role of remittances under stronger financial development and investment conditions.

At the same time, inflation is expected to undermine growth by increasing uncertainty and eroding real purchasing power. Investment and FDI typically support growth through capital formation and productivity spillovers. Trade openness may have a positive influence if supported by export competitiveness and stable exchange rate conditions. Government expenditure may contribute positively if it supports infrastructure and human development but could be growth-reducing if dominated by unproductive current spending.

Policy Recommendations

Based on the empirical findings, the study recommends that Pakistan adopt a comprehensive policy framework to enhance the growth impact of remittances by channelling them toward productive uses such as small and medium enterprise development, agricultural modernization, and export-oriented industries rather than predominantly consumption-based expenditures. Strengthening financial development and inclusion is essential to ensure that remittance inflows are effectively intermediated through formal banking systems and digital financial platforms, thereby converting private transfers into investment financing.

Additionally, reducing remittance transfer costs and expanding secure formal channels can improve transparency, increase foreign exchange reserves, and enhance macroeconomic management. Maintaining macroeconomic stability, particularly through inflation control and credible monetary and fiscal policies, is equally important to create a conducive environment for investment and long-term growth. Finally, integrating remittance strategies with national investment and industrial policies, through diaspora investment instruments, SME financing programs, and targeted incentives, can create complementarity between



remittances, domestic investment, and foreign direct investment, thereby maximizing their contribution to sustainable economic development in Pakistan.

Limitations of the Study

This study uses officially recorded remittances, which may understate total inflows due to informal channels. It employs annual data, which may not capture short-term shocks and seasonal patterns. Structural breaks, political economy factors, and institutional quality indicators were not explicitly modelled, though they can influence the growth impact of remittances. Future research may address these limitations using nonlinear and structural break frameworks.

Future Research Directions

Future research may incorporate structural break tests, threshold/nonlinear models (e.g., NARDL), and governance/institutional quality measures. Sectoral analysis can further clarify whether remittances support productive sectors or primarily drive consumption. The role of exchange rates and potential Dutch disease effects may also be explored in greater depth.

6. Conclusion

This study examined the role of remittances and other macroeconomic determinants in shaping Pakistan's economic performance over the period 1980–2022. Using annual time-series data and applying ADF and PP unit root tests, Johansen cointegration analysis, Vector Error Correction Model (VECM), and Granger causality tests, the study assessed both long-run equilibrium relationships and short-run adjustment dynamics among real GDP, remittances, investment, FDI, inflation, trade openness, financial development, and government expenditure.

The results confirm the presence of a long-run equilibrium relationship among the variables, indicating that remittances and the selected macroeconomic factors move together over time. Remittances contribute positively to long-run output, particularly in an environment where financial development and productive investment facilitate the effective utilization of inflows. Investment and FDI are associated with growth-enhancing effects, reflecting their role in capital formation and productivity improvement. Inflation exhibits a negative relationship with output, highlighting the importance of macroeconomic stability for sustained growth.

Overall, the findings suggest that remittances can serve as an important contributor to sustainable economic growth in Pakistan, but their growth impact depends strongly on policy and institutional conditions that influence how remittances are mobilized and allocated.

Acknowledgments

The authors would like to thank the participants and the respective universities for their support and cooperation in conducting this study.

Contribution of Authors

All the authors participated in the ideation, development, and final approval of the manuscript, making significant contributions to the work reported.

Conflict of Interest Statement

The authors declare no conflicts of interest.

Funding Statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of 1964 Helsinki declaration and its later amendments.

Data Availability

The datasets generated during and analysed during the current study are available from the corresponding author on reasonable request.



References

- Adams, R. H., Jr., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, 33(10), 1645–1669.
- Ali, M. (2017). Remittances, foreign direct investment and economic growth in Pakistan: An empirical analysis. *Pakistan Journal of Humanities and Social Sciences*, 5(1), 94–108.
- Barajas, A., Chami, R., Fullenkamp, C., Gapen, M., & Montiel, P. (2009). *Do workers' remittances promote economic growth?* (IMF Working Paper No. WP/09/153). International Monetary Fund.
- Chami, R., Fullenkamp, C., & Jahjah, S. (2005). Are immigrant remittance flows a source of capital for development? *IMF Staff Papers*, 52(1), 55–81.
- Iqbal, Z., & Sattar, A. (2005). *The contribution of workers' remittances to economic growth in Pakistan* (PIDE Research Report No. 29). Pakistan Institute of Development Economics.
- Javid, M., Qayyum, A., & Arif, M. (2012). Remittances and economic growth in Pakistan: A time series analysis. *Academic Research International*, 2(1), 44–58.
- Khan, M. (2019). Remittances and economic growth in Pakistan: An ARDL approach. *Journal of Economics and Sustainable Development*, 10(8), 1–12.
- Mundaca, B. G. (2009). Remittances, financial market development, and economic growth: The case of Latin America. *Review of Development Economics*, 13(2), 288–303.
- Naqvi, S. T. A. (2013). *Remittances, inflation and economic growth: A case study of Pakistan* [Unpublished MPhil thesis]. Pakistan Institute of Development Economics.
- Qayyum, A., Javid, M., & Arif, M. (2008). *Impact of remittances on economic growth and poverty in Pakistan* (MPRA Paper No. 22941). Munich Personal RePEc Archive.
- Rehman, F. U., Ali, H., & Muzammil, M. (2023). Remittances and economic growth in Pakistan: The role of financial development. *Journal of Management and Research*, 10(2), 1–20.
- Saleem Dilawar, M. (2017). Impact of remittances on economic growth of Pakistan: A time series analysis. *Journal of Economics and Finance*, 8(4), 45–56.
- World Bank. (n.d.). *World development indicators*. <https://databank.worldbank.org/source/world-development-indicators>

