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COMPARATIVE ANALYSES OF AGGREGATE AND COUNTRY-SPECIFIC REMITTANCE INFLOWS ON PAKISTAN'S ECONOMIC GROWTH

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Abstract
This research empirically examines the impact of aggregate and country-specific remittances from Saudi Arabia (KSA), the UAE, the UK, and the USA on Pakistan's economic growth during 1991-2023, using annual time-series data. This study uses an Autoregressive Distributed Lag (ARDL) bounds testing approach and finds that all five models are cointegrated, with an adverse and statistically significant error-correction term, indicating adjustment toward long-run equilibrium. For many Pakistanis abroad, remittances from these countries are a significant source of income. They make a substantial contribution to Pakistan's external sector, but their contribution differs among the recipient countries; therefore, it is necessary to analyze them separately. In all the models, remittances are found to have a substantial effect on the Pakistani economy. Remittances from KSA have the highest impact on GDP growth, followed by remittances from the UK, the USA, and the UAE. Aggregate remittance inflows positively affect economic growth. Labor force, industry, and final consumption expenditure have positive and significant long-run growth effects. At the same time, manufacturing, exports, and trade have negative coefficients, implying a mild Dutch disease. The study recommends that Pakistan develop bilateral labor and investment agreements with high-income countries and direct remittances toward factor accumulation to achieve the maximum economic growth effect.

JEL Classification: *F24, O47, C22*

INTRODUCTION

Remittance flows remain a crucial component of Pakistan's economy, accounting for 9.4 percent of the country's GDP in 2024 (World Bank, 2025a). In 2024, Pakistan is ranked fifth among countries receiving the highest remittances, following India, China, Mexico, and the Philippines (World Bank, 2024b). Workers' remittances are an important source of foreign currency for Pakistan. Remittances are essential for enhancing

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household welfare in Pakistan, greatly improving access to necessities and lowering economic vulnerability (Shair et al., 2024).

Historically, with a total of US $258.3 billion, they stand as the second-largest inflow after exports, far exceeding foreign direct investment FDI (Ellahi & Omer, 2021). Remittances may directly affect investment activity by stimulating the rate of capital accumulation. Reducing spending limitations, lower the cost of capital, and enhance economic growth.

The foreign remittances to Pakistan are heavily concentrated in a few key countries rather than being evenly distributed across the world. The high concentration is primarily attributed to the large Pakistani community, strong ties in the labour market, and migration routes with these countries. There are many Pakistani blue-collar workers in the GCC countries, particularly Saudi Arabia and the UAE, and there are skilled and highly educated Pakistani workers in the United Kingdom and the United States. These four countries (Saudi Arabia, UAE, UK, and USA) are the top sources of remittances to Pakistan. Therefore, it is imperative to analyze the country-specific impact of remittances from these four nations to understand their distinct contributions to Pakistan's economic growth.

Saudi Arabia (KSA) continues to be the largest contributor to remittances, and millions of Pakistanis live overseas, earning foreign exchange that is sent back home. KSA is a country with a large number of Pakistani citizens residing within it. As a result, there has been continuous demand in Pakistan for a Pakistani workforce in KSA due to its economic ties and the development of job opportunities within KSA that facilitate job creation among Pakistani citizens residing there. In 2025, Pakistan received a total of $803.6749 million in remittances from KSA (BEOE 2025). As of 2024, approximately 62.2 percent of Pakistani citizens seeking overseas job placement are destined for KSA, up from 12 percent in 2023. (Asian Development Bank, 2024). Rem Article

The United Arab Emirates (UAE) is a well-liked destination for migrant workers from around the world, not only in the Asian region. In 2025, Pakistan received $ 692.2698 million from the UAE. Two factors have led to the excessive level of such remittances. First, the Pakistani workforce in the UAE is usually filled by the blue-collar (services and construction) sectors. These workers account for a significant share of total remittances sent to Pakistan from the UAE, and the large number of migrants contributes to substantial aggregate outflows. Secondly, with the discovery of oil and the economic growth of the GCC nations, the influx of migrant workers in the Gulf was enormous, with the participation of South Asian countries (Oommen, 2017).

The UK is the third-largest country of remittance inflow (USD 4.1 billion) in Pakistan. The UK attracts skilled workers (doctors, engineers, IT workers) and offers opportunities in various sectors, creating a base for high-value remittances. The UK remains a leading source of remittances for Pakistan, contributing significantly to the country's foreign exchange earnings. Inflows from the UK show strong annual growth, complementing dominant flows from the Gulf. The UK offers higher wages compared to Pakistan, allowing workers to save and send substantial amounts, supporting family livelihoods and Pakistan's economy. Pakistan received $ 517.0351 million in remittances from the UK in 2025 (BEOE 2025).

Pakistani societies in the USA, in general, are advantaged with respect to education, professional, and white-collar jobs. The USA is home to 680,000 individuals of Pakistani origin altogether (Pew Research Center 2023). By 2023, remittance flows to LMICs will have been enabled by well-functioning labor markets in advanced economies, especially the United States, which is the largest source country of remittances and the main destination country for migrants. Pakistan received $ 303.6437 million in remittances from the USA in 2025 (Shah & Shahzad, 2024).

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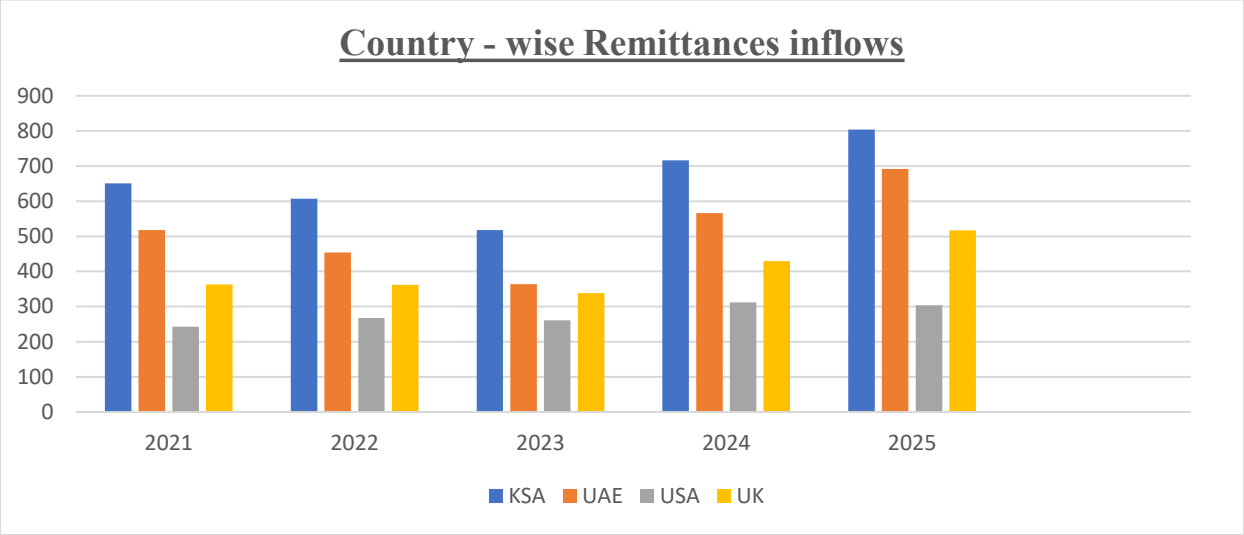


Figure1.1: Source: Bureau of Emigration & Overseas Employment (2021-2025)

The graph below shows a trend in remittances received by Pakistan between 2021 and 2025. The data on remittances between 2021 and 2025 clearly shows that KSA has always been the biggest source of remittances in general. It was, however, observed that the most active trend was in the UAE, as its contribution to remittances almost doubled between its lowest mark in 2023 and the highest mark in 2025. This sudden rise, together with a significant rise in the UK, promoted the ultimate peak. However, the USA provided much-needed stability, and even when other countries slowed flows, it maintained a steady rate of remittances. This shows that the Gulf economies (KSA and UAE) drive the volume and rapid growth in remittances, while the USA helps stabilize the base.

Several scholars have examined how remittances influence economic growth in different contexts. Umair (2023) studied the channels through which foreign remittances affect economic growth, including physical capital, human capital, and total factor productivity. Sutradhar (2020) analyzed the relationship between remittances and the development of gross domestic product (GDP) in four South Asian countries. Khan (2021) explored age, race, and marital status as factors that influence the remittance behavior of migrants in the United Arab Emirates (UAE). Jijin (2022) attempted to identify macroeconomic determinants using the autoregressive distributed lag (ARDL) approach in India. The author found that domestic GDP, oil prices, and exchange rates were critical drivers of remittances. Finally, Mubeen et al. (2016) evaluated the impact of remittances on the financial development of Pakistan, with an emphasis on the exchange rate and economic growth.

Despite this work, the research lacks a comparison of remittances' overall impact on Pakistan's economic growth. More specifically, there is no analysis of the impact of remittances from two Gulf countries (KSA and UAE) and two developed countries (USA and UK) on the Pakistani economy separately. Such a comparison is needed to assess the combined impact of remittances from these four countries.

To fill this gap, the current study has two objectives. Firstly, the study tries to see how remittances affect Pakistan's economic growth empirically. Secondly, the study empirically investigates the impact of remittances from

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different GCC countries (KSA and UAE) and developed countries (USA and UK) on Pakistan's economy.

Literature Review

Many of the studies mentioned above have examined the relationship between remittances and economic growth. In the case of Bangladesh, Kumar and Stauvermann (2014) did research and came to the conclusion that remittances hurt output per worker in the short run, while in the long run, they had a positive effect. On the other hand, Kshetri and Mainaly (2025) took Nepal as the subject of their study and found out that remittances had a positive effect on GDP growth in the short run, but in the long run, capital formation, government spending, and exports determined economic growth. For Saudi Arabia, Javid and Hasanov (2023) found that GDP and non-Saudi employment have positive effects on remittance outflows, and the ECT approves a fast adjustment to long-run equilibrium. For Pakistan, Iqbal and Sattar (2010) found that remittances positively affect economic growth, making them one of the most important growth factors after public and private investment. Khan et al. (2019) confirmed that remittances positively affect Pakistan's GDP in both the short and long run, whereas inflation and consumption have negative effects. Ahmed and Jaffri (2025) used the NARDL method and found that positive remittance shocks increase Pakistan's economic growth, while negative shocks have no significant effect. Zaman et al. (2025) found that remittances in Pakistan have a positive but temporary effect on GDP, consumption, and investment, which peaks and then declines. Ghaffary Fard and Alireza (2025) found a positive and significant impact of remittances on Pakistan's economic growth. Hayat and Ghauri (2024), however, found that remittances from the GCC have a negative impact on Pakistan's GDP, while remittances from the UK have a positive impact, and remittances from the USA and EU have no measurable effect.

Meyer and Shera (2017) studied six European countries and found that remittances have a significant effect on GDP per capita. Uddin and Murshed (2017) studied eight South Asian countries and found that remittances significantly appreciate the real effective exchange rate and reduce the ratio of traded-to-non-tradable goods output, causing premature deindustrialization. Garcia-Fuentes et al. (2025) studied 103 developing countries and found that remittances have a positive effect on economic growth by helping financial institutions connect businesses and provide better investment opportunities. Efobi et al. (2019) studied 49 African countries and found that remittances have mixed effects on industrialization, but their interaction with banking efficiency supports long-term industrialization. Ngong et al. (2025) studied 11 African developing countries and found that remittances negatively affect GDP growth. Saadat et al. (2025) conducted research on South Asian countries and found out that remittances have a positive impact on economic growth, while brain drain, appreciation of the domestic currency, and an increase in consumer spending have a negative effect. In turn, Sutradhar (2020) analyzed the data from South Asian countries too but found out a positive long-run relationship between remittances and GDP growth. Umair (2023) studied the impacts of foreign remittances on physical capital, human capital, and total factor productivity in several countries.

Muhammad and Ahmed (2009) conclude that remittances have positive effects in Pakistan since they increase the income of individuals through the multiplier effect, which takes place through local consumption and imports. Contrary to the positive impacts of remittances on the host countries, there are negative effects of remittances on the economies of the recipient countries. According to Kuffour et al. (2024), remittances have a negative relationship with Gross Domestic Product (GDP) growth and contribute to an increase in unemployment, with clear Dutch Disease in Nigeria. Similarly, Yoda (2025)

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concludes that higher levels of remittances reduce the total labor force participation rate in 30 Sub-Saharan African countries. Ngubane et al. (2025) observe that remittances have a negative relationship with consumption in the Sub-Saharan African region. Furthermore, the study does not find any significant relationship between remittances and short-term domestic investment in Sub-Saharan Africa. Sadiq et al. (2025) conclude that remittances have a negative effect on international competitiveness in some instances.

The literature shows mixed findings. Most studies focus on aggregate remittances, and few examine country-specific effects. This study fills this gap by analyzing remittances from KSA, UAE, UK, and USA separately for Pakistan (1991–2023).

Theoretical Framework

According to the Solow growth model, growth is determined by the factors of production such as savings, investment, labor, and technological development. On the contrary, Sato (1964) emphasizes the role of abilities and skills in relation to technology and human capital. Moreover, the development and growth of the economy or a nation are highly dependent upon the efficiency of management within the country. For example, the government's ability to formulate economic growth policies and implement them consistently is associated with growth. The government can promote economic growth through the formulation of policies that promote technological developments and the creation of skills among citizens.

Remittances affect the recipient country's economy via various channels of transmission. First, as a crucial source of foreign funding, remittances positively influence the local economy by reducing financial constraints, encouraging investments, and ultimately promoting economic growth. Additionally, as remittances serve as a risk hedge, they can even positively impact the domestic economy during economic downturns by increasing consumption and disposable income during times when aggregate demand from other sources is weak. Conversely, remittances might have some negative consequences as well, especially if they lead to Dutch disease, shrinkage in the workforce, and crowding out of the manufacturing industry in the recipient country (Taguchi & Batool, 2025).

Methodology

The model is modified to address country-specific remittances and the effects of aggregate remittance inflows on Pakistan's economic growth. The study developed a model following Faruq (2025).

Model 1: Aggregate Remittances Effect

$$\Delta LGDP_t = \alpha_0 + \sum_{i=1}^{p}\beta_{1i}\Delta LGDP_{t-i} + \sum_{i=0}^{p}\beta_{2i}\Delta REM_{t-i} + \sum_{i=0}^{p}\beta_{3i}\Delta MANU_{t-i} + \sum_{i=0}^{p}\beta_{4i}\Delta LLF_{t-i} + \gamma_1 LGDP_{t-1} + \gamma_2 REM_{t-1} + \gamma_3 MANU_{t-1} + \gamma_4 LLF_{t-1} + \mu_t \quad \text{..... (3.1)}$$

Model 2: Country-wise Specific Remittances Inflow

$$\Delta LGDP_t = \alpha_0 + \sum_{i=1}^{p}\beta_{1i}\Delta LGDP_{t-i} + \sum_{i=0}^{p}\beta_{2i}\Delta REM_{t-i} + \sum_{i=0}^{p}\beta_{3i}\Delta MANU_{t-i} + \sum_{i=0}^{p}\beta_{4i}\Delta LLF_{t-i} + \sum_{i=0}^{p}\beta_{5i}\Delta INDUT_{t-i} + \sum_{i=0}^{p}\beta_{6i}\Delta EX_{t-i} + \sum_{i=0}^{p}\beta_{7i}\Delta INFL_{t-i} + \sum_{i=0}^{p}\beta_{8i}\Delta TT_{t-i} + \sum_{i=0}^{p}\beta_{9i}\Delta FCONS_{t-i} + \sum_{i=0}^{p}\beta_{10i}\Delta FDI_{t-i} + \gamma_1 LGDP_{t-1} + \gamma_2 REM_{t-1} + \gamma_3 MANU_{t-1} + \gamma_4 LLF_{t-1} + \gamma_5 INDUT_{t-1} + \gamma_6 EX_{t-1} + \gamma_7 INFL_{t-1} + \gamma_8 TT_{t-1} + \gamma_9 FCONS_{t-1} + \gamma_{10} FDI_{t-1} + \mu_t \quad \text{..... (3.2)}$$

LGDP= Gross Domestic Product (constant) in log form

LREM = Remittances in millions of US$ in log form

LMANU= Manufacturing, value added (% of GDP) in log form

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LLF = Total labor force in log form
LINF = Inflation, consumer price (annual %) in log form
LINDUT = Industry (including construction), value added (current US$) in log form
LEX = Exports of goods and services (% of GDP) in log form
LTT = Total trade in log form
LFCONS = Final consumption expenditure (constant 2015 US$)
LFDI = Foreign direct investment, net inflows (BoP, current US$) in log form
In this model, we examine how external influences shape Pakistan's economic progress. It will additionally cover how foreign remittances affect Pakistan's economic growth.

Data Sources

All variables in this research are time series data from 1991 to 2023. All the variables' data were collected from reliable secondary sources, the WDI and the Bureau of Emigration and Overseas Employment (BEOE).

Econometric Technique: ARDL Bounds Testing

Cointegration tests were conducted through the ARDL model. This includes cointegration testing through the ARDL model (Pesaran et al., 1996; Pesaran & Shin, 1995). First of all, ARDL is better regardless of whether the regressors underlying it are of I(0), I(1), or co-integrated among themselves (Pesaran et al., 1996). Secondly, it is a more robust method that gives better results than other co-integration methods, especially when applied to a smaller sample size (Ghatak and Siddiki, 2001). Third, the ARDL method is also capable of solving the issue of invalid relationships caused by non-stationary time series data (Laurencon & Chai,2003).

The DF test is a suitable technique for testing unit roots, provided that there is no autocorrelation in the error terms. But if the case is different, then the DF test cannot be applied. One of the main drawbacks of the DF test is that it cannot be applied when autocorrelation exists in the model. This means the error terms are correlated with explanatory variables. Dickey & Fuller (1981) proposed an alternative solution known as the augmented version, which is widely referred to as the ADF test.

The primary aim of the unit root test is to find out whether the series is stationary, that is, whether it exhibits a stochastic trend (1) or a stationary pattern with a deterministic trend (0). Therefore, the goal is to assess whether the data is stationary. These come in three forms. The researchers can choose any one depending on the nature of the data.

The null hypothesis, along with the alternative hypothesis, is expressed as follows:

H0: $\alpha=0$, a unit root is present

H1: $\alpha\leq 0$, the data is stationary

This research adopts the ARDL bounds testing method introduced by Pesaran et al. (2001), which is especially suitable for small samples and allows for regressors of order I(0) or I(1), though not I(2). In equations (1) and (2), the short-run parameters are represented by β, and the long-run numbers are derived by normalizing the estimated coefficients relative to the coefficient of the lagged dependent variable.

If the F-statistic is greater than both the upper and lower critical bounds set out by Pesaran et al. (2001), then the bound test rules out the null hypothesis that no cointegration exists.

There are two kinds of coefficients: short-term and long-term. In this study, the ARDL model has been applied to test the following hypothesis and determine whether a co-integration relationship exists.

H0:($\gamma_1= \gamma_2= \gamma_3= \gamma_4= \gamma_5= \gamma_6= \gamma_7= \gamma_8= \gamma_9=0$)
(There is no cointegration between variables)

H1:(At least one $\gamma_i\neq 0$)
(There is cointegration)

In the next step, the residual series, referred to as the error term ECM, is created using the equation derived in the long-run regression, and a unit root test is applied to it. The ADF test results indicate that ECM is stationary at level, a finding that is mirrored in the first lag of the short-run estimates.

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The ECM model serves to determine how quickly the variables adjust toward equilibrium. In the regression, the short-run ECM model's output ought to show ECM (-1) as both significant and negative. This therefore confirms once more that the relationship genuinely holds in the long-run estimates.

The short-run ECM was similarly subjected to diagnostic testing, which comprised the Breusch-Pagan-Godfrey test for heteroscedasticity, a Normality test, and the Ramsey RESET Test.

In order to evaluate how stable the parameters and results of the short-run ECM model were, the researcher made use of the CUSUM and CUSUM squared stability tests.

Results and Discussion

Descriptive Statistics

The analysis covers 33 observations (1991–2023) across five models. LGDP averaged 30.749, ranging from 30.105 (1991) to 31.343 (2023). Remittances from KSA averaged 4.794 (log form), from the UAE 4.308, from the UK 3.834, and from the USA 4.246.

Table 1

Unit Root Test			
Augmented Dickey-Fuller test results			
Variables	**level**	**1 difference**	**Decision**
GDP	------	-6.858573*** (0.0000)	I(1)
REMITTANCE	-6.36611*** (0.0000)	------	I(0)
INFLATION	-5.512875*** (0.0001)	------	I(0)
LABOR FORCE	------	-5.081287*** (0.0002)	I(1)
INDUSTRY	------	-6.86133*** (0.0000)	I(1)
TRADE	------	-5.71730*** (0.00000)	I(1)
FDI	-2.628656* (0.09820)	------	I(0)
EXPORT	------	-5.58444*** (0.0001)	I(1)
FINAL CONSUMPTION	------	-4.289245** (0.0020)	I(1)
MANUFACTURE	------	-5.39894*** (0.0001)	I(1)
*,**,*** indicates the level of significance at 10%, 5% and 1% respectively.			

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Note: The figures in [ ] indicate the lag selected according to the Schwarz information criterion (SIC). The model shows the mixture of variables at I (0) and I (1). Therefore, we should apply the ARDL model.

According to the outcomes of the ADF unit root test, the dependent variable GDP, together with the independent variables Industry, Trade and Manufacture, consumption, labour force, and export, achieves stationarity at the first difference. At level, remittance, inflation, and FDI are stationary. These findings are further examined through the Phillips-Perron test, which produces comparable outcomes.

Table 2 ARDL Cointegration Results

Models	F-Statistics	Significance
Aggregate Model	8.146	1%
KSA Model	4.644	5%
UK Model	32.79	1%
UAE Model	13.77	1%
USA Model	4.53	5%

The bounds test confirms cointegration in all five models. The F-statistics are: Aggregate Model = 8.146 (> I(1) bound at 1%); KSA Model = 4.644 (> I(1) bound at 5%); UK Model = 32.793 (> I(1) bound at 1%); UAE Model = 13.773 (> I(1) bound at 1%); USA Model = 4.533 (> I(1) bound at 5%).

Table 3 Long-Run Results

DEPENDENT VARIABLE: GDP					
METHOD: ARDL					
VARIABLES	**Model- 1 Aggregate Model**	**Model-2 KSA**	**Model-3 UK**	**Model-4 UAE**	**Model-5 USA**
C	2.6309 0.6877***	-8.1761 3.4096**	4.7750 1.2492***	7.9045 1.2747***	2.1467 1.0635*
LREM	0.1762 0.0794*	0.2614 0.1380*	0.0263 0.0088***	0.01074 0.00506**	0.01131 0.00468**
LINF	-------	-0.0363 0.0238	--------	-------	-0.01132 0.00320**
LLF	0.03137 0.10865*	0.1649 0.4671***	--------	-------	------
LINDUSTRY	-------	-------	--------	0.0839 0.04030*	------
LTT	------	-------	--------	-0.0857 0.0434*	-------
LFDI	-------	-------	0.00974 0.00569*	-------	-------

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LEXP	-------	-------	-0.0738 0.0257***	-------	-------
LFCE	-------	-------	------	-------	0.6345 0.0798***
LMANU	-0.53111 0.1661***	------	--------	--------	-------
		Diagnostics			
R-SQUARED	0.990187	0.9909	0.999210	0.997994	0.999211
F-STATISTIC	212.9506	256.408	2277.014	3358.509	8546.292

,**, indicates the level of significance at 10%, 5% and 1% respectively.**

The Aggregate Model provides a comprehensive assessment of how remittance inflows from all major source countries affect Pakistan's national economy. The empirical results reveal that a 1 percent rise in remittances leads to a 0.176 percent increase in GDP at a 10 percent significance level. The results confirm the positive macroeconomic contribution of total remittance inflows to Pakistan's economic growth. This result agrees with the previous study conducted by Azam and Raza (2016), who claimed that remittances influence economic growth through capital accumulation. In the case of the long-run coefficient for Manufacturing equals -0.531 and is statistically significant at the 1 percent level. This implies that a rise in the value added by 1 percent in the manufacturing sector leads to a decline in GDP by 0.53 percent. The coefficient for the Labor Force variable is 0.031 and is statistically significant at the 10 percent level. Accordingly, an increase in the labor force by 1 percent is associated with a rise in GDP by 0.031 percent. This positive link between labor and GDP is not surprising, given that labor is considered to be one of the main factors of production.

The remittance inflow coefficient of 0.26 implies that KSA is among the leading countries receiving remittances from Pakistan. The evidence shows that GDP increases by 0.26% in the long run when remittances from KSA rise by 1%. The main reason KSA is at the top of the list is that it has a high demand for foreign labor due to development needs in the country as proposed by Vision 2030. The coefficient of labor force in the KSA model is statistically significant at the 1 percent level. This implies that a 1 percent rise in the labor force is linked with a 0.16 percent increase in GDP. The long-run coefficient for inflation in the KSA model is -0.036, but it is statistically insignificant. This suggests that during a 1 percent rise in inflation, GDP falls by 0.036 percent.

The UK comes in third place among countries that are sources of remittances, with a coefficient of 0.026. A one percent rise in remittance inflows into the UK results in a 0.026 percent growth in GDP. The FDI coefficient stands at a positive 0.009 and is statistically significant at the 10 percent level. This means that a 1% rise in Foreign Direct Investment (FDI) is linked to a 0.0097 percent increase in GDP. The export coefficient is negative, at -0.073, significant at the 1 percent level. This means that a 1 percent rise in exports corresponds to a 0.073 percent decline in GDP. This adverse relationship is explained by the Dutch Disease phenomenon, in which significant remittance inflows tend to increase real exchange rates, through which the competitiveness of exports is undermined, and consequently a

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contraction in the tradable sector occurs (Jafarey & Nabi, 2024).

The United Arab Emirates (UAE) has a positive remittance coefficient of 0.010, which means that an increase in UAE remittances by 1 percent increases GDP by 0.010%. The coefficient is positive, which indicates a unidirectional relationship between remittances and GDP. The industry has a positive coefficient of 0.083, which is significant at the 10 percent level. This suggests that a 1 percent increase in the value added by the industry increases GDP by 0.083%. On the other hand, the trade coefficient is negative, suggesting that trade has a dampening effect on economic growth. A one percent increase in trade (total trade value) reduces GDP by 0.085%. The UAE has a persistent trade deficit where imports exceed exports. Empirical research confirms a statistically significant and negative influence of the trade deficit on GDP in Pakistan, meaning that as the trade deficit increases, GDP decreases. The trade deficit puts pressure on Pakistan's foreign exchange reserves, leads to currency devaluation, and raises external debt, which in turn has negative implications for GDP growth (Safdar et al., 2021).

The United States (USA) determines a positive remittance coefficient of 0.01 percent level, which implies that a 1 percent increase in remittance inflows from the USA contributes to a 0.01 percent rise in GDP. The final consumption expenditure coefficient is positive with a value of 0.634 and statistically significant at the 1 percent level. This means that for GDP to grow by 1 percent, the final consumption expenditure must grow by 0.63 percent. This is a sign of the influence of consumption in the USA model (Manazir et al., 2023). The inflation coefficient for the USA model is -0.0113 with a statistical significance at the 5 percent level. That means that an increase in inflation of 1 percent is accompanied by a decrease in GDP of 0.011 percent. This negative relationship is explained by the economic theory that high inflation decreases the purchasing power of consumers, lowering their demand and increasing production costs, which, in turn, decreases the rate of economic growth. The negative association between inflation and economic growth in this study can be explained by the rapid increase in inflation in the USA. The growth of the cost of living for overseas Pakistani residents reduces their disposable income, which decreases remittances to Pakistan, thus negatively affecting the GDP of Pakistan (Jui et al., 2024).

The diagnostic statistics used to test the models' accuracy confirm the reliability of all five ARDL models. First, the R-squared values for all the models are close to 1, ranging from 0.990 for the Aggregate Model to 0.999 for the UAE and USA models, indicating that the independent variables explain over 99% of the variation in GDP (Gujarati & Porter, 2009). Similarly, the F-statistic is significant at the 1% level and is high for all the models, ranging from 212.95 to 8,546.29, confirming the overall significance of the models (Wooldridge, 2016). The diagnostic statistics for the ARDL model were reliable, confirming that the selected specifications best capture the relationships between remittances and economic growth in Pakistan (Pesaran et al., 2001). In turn, the reliability of these statistics increases the credibility of the estimates and the policy recommendations based on them (Khan et al.,2021).

Table 4 Short-Run Results (ECM)

DEPENDENT VARIABLE: GDP					
METHOD: ARDL					
Variable	**MODEL-1**	**MODEL-2 KSA**	**MODEL-3 UK**	**MODEL-4 UAE**	**MODEL-5 USA**

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	Aggregate Model				
C	2.63095*** (0.68773)	-8.17618** (3.40966)	4.77501*** (1.24928)	7.96455*** (1.27472)	2.14671* (1.0635)
DLREM	0.17629** (0.0794)	0.26147* (0.0605)	0.02635*** (0.0088)	0.01074* (0.00389)	0.011319** (0.00468)
DLINF	-------	-0.03633* (0.01919)	-------	-------	-0.01132 0.00320**
DLLF	0.03137 0.10865*	1.64969** (0.46713)	-------	-------	-------
DLINDUSTRY	-------	-------	-------	0.083925** (0.04030)	-------
DLTT	-------	-------	-------	-0.08579** (0.02636)	-------
DLFDI	-------	-------	0.0097* (0.00569)	-------	-------
DLEXP	-------	-------	-0.07386** (0.0257)	-------	-------
DLFCE	-------	-------	-------	-------	0.63457*** (0.0550)
DLMANU	-0.53119*** (0.13042)	-------	-------	-------	-------
ECM(-1)	-0.3298*** (0.0537)	-0.8322*** (0.1582)	-0.15811*** (0.01152)	-0.27931*** (0.01980)	-0.19906*** (0.04434)
			Diagnostics		
R-squared	0.66784	0.622940	0.784026	0.365186	0.750228
Adjusted R-square	0.57725	0.547528	0.725124	0.365186	0.741902
F-statistic	7.372279	8.260494	13.31068	3.883037	90.10937
Prob(F-statistic)	0.000205	0.000102	0.000002	0.00000	0.0000

As per the results, it is observed that the coefficient (ECT) is negative and statistically significant at the 1% level of significance in all five model equations, which implies that short-run deviation is adjusted towards the long run. The adjustment speed is 32.98% for the Aggregate Model, 83.22% for the KSA Model, 15.81% for the UK Model, 27.93% for the UAE Model, and 19.91% for the USA Model. Thus, it can be concluded that the KSA Model possesses the highest speed of adjustment (83.22%), signifying a swift reduction of distance from long-run equilibrium in this model. Accordingly, the UK Model has the lowest adjustment speed (15.81%), indicating a

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prolonged period for the UK remittance channel to restore equilibrium.

Diagnostic Tests

The short-run ECM value has been estimated; the subsequent stage involves carrying out diagnostic tests, for instance, the Breusch-Pagan-Godfrey test to detect heteroscedasticity, the Breusch-Godfrey LM test for serial correlation, the Jarque-Bera test for normality, and the Ramsey RESET test. A table will present the results obtained from these tests.

Table 5

DIAGNOSTIC TESTS

Test (prob.)	Null Hypothesis	Model-1 KSA	Model-II UAE	Model-III UK	Model-4 USA	Model-5 AGGREGATE
Hetroscedasticity test	Brush-pagan Godfrey	0.689	0.5963	0.6929	0.1534	0.5963
Serial correlation LM test	Breusch-Godfrey	0.619	0.295	0.177	0.370	0.449
Ramsey Reset	The model is stable	0.1675	0.6180	0.8656	0.1659	0.6180
Jarque-Bera	Residuals are Normally Distributed	0.871	0.2682	0.8379	0.9976	0.2110

The models succeeded in all four diagnostic tests because all p-values exceeded the 5% significance threshold. The models demonstrate no heteroscedasticity or serial correlation, and their specifications prove accurate; their residuals also follow a normal distribution, and all models are stable. Therefore, all five models meet the fundamental requirements of classical linear regression analysis.

Stability test for the short-run ECM model

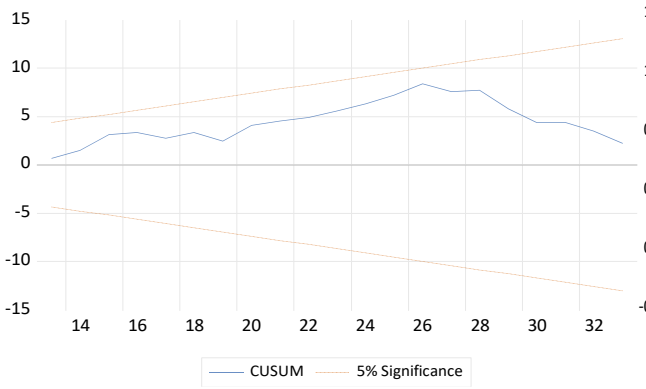
To assess the stability of the short-run ECM model's results and parameters, CUSUM and CUSUM-squared tests were employed. Once the long-run dynamics of the ARDL model had been estimated, the constancy of the variables was checked by means of the CUSUMSQ and CUSUM tests. Whether the model is stable depends on it falling inside the critical bounds and on the null hypothesis not being rejected.

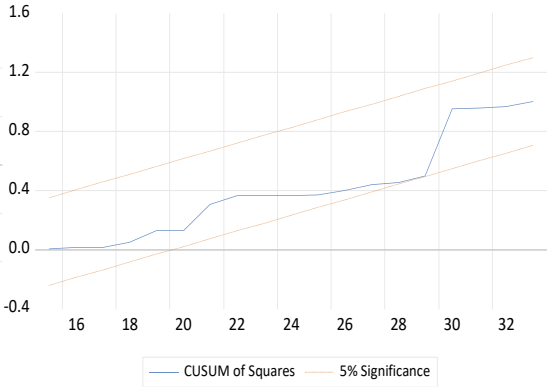
Short-run and long-run constraints are examined through constancy tests employing the CUSUM square and CUSUM. The figures display the graphs produced by these tests, revealing that every value falls inside the critical bounds at the 5 percent significance level. This establishes that the short-run and long-run variables are both stable.

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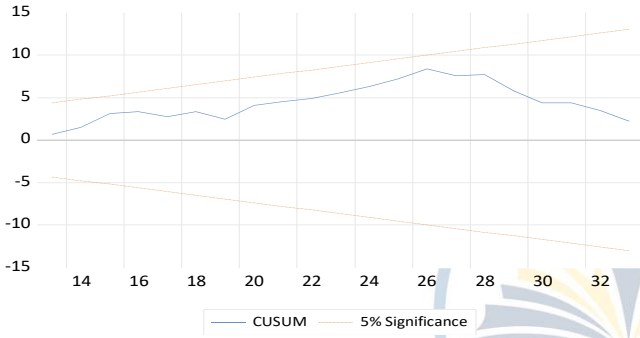
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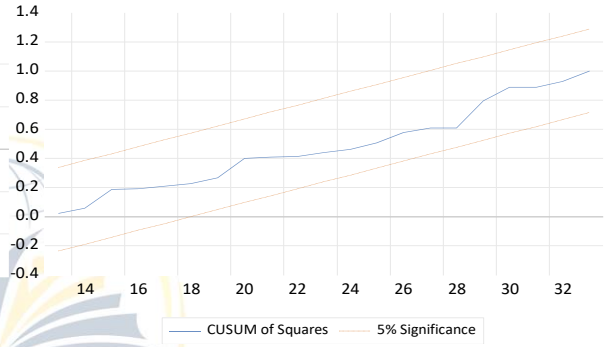
CUSUM test for Aggregate Model-1



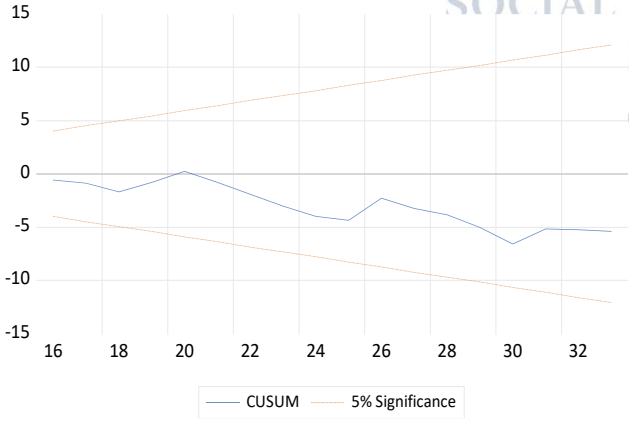


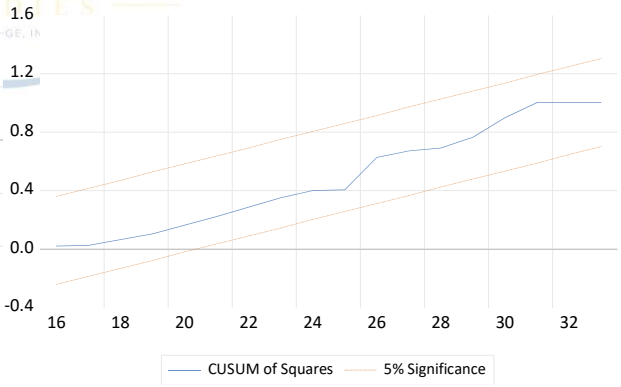
CUSUM test for KSA Model-2





CUSUM test for UAE Model-3

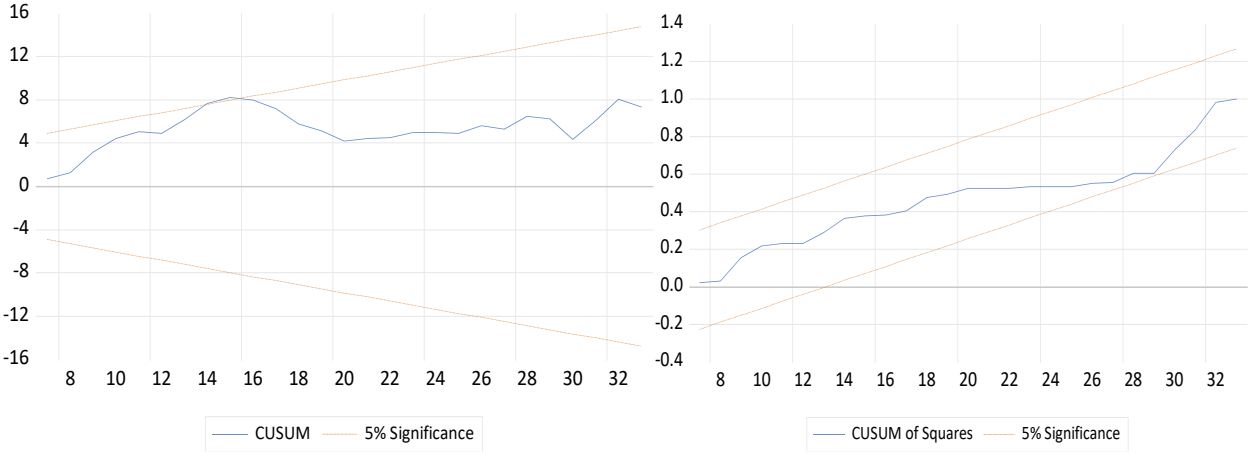




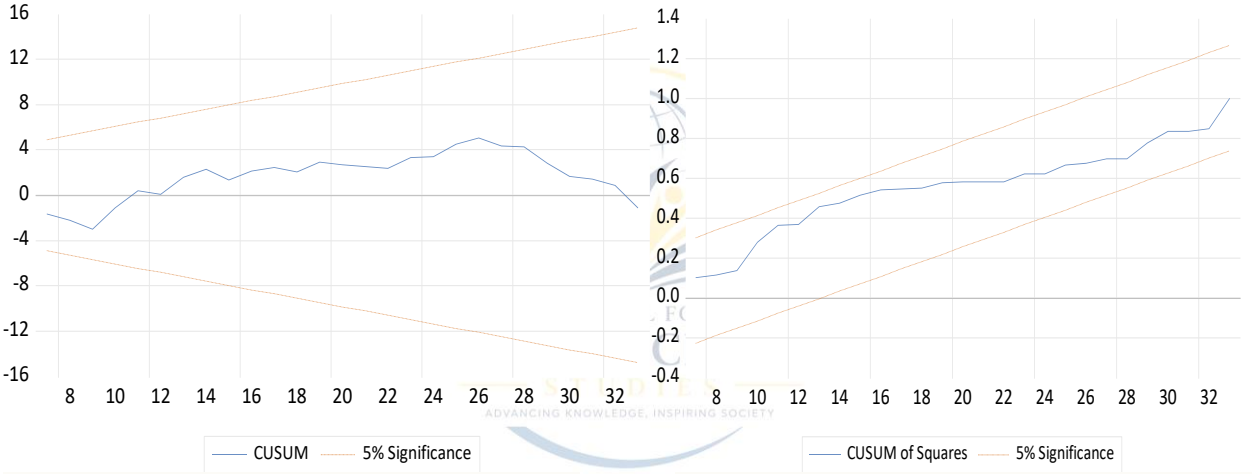
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CUSUM test for UK Model-4



CUSUM test for USA Model-5



Every figure shows that the CUSUM and CUSUM squared curves lie within the 5 % critical bounds, indicating significance. This verifies that the findings are correct for both the short-run and the long-run estimates.

Conclusion

This study hypothesized that remittances played a vital role in Pakistan's economic growth. The results of the study revealed that remittances had a positive impact on Pakistan's GDP as they added a continuous flow of income to the country, which increased the GDP through the multiplier effect. It was also found that out of the four countries analyzed, the remittances from Saudi Arabia had the highest positive impact, followed by the United Kingdom, the United States, and the United Arab Emirates. This can be explained by the fact that Saudi Arabia has the largest Pakistani workforce, while the UAE is considered the main provider of blue-collar jobs, the UK provides highly skilled professions, and the USA provides white-collar jobs. The empirical evidence also shows that larger remittances are linked with higher current GDP. However, inflation negatively affects GDP growth in Pakistan, and evidence of Dutch Disease is found, as manufacturing, exports, and trade show negative relationships with GDP. Overall, remittances significantly support Pakistan's GDP growth, but their impact varies across source countries.

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Policy Recommendations

Firstly, the government should organize skill training programs in order to match the demands of the host country, e.g., construction and oil and gas for KSA and the UAE, IT, healthcare, and engineering for the UK and the USA. Secondly, Pakistan should negotiate bilateral labor and investment agreements with high-income countries to reduce transaction costs and ensure the migrant workers' protection. Thirdly, provide tax benefits for remittance households that invest in small businesses, agriculture, and export-oriented industries. Fourthly, the government should control the exchange rate in order to avoid Dutch disease and maintain competitiveness of exports.

Limitations

This study accounts only for formal remittance channels; the true effect of remittances could be understated. Moreover, it is necessary to consider other channels of informal money transfer (hundi/hawala). Future research should incorporate informal flows and explore nonlinear effects.

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