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The Role of Worker's Remittances in Fostering Economic Growth of Pakistan: An Empirical Analysis Using ARDL Approach

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Abstract

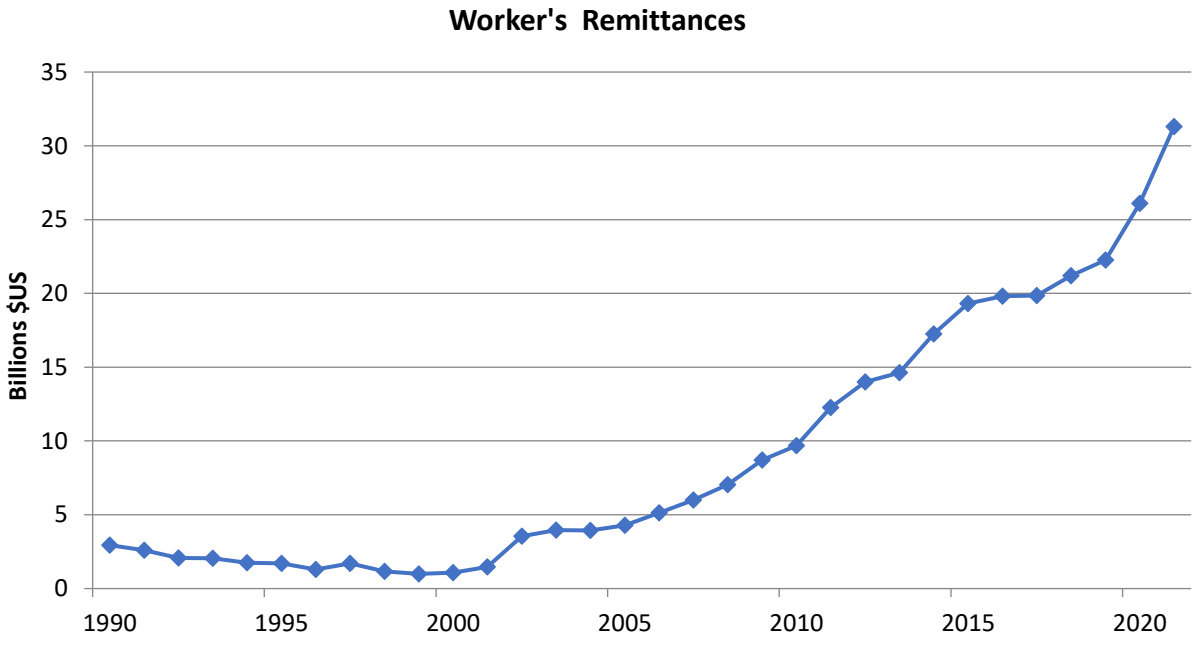
This study examines the contribution of workers' remittances to Pakistan's economic growth. Time series data from 1993 to 2021 has been used for the empirical analysis. The results of the ADF unit root test indicate that emigration and inflation are stationary at levels, whereas worker remittances, unemployment rate, and total reserves are stationary at first differences. Hence, we employ the ARDL technique to estimate the data. The ARDL results show both long-term and short-term relationships. The findings demonstrate that workers' remittances and emigrants positively and significantly impact GDP while it is negatively influenced by inflation and unemployment.

Keywords: Workers' remittances, Economic growth, Inflation, ARDL

Introduction

Workers' remittances reduce poverty and lead to economic progress in the home country (Gul et al., 2021; Ozaki, 2012). The remittances from workers improved GDP growth and decreased poverty by raising income, encouraging investment, lowering credit restrictions, and fostering HDI (Gupta et al., 2009; Calero et al., 2009). By increasing disposable income and providing

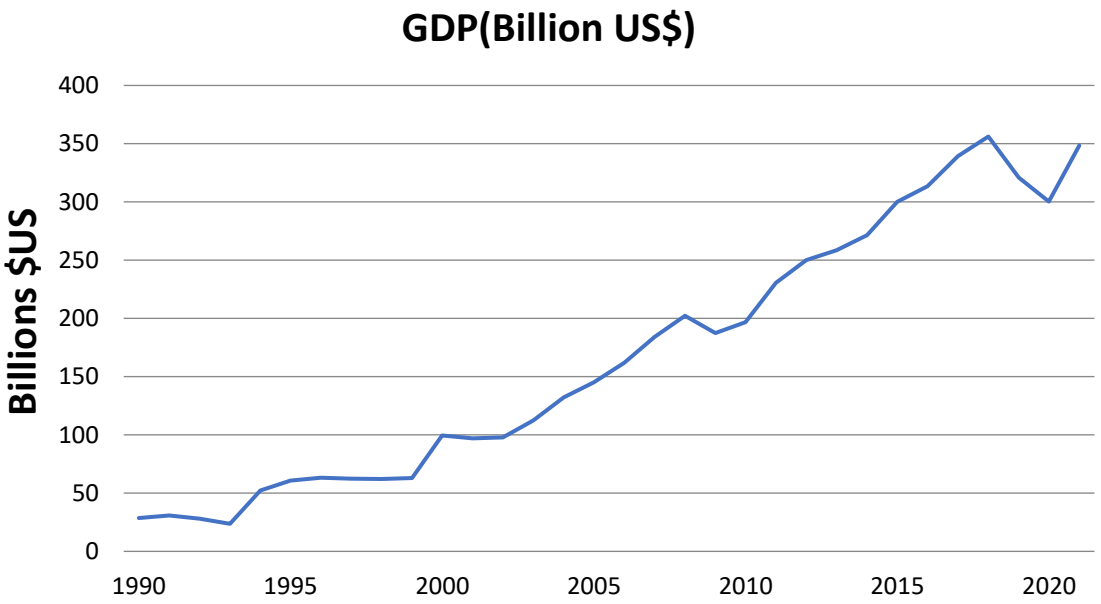
support when other sources of domestic aggregate demand are insufficient, remittances also aid in economic recessions (Yang & Choi, 2007). Similar to other developing nations worldwide, Pakistan is renowned for its high rate of worker remittances and migration. The remittances from workers are generally seen as a significant source of external funding and economic grow; numerous research works on the subject have shown that employee remittances may impact economic growth in a favorable, negative, or neutral way. Since 1970, remittances from outside have constituted a substantial portion of Pakistan's foreign exchange revenues. Pakistan has received a significant amount of remittances during the past forty years; nevertheless, there have also been noticeable shifts in this funding source. By improving the balance of payments, lowering reliance on external borrowing, and lowering the current account deficit, worker remittances contribute favorably to economic growth (Iqbal and Sattar, 2005).



The graph shows the magnitude of workers' remittances received by Pakistan from 1990 to 2021. Remittances from workers are a major factor in Pakistan's economy, supporting both growth and stability. Pakistan's GDP is largely derived from remittances. By offering a reliable stream of foreign cash that can be used to fund imports, settle debt, and maintain the nation's

balance of payments, they support economic growth. Remittances frequently reach households directly, improving conditions and lowering poverty. Pakistan's foreign exchange reserves are strengthened by remittances, which also serve as a buffer against economic shocks and support stable exchange rates. Some households that receive remittances invest the money in small enterprises or farming ventures. This can promote regional economic growth, open up job opportunities, and advance global economic success. Remittances provide Pakistan with a more reliable and sustainable source of income by reducing its reliance on loans and foreign aid. On the other hand, a high reliance on remittances can present certain difficulties. Reliance on these finances could make one vulnerable to changes in the state of the world economy, volatility in the value of one's currency, or changes in the laws of the host nations where Pakistani workers are employed.

The following graph shows the magnitude of GDP of Pakistan from 1990 to 2021. With an increase in remittances, GDP also increases each year.



The connection between the variables was ascertained by the application of regression modeling. The findings show a strong positive correlation between worker remittances and GDP growth in

Pakistan. This study examines the effect of worker remittances on Pakistan's GDP over a twenty-nine-year period, from 1993 to 2021, using time series data analysis.

The pivotal objective of this investigation is to observe the impact of workers' remittances on the GDP of Pakistan. We also examine the macroeconomic indicators inflation, unemployment rate and number of emigrants on economic growth of Pakistan.

Literature Review

Studies of economic growth and its factors have been conducted for a very long time. The researchers have done enough in-depth research on it. Remittances from migrants are a worldwide phenomenon. Owing to the global economy's growing openness, many individuals leave their home nation in search of work in other places. They make money there, which they send home to support their family. Although worker remittances are increasing the receiving country's purchasing power, savings, and resources to finance investments, their relationship to economic growth has not received much attention in the past. Over the past ten years, numerous scholars have persistently discussed and presented empirical data regarding workers' remittances.

Karagoz (2009) conducted a detailed analysis of the link between worker remittances and GDP growth in Turkey after examining thirty years' worth of time series data. The analysis revealed a negative association between the two variables.

Similarly, Jawaid and Raza (2012) studied this area of inquiry, took time series data of 29 years for China and Korea, and came up with the findings that a considerable correlation between workers' economic growth and remittances in both countries, however, the nature underlying these relationships varies for the two nations. Korea had a positive association, but China had a negative link between worker remittances and economic development.

Wakayama (2011) investigated a comprehensive analysis of the relationship between workers' remittances and GDP growth in developing countries in Europe and Central Asia. The study found no significant correlation between the development of GDP per capita and worker remittances, and there exists no correlation between these indicators, suggesting that workers'

remittances might not adequately justify GDP in countries with high remittances-to-GDP ratio as proposed by the core theory.

Irfan (2011) conducted his empirical study of Remittances and their linkages to poverty in Pakistan. He examined the data in the time spanning 1975 to 2009. The study concluded that GDP and workers' remittances play a significant role in reducing poverty and boosting economic development.

Nishat and Bilgrami (1991) estimated Pakistan's remittance multiplier for the years 1959 to 1988 using a basic Keynesian structural model. The data revealed a multiplier impact of 2.4, driven mostly by consumption. Unlike their previous study, which focused on the influence of remittances on gross national product, this study explores at how remittances affect real GDP growth, which is a crucial sign of economic development.

Burney (1987) used Middle Eastern time series data from 1969 to 1986 to study the effects of worker remittances on Pakistan's GNP growth, domestic savings, and balance of payments. The study's conclusions showed that remittance inflows not only decreased Pakistan's poverty rate but also enhanced the country's ability to service its debt, decreased the need for further foreign loans, and lessened the burden of external debt.

In their 2009 study, Jackman, Craigwell, and Moore examine how workers' remittances and economic development fluctuate in tiny island developing nations. They came to the conclusion that while remittance volatility positively corresponds with higher economic volatility, a rise in the remittance to GDP ratio stabilizes investment, production, and consumption. This study challenges the idea that remittances from outside are just consumed, emphasizing their influence on investment activities during economic boom.

Based on empirical data, Glytsos (2005) deduced that remittances in industrialized nations such as Europe had a negligible impact on economic growth. Notwithstanding, remittances have a major influence on economic growth in poorer nations as they account for a large portion of imports. Through banks, migrant workers' savings also make their way toward useful endeavours, opening up funds for loans.

The effects of worker remittances on the economic circumstances in Latin American nations were studied by Fayissa and Nsiah (2010). They concluded that remittances significantly boost Latin American nations' GDP per capita. Notably, foreign aid and other financial inflows showed negative correlations with GDP, but investments in human and physical capital positively impacted GDP per capita.

In an investigation of the connection between worker remittances and financial growth, Adenutsi (2011) found that financial development comes before overseas remittances in Ghana. Foreign remittances are encouraged by a nation's well-developed financial system, and financial development fuels economic expansion. It has been discovered that worker remittances significantly and favorably affect economic growth over the long term.

Vikram (2005) looked at several ways that remittances might affect the state of the economy. The study show the uncertainty in the longer-term economic implications of such flows, even while it did not expressly support the short-term stabilizing effect on consumption.

Using the Gravity Model technique, Ahmed and Martinez-Zarzoso (2014) examined the effects of remittances on a number of macroeconomic variables in Pakistan, concentrating on 23 nations that accounted for 90% of remittances to Pakistan. According to their research, remittances have a major and favorable impact on the recipient nation's economic activity. Nonetheless, given the economic situation of the sending nation, the response was comparatively subpar. Moreover, factors like geographical distance, bilateral exchange rates, stock migrants in the destination country, interest rate differentials, employment, and political stability significantly impacted remittances.

Arif (1999) examined the relationship between remittances and household investments in the NWFP (now Khyber Pakhtunkhwa), Sindh, Punjab, and Azad Jammu & Kashmir. Utilizing information from the ILO/ARTEP (1986) survey of return migrants, which comprised 1251 households, the study discovered that around 78% of migrants' total income has sent home, and 68% of them save and invest a sizable portion of it.

Iqbal and Sattar (2005) looked studied the impact of remittances on a number of macroeconomic variables, such as real GDP growth, private and public investment, inflation rate, emigration terms, per capita income, and foreign debt. Their study, which spanned four decades from 1973 to 2003, revealed a strong and positive correlation between remittances and real GDP growth as well as private and public investment but a significantly negative correlation with the inflation rate.

Methodology and Data Sources

This chapter explores the connection between Pakistan's GDP and the remittances received by its workforce. In this work, the model is analyzed using the ARDL estimation approach. It is widely acknowledged that workers' remittances have a positive impact on economic development by fostering output growth.

The primary objective of the research is to ascertain how the remittances received by workers affect Pakistan's GDP. Annual time series data from 1993 to 2021 were used in the study. The data is collected from the World Bank, State Bank of Pakistan, and Pakistan Bureau of Statistics.

It is important to collect data from authentic sources for the empirical analysis as well as for the validity of the research. In this analysis, time series data spanning from 1993 to 2021 was employed. The data and their sources are gathered in the following table:

Sr. No	Variables	Data source
1	GDP	Word data bank
2	Inflation	State Bank Pakistan
3	Worker remittances	Pakistan Bureau Statistics
4	Total reserves	Word data bank
5	Emigrants	Word data bank
6	Unemployment rate	Word data bank

This research is comprised of the ARDL estimation technique to find the empirical outcomes that investigate the long-term relationships between worker remittances and GDP growth and other variables.

Worker remittances received have a substantial impact on GDP growth because Workers' remittances can promote total reserves, stabilize exchange rates, and encourage economic development.

This study uses the Auto Regressive Distributed Lag model (ARDL) to assess both the short- and long-term impacts of worker remittances on GDP. This method allowed for the analysis to be finished in two stages. An ADF test was used in the first phase to ascertain if the residuals were stationary. The variables are co-integrated (had an equilibrium or long-run connection with each other) if the residuals meet the conditions. The residuals were then obtained by doing a regression analysis on the level form. The ability to add an error-correcting mechanism to the short-run equation is explained by co-integrated variables. To achieve the required results, the following model has been used.

GDP= f (FR, inf, TOR, UR, Emigrants)

Considering the above relationship, an econometric model can be written as:

$$\mathbf{GDP= \beta_o + \beta_1 WR+ \beta_2 Inf+ \beta_3 UR+ \beta_4 TR+ \beta_5 Em + u_t}$$

Where,

GDP= Gross Domestic Product growth

While the independent variables are:

WR= Workers Remittances Received

Inf= Inflation

TR= Total reserves

UR= Unemployment Rate

And

Em= Emigrants

β= Coefficient of variables

U= Error term

The optimal lag order of the above model is selected based on Akaike information criteria. The tests for null and alternate hypotheses are given below:

H0: B1 = B2……=0

H1: B1≠B2…..≠0

The F-Bounds Test in the analysis checks for the existence of a long-run relationship among the variables included in the model.

Results and Estimations

This chapter of the study contains the results of the analysis and their interpretation.

The stationary of the variables has been examined with the ADF unit root test. Unit root test results indicated that certain variables are stationary at levels, while some are stationary at first difference; therefore, we had to utilize the ARDL estimate technique to examine how worker remittances affected Pakistan's GDP growth.

The following table displays the results of unit root tests

Table No. 2 Unit Root Test (ADF)

Variable	Calculated value	Critical Values			Prob.	Conclusion
		1%	5%	10%		

GDP	-5.665528	-3.724070	-2.986225	-2.632604	0.0001	I(1)
WR	-3.388764	-4.416345	-3.622033	-3.248592	0.0776	I(1)
Inflation	-4.039844	-3.788030	-3.012363	-2.646119	0.0058	I(0)
Emigrants	-5.769239	-3.711457	-2.981038	-2.629906	0.0001	I(0)
Unemployment rate	-5.881872	-3.711457	-2.980948	-2.629906	0.0001	I(1)
Total reserves	-4.243381	-4.356068	-3.595026	-3.233456	0.0128	I(1)

Descriptive statistics

	GDP	**PR**	**INF**	**EMIGRANTS**	**UR**	**TOR**
Mean	24.92161	21.67918	2.039791	11.87223	0.264439	21.89697
Median	24.84082	21.47612	2.124291	11.79543	-0.40822	21.4366
Maximum	26.16389	23.22985	3.009937	13.0322	1.774952	23.59671
Minimum	23.88682	20.71926	1.069573	10.96823	-0.91629	20.76865
Std. Dev.	0.698934	0.657127	0.492143	0.525441	0.934762	0.981228
Skewness	0.344029	0.756711	-0.39246	0.727141	0.286941	0.62402
Kurtosis	1.794984	2.73518	2.329363	3.010238	1.269335	1.714183
Jarque-Bera	2.567314	3.147438	1.421148	2.820057	4.432725	4.28124
Probability	0.277022	0.207273	0.491362	0.244136	0.109005	0.117582
Sum	797.4914	693.7339	65.27331	379.9112	8.462057	700.7032

SumSq. Dev.	15.14377	13.3863	7.508362	8.558742	27.0872	29.84705
Observations	32	32	32	32	32	32

Results of the ARDL model

When all the variables are stationary at the level and some are on the first difference then we can apply the ARDL estimation technique.

After fetching data from various authentic sources the author entered the data in Eviews. After running commands of the Auto Regressive Distributed Lag model in Eviews following results are generated:

Table No. 3 Auto Regressive Distributed Lag model (ARDL)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	0.531631	0.161441	3.293039	0.0216
GDP(-2)	-0.083769	0.195489	-0.42851	0.6861
GDP(-3)	0.204718	0.194988	1.049905	0.3418
WR	0.507471	0.169781	2.988968	0.0305
WR(-1)	-0.0817	0.143568	-0.56907	0.5939
WR(-2)	0.214072	0.175652	1.218727	0.2773
WR(-3)	0.429502	0.107288	4.003272	0.0103
INF	-0.199641	0.141502	-1.41087	0.2174
INF(-1)	-0.286866	0.089235	-3.21474	0.0236
INF(-2)	-0.197224	0.075446	-2.61412	0.0474
INF(-3)	-0.295338	0.086525	-3.41332	0.019
EMIGRANTS	0.205832	0.111362	1.848305	0.1238
EMIGRANTS(-1)	0.042326	0.122371	0.345884	0.7435

EMIGRANTS(-2)	0.040332	0.128852	0.313009	0.7669
EMIGRANTS(-3)	0.510317	0.101161	5.044609	0.004
UR	-0.815548	0.134715	-6.05389	0.0018
UR(-1)	0.095928	0.064699	1.482684	0.1983
UR(-2)	-0.10611	0.07948	-1.33505	0.2394
UR(-3)	0.134938	0.078723	1.714083	0.1472
TOR	-0.42878	0.142635	-3.00613	0.0299
TOR(-1)	-0.115837	0.099149	-1.16831	0.2954
TOR(-2)	-0.21638	0.098488	-2.19703	0.0794
TOR(-3)	-0.145234	0.104832	-1.38541	0.2245
C	-1.982672	2.332319	-0.85009	0.4341
R-squared	0.998978	Durbin-Watson stat		2.00477
Adjusted R-squared	0.994279	Prob(F-statistic)		0.000005

As we can see in the table the results show that all the worker remittances are highly significant and directly proportional to GDP. Inflation, total reserves, and unemployment rate are negatively related to GDP while Emigrants are positively related to GDP but it has an insignificant impact on the GDP of Pakistan.

F-Bound Test

Test Statistic	**Value**	**Significance**	**I(0)**	**I(1)**
F-statistic	20.0579	10%	2.08	3
k	5	5%	2.39	3.38
		2.50%	2.7	3.73

		1%	3.06	4.15

Long Run Estimates

Table No. 4 ARDL Long Run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WR	3.077962	1.13439	2.713319	0.0421
INF	-2.81812	1.010541	-2.788724	0.0385
EMIGRANTS	2.299256	0.770311	2.984841	0.0306
UR	-1.988351	0.638856	-3.112363	0.0265
TOR	-2.608464	1.12457	-2.319521	0.0681
C	-5.706854	7.834811	-0.728397	0.499

The long-run analysis of the data clearly shows the strong and positive relationship between worker remittances and the GDP 1 unit increase in workers' remittances leads to an increase of 3.077962 units in the GDP of Pakistan. This shows the importance of workers' remittances in fostering the GDP growth of Pakistan in the long term.

Like workers' remittances, emigrants also have a positive and significant impact on the GDP of Pakistan while inflation, total reserves, and unemployment rate have a negatively significant impact on the GDP of Pakistan in the long run.

Error-correction Mechanism

After estimating the long-run analysis and discovering a substantial correlation between workers' remittances and Pakistan's GDP, we use ECM to analyze the short-run dynamic adjustment. The findings of the short-run regression are shown in Table No. 5.

At the one percent significance level, the estimated coefficient of remittances is determined to be positive and statistically distinct from zero. The short-run results indicate that worker remittance

and emigrants have a positive and significant relationship with the dependent variable GDP which interprets as a 1 unit increase in person remittance will lead to an increase of 0.507 units in GDP, while the inflation unemployment rate and total reserves are negatively related to the GDP. The coefficient of the ECM term has a negative sign as it is expected to be and it is statistically significant.

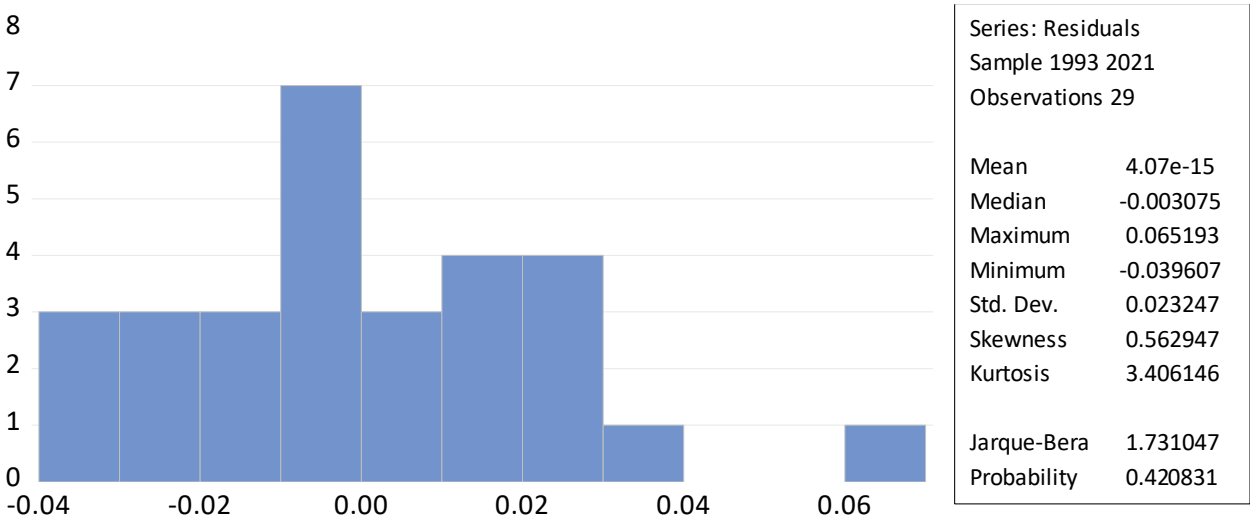
Table No. 5 Short Run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.12095	0.069206	-1.747676	0.1409
D(GDP(-2))	-0.204718	0.092891	-2.203854	0.0787
D(PR)	0.507471	0.085543	5.932369	0.0019
D(PR(-1))	-0.643573	0.063825	-10.0834	0.0002
D(PR(-2))	-0.429502	0.065483	-6.559025	0.0012
D(INF)	-0.199641	0.038443	-5.193183	0.0035
D(INF(-1))	0.492562	0.039174	12.57359	0.0001
D(INF(-2))	0.295338	0.035201	8.39013	0.0004
D(EMIGRANTS)	0.205832	0.047663	4.318456	0.0076
D(EMIGRANTS(-1))	-0.550648	0.049428	-11.14042	0.0001
D(EMIGRANTS(-2))	-0.510317	0.050013	-10.20369	0.0002
D(UR)	-0.815548	0.046164	-17.66627	0
D(UR(-1))	-0.028828	0.030128	-0.956881	0.3826
D(UR(-2))	-0.134938	0.037785	-3.571199	0.016
D(TOR)	-0.42878	0.056226	-7.625958	0.0006
D(TOR(-1))	0.361614	0.030853	11.7205	0.0001
D(TOR(-2))	0.145234	0.03536	4.107368	0.0093

CointEq(-1)*	-0.347419	0.024315	-14.28829	0
R-squared	0.984696	Durbin-Watson stat		2.00477
Adjusted R-squared	0.961044	Prob(F-statistic)		0.000005

According to the results of the ECM coefficient, the adjustment process is quick. It explains that 34% of disequilibrium that existed in variables integrated in the prior period has been adjusted per period.

Histogram



Serial Correlation LM Test

The results of Table No. 6 of the serial correlation LM test indicate that as the probability value is greater than 5 percent there is no autocorrelation in the model.

Serial Correlation LM Test

F-statistic	3.2309	Prob. F(3,2)	0.2453
Obs*R-squared	24.03964	Prob. Chi-Square(3)	0

Conclusion and Policy

This study mainly focused on the importance of the inflow of workers' remittances and its implications in fostering Pakistan's GDP. Using the ARDL estimation technique, we analyze the impact of workers' remittances on Pakistan's GDP. The study statistically proves that workers' remittances play a significant role in fostering Pakistan's GDP. Both short-run and long-run analyses highlighted that workers' remittances along with the number of emigrants, have a significant positive effect on the GDP of Pakistan, while inflation, unemployment rate, and total reserves also have an important but negative relationship with the GDP of Pakistan. Increasing the magnitude of workers' remittances can increase the GDP.

In countries like Pakistan, where inflation and unemployment have deep roots in the economy, it is essential to explore and utilize other ways to grow GDP so that economic conditions make their way to progress. Workers' remittances have the potential to increase welfare, support sustainable growth, and elevate impoverished households not just in the near term but also over the long term, given their growing influence.

The government should relax regulations allowing people to labor abroad and create measures that increase remittance amounts by lowering the cost of remittance transfers via official channels. In addition, the government ought to establish competitive programs that teach workers by worldwide standards, having identified the demands of global markets.

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