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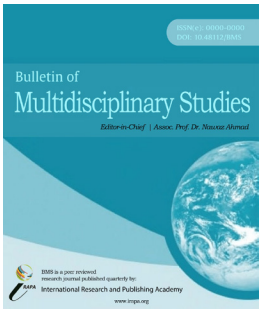

Original Article

Effect of Workers' Remittances on Inflation in Pakistan

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ABSTRACT

Remittances contribute significantly to the country's capital account. In some cases, the amount of remittances has been greater than Foreign Direct Investments (FDIs) and other forms of economic inflows. Because of their large volumes, remittances are able to influence many macroeconomic variables, in particular the Gross Domestic Product and the balance of international payments. This study examines the dynamics between remittances and inflation in Pakistan with the help of annual data for the period July 2000 to June 2023. The Augmented Dickey-Fuller (ADF) test was used to assess stationarity in the variables. In order to test for cointegration, it uses the Engle-Granger two-step procedure and Johansen's cointegration technique. The findings indicate the long-run association between workers' remittances and inflation.

Keywords: *Augmented Dickey-Fuller, Foreign Direct Investments, Inflation in Pakistan, Workers' Remittances*

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INTRODUCTION

Remittances are frequently described as one of the major forces that justify brain drain, especially for developing countries, in which expatriates contribute substantial foreign inflows. The same is true for Pakistan as well, a large share of remittances comes from abroad. The brief of globalization accelerated the volume of remittances (Taylor, 1999). There is an economic aspect as well, as remittances are important for not just the GDP of receiving states but also in shrinking current account deficits. They are also widely regarded as a way to reduce internal and external debt levels. Some researchers, however, have noted potential downsides, suggesting that remittances can reduce labour force participation, and thus total economic output. Many studies have researched the effects of remittances on macroeconomic variables.

The impact of remittances on economic growth, in particular, has been extensively studied. For example, Yang (2011) analysed the association of growth in remittances with GDP growth in the case of Bangladesh from the period 1979 to 2009 and discovered a positive correlation (Khan et al., 2019). For Pakistan, there were two distinct waves of remittance inflow: the first was from 1977 to 1983 and second began from 2002. Remittances to Pakistan have been steadily increasing since 2002. In countries such as Pakistan, in which capital is limited, remittances are an important foreign exchange source. One common belief is that more remittances mean less need for external borrowing. Remittances also played a key role in helping stabilise exchange rates and offer a buffer against oil price shocks. Moreover, they are thought to raise the living conditions of beneficiary households. Nevertheless, critical voices argue that these supposed benefits have not yet materialized in Pakistan - with one significant reason being that too much of remitted money are used for consumption instead of investment.

On the other side, whether remittances are spent on the consumption of goods and services, and whether they are of domestic or foreign origin, can lead to significant benefits to the recipient country (Glytsos, 2002). Nonetheless, several studies have demonstrated that remittances in Pakistan were spent on investment purposes as well. Thus, we can name them in two types; remittances are spent for household consumption purposes and second type of remittance are used for investing purposes. There is ample research in Pakistan on this subject but still further studies are required to observe the impact of remittances on macroeconomic indicators. It investigates the impact of remittance on major macroeconomic variables including GDP, inflation and balance of payment in Pakistan.

Over the past three decades, Pakistan has witnessed a steady increase in remittance inflows due to its large diaspora working in the Middle East, North America, and Europe (Rizvi et al., 2019). These remittances have become a vital source of foreign exchange, helping to stabilize the country's external accounts and contributing to household incomes. However, their macroeconomic impact extends beyond immediate benefits. Inflation in Pakistan has remained relatively high compared to global standards, with remittances potentially contributing to price increases by boosting aggregate demand. At the same time, remittances can appreciate the real exchange rate, which makes exports less competitive and may hurt the tradable goods sector. Understanding these implications is crucial for policymakers to ensure that remittances benefit the economy without creating adverse effects. Past studies in South Asia indicate that remittances can lead to inflation and actual exchange rate fluctuations. However, there is limited research focusing specifically on Pakistan. This study seeks to plug this space by exploring the direct and indirect impacts of remittances on Pakistan's economy over recent decades.

Objectives of the Study

The aim of this study is to analyse the economic impact of remittances on inflation and the real exchange rate in Pakistan. Specifically, the objectives include:

- To inspect the association between remittances and inflation in Pakistan: Understanding whether increased remittance inflows drive price levels higher by boosting consumption and demand
- To assess the effect of remittances on the real exchange rate: Investigating if remittances contribute to the appreciation of the local currency and the implications for Pakistan's export competitiveness
- To identify other macroeconomic variables influenced by remittances: Exploring how factors such as GDP growth, trade balance, and external debt interact with remittance inflows
- To provide policy recommendations: Based on findings, suggesting measures to maximize the benefits of remittances while mitigating any adverse effects

Scope of the Study

The scope of this study is paying attention on understanding the macroeconomic effects of remittances in Pakistan. The research is limited to

analysing inflation and real exchange rate dynamics, providing insights into their relationship with remittance inflows. The study is centred exclusively on Pakistan, although it may draw comparisons with other South Asian economies for context. The analysis covers recent decades, with data unruffled from reliable sources like the WDIs and International Financial Statistics. The study prioritizes the examination of inflation and the real exchange rate, without delving deeply into other aspects like employment or investment. The findings aim to guide policymakers in managing remittance inflows more effectively, ensuring economic stability and growth. The study does not cover micro-level impacts of remittances (e.g., individual household spending patterns) but instead focuses on macroeconomic indicators. Its findings will contribute to broader economic debates on how remittances can be leveraged for sustainable development in Pakistan.

Statement of the Problem

Workers' remittances have been a significant financial inflow for Pakistan, contributing to household income and foreign exchange reserves. However, their impact on inflation remains contentious. On one side, remittances increase domestic demand and improve the standard of living; on the other, they may fuel inflationary pressures by increasing aggregate demand without corresponding increases in supply. This duality creates a critical challenge for policymakers: how to leverage remittances for economic growth while mitigating adverse effects like inflation. Furthermore, there is limited empirical research specifically exploring the nuanced relationship between workers' remittances and inflation in Pakistan, underscoring the need for a comprehensive study to address this gap.

LITERATURE REVIEW

Inflation steadily decreases the real value of unsustainable public debt (Sims, 1994; Woodford, 2001) and therefore is suggested by the fiscal theory of the price level. This is not without its critics, but short-term government debt is more inflationary than long-term government debt. The analysis gives consideration to external debt to GDP: Does increased external debt lead to inflation, which might, in fact, be a policy choice from governments in order to better default on internal debt? Another factor that can leading towards high inflation under the pecuniary approach to balance payments are current account deficits that become increasingly larger as a percentage of GDP, as may happen as a result of monetary expansion. Available empirical evidence suggests inflation is often characterized by some inertia, where the current inflation rate is shaped by the past one (as inflation has adaptive expectations). This trend is especially significant in South Asia, where inflation averages have always exceeded those of the rest of the world. So past instances of price increases in the area probably affect expectations for future inflation.

Evidence of the dampening effect of remittances on poverty depth was observed in a time series analysis of household-level data from Ghana. That said, the study did point out an exception, noting that international remittances were more successful at reducing poverty than were those stemming from internal migration. Different effects of these remittances on the different households explain the discrepancy (Adams, 2009). Likewise, Lasagabaster et al. (2005) found an affirmative connection between remittances and economic growth does appear. They said finance is central to turning ideas into action, with remittances accounting for an important source of funding. Consequently, remittances can promote entrepreneurship, leading, in turn, to economic development. The piece also highlights concerns regarding elements of transfer systems, as it seeks to increase cash flow, whilst also lending assistance to future public and private construction.

By expanding the landscape of scholarship documenting migrant remittance inflows to Sri Lanka, this article adds to the growing body of literature which can be used to develop data-driven policies that promote both short-, medium- and long-run improvements. It stresses on the need to strengthen and enhance rural infrastructure to support sustainable growth. According to Amjad and Ahmed (1986), there is a positive relationship between remittances and consumption, and remittances accounted for a sizeable budget share on residential investments. The study also noted a systematic relationship between remittances of workers and sectors including wholesale and retail trade, construction, communication and transport, BDS, etc. Likewise, Burney (1990) explored the significance of the Gulf remittances in Pakistan's economic growth.

By adopting the ARDL research method, this research method used data from 1973 to 2007 to examine the influence of remittances on the economy and poverty in Pakistan. It highlighted the role of remittance inflows in helping spontaneous extreme poverty alleviation and the opportunity for other benefit to develop in the country. In addition, the results showed that workers' remittances had an optimistic contact on economic growth of Pakistan for GNP. The report also highlighted lower current account deficit and external debt burden

among other positive impacts of increased remittance flows. Adenutsi and Ahortor (2021) examined the effects of remittance on macroeconomic variables in Sub-Saharan African countries. Indeed, the increase of remittances in the region had been tied with, more recently, a higher migration. The current account balance and capital flight in reverse correlation with each other; and remittances and current account balance significant correlation test statements has been indicated by this study. Remittances can fill the current account gap, writes Maria, who also finds a positive effect of remittances on economic growth.

Using various exchange rate regimes, Reinhart et al. (2011) study the heterogeneous relationship between remittances and inflation. In addition, the study provides a novel system for analysing the evolution and outlook of exchange rates in a historical context. Importantly, it adds parallel exchange rates data from 1946 for 153 countries, rather than relying on the IMF's official classification, making it a new, unique and refined approach. The reclassification is notable for both its unique methodology and its extensive coverage. Those findings imply that the Bretton Woods definition of an exchange rate might not have had the impact once assumed. Under An increase in remittances under flat exchange rate regimes could move resources away from the tradable sector toward the non-tradable sector exerting upward pressure on prices.

Acosta et al. (2007) find a positive correlation between prices levels and remittances. These hold funds which are instantly exchanged into domestic currency when expatriates would normally send large remittances home. A national household survey in 10 Latin American countries shows that remittances not only contribute to reducing poverty, they also come with a negative externality: higher inflation. That happens as the conversion adds to the local money supply. The relevance of these facts lies in the fact that if a large chunk of the influx of funds has gone into the consumption rather than the investment, it provides a filling inflationary factor of the economy (Choudhri & Hakura, 2006).

In most remittance receiving economies, remittances can have significant macroeconomic implications, as they are potential sources of foreign reserves and can also be used to achieve BoP (balance of payments) surplus (Bugamelli & Paterno, 2011). Drawing on an analysis of 60 developing countries between 1980 and 2003, they uncover a sizeable relationship between remittances and the BoP. They found that remittances do affect the causal relationships between macroeconomic variables. An appreciation of the currency occurs when a country's central bank does not successfully offset the impact of more of this international reserve, causing an increase in the monetary base. This increase appreciates domestic price pressure and leads to inflation.

Conceptual Framework

The conceptual framework is built around the direct and indirect pathways through which remittances affect inflation and other macroeconomic indicators.

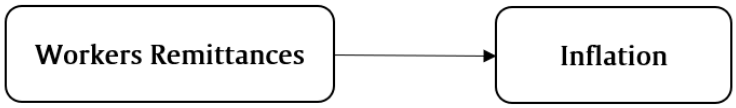

Fig. 1. Conceptual Framework

Hypotheses

H_1: Workers' remittances having a statistical positive momentous effect on inflation in Pakistan.

H_2: Increased remittance inflows direct to an appreciation of the real exchange rate, thereby affecting Pakistan's export competitiveness.

H_3: Other macroeconomic indicators, such as GDP growth and external debt, mediate the connection between remittances and inflation.

Determinants of Inflation

This apparent relationship between inflation and remittances does not necessarily hold for other inflows of foreign exchange. Unlike exports, which are motivated by an increase in industrious competence and domestic employment, remittances work more like a "gift" from abroad. Such inflows are of course likely to increase consumption or to allow consumption smooth and to reduce poverty to a certain extent than investment. This feature is, in part, the reason that the influence of remittances on economic growth has been hard to evidence in the literature (Barajas et al., 2009). Thus, remittances typically result in increases in aggregate demand without a similar growth in domestic output, pushing up price levels. Economic growth can suppress inflationary effects, assuming offsetting policy variables do not change. As a result,

real GDP growth is accounted for as a control variable in the analysis. A further significant determinant of inflation is trade openness. So greater openness to trade tends to align domestic inflation with inflation trends in the rest of the world (Romer, 1993). This is potentially less relevant to countries like Nepal, which engage in substantial trading relations with neighbouring states. When a neighbour's inflation is not well aligned with global inflation, that alignment becomes less important.

Hypotheses around the fiscal theory of the price level argue that unsustainable government debt will be eroded in real terms by inflation (Sims, 1994; Woodford, 2001). Though this view is not without detractors, government bonds will cause inflation in the short run much more readily than it does in longer maturities. In particular, the analysis takes into account external debt relative to GDP and the issue of whether or not rising external debt leads to inflation in order for governments to reduce internal debt. A rising current account deficit (to GDP), possibly resulting from the pecuniary extension, could also escort to top inflation, as per the pecuniary approach to the balance of payments. Empirical evidence also shows inflation is typically inertial, whereby current inflation is a function of past inflation due to adaptive expectations. This trend is especially pertinent in South Asia as historically, inflation rates in this region have been significantly higher than global averages. Inflationary expectations for the future are likely a function of past experiences of high inflation throughout the region.

Direct Effect on Inflation

Workers' remittances boost household incomes, increasing consumption and demand for goods and services. This surge in aggregate demand may lead to higher price levels, especially in sectors with supply constraints. This framework posits that remittances are a double-edged sword, offering economic benefits but posing challenges for macroeconomic stability, particularly inflation. The study employs time-series econometric methods, such as co-integration analysis, to empirically validate these relationships.

METHODOLOGY

Previous studies either included multiple factors simultaneously or used one or more than one illustrative variable in equations. This approach taken in this study corresponds with previous researches on this subject which include among others Al Khathlan (2012); Ayyoub, et al. (2011); Gokal & Hanif (2004). The following equations are used to analyze the relationship between these variables:

$$WR_t = \alpha + \beta WR_{t-1} + \beta WR_{t-2} + \beta I_t + \beta I_{t-1} + \beta I_{t-2} + \varepsilon_t$$

Whereas, WR is an independent variable and I is dependent variable.

WR= IV, Inf=DV

Where WR = workers remittances (in mn $), I = inflation rate is based on GDP. The data sets are sourced from 'Hand book of Statistics' for 2000-2023. This study employs annual data set for the empirical analysis. One problem that is often encountered in the time series data is the stationarity of the data. In order to gather the meaningful and valid results, the data that we are fed must be stationary data. The result could be spurious if the data is not stationary. 3.3 Stationarity Check The stationarity of the variables is observed using t statics.

Data Analysis

It is necessary to examine the variable order of integration form to detect a long run connection between variables within a co-integration equation. For this time series unit root test, the Augmented Dickey-Fuller (ADF) test (as discussed by Paparoditis & Politis, 2018) was used to determine the integration order of all variables. Below is the output of this test.

Co-Integration

Unit Root Test Result for Residual Series (Engel-Granger Procedure – Step 2)

Since all the three-models are confirmed co-integration, the coefficients from Model 1, 2 and Model 3 are the long-run equilibrium value. In the long run, the results of Model 1 show that inflation and remittances are inversely related and statistically significant at 1% level. Such primary results imply that the remittances may have adverse long run effect on the balance of payments. Among the variables included in the same, remittances are the only positive contributor to GDP in the long-run, emphasized in Model 2. In Model 3, remittance and inflation have a positive and statistically significant relationship in the long-run. The method presented by Johansen and Juselius (2001) was then employed to Equation 1 to further confirm the existence of co-integration.

Model Summary

The simple linear regression model with 1 independent variable (WR_INFLOW) and 1 dependent

variable (INFLATION). Having sample size of 24 observations, adjusted from 2000 to 2023.

Coefficient Interpretation

C (Constant)= 5.921901: is the intercept/ constant term of the regression equation, representing the expected value of inflation when WR_INFLOW=0. WR_INFLOW: 0.000252 The coefficient of the independent variable (WR_INFLOW). Representing the change in inflation for a 1- unit change in WR_INFLOW, while holding another variable constant. In this case, a 1-unit raise in WR_INFLOW is associated with a 0.000252 rise in inflation too. Statistical Significance t-Statistic: 1.805734 (for WR_INFLOW): This measures the number of standard errors away from zero the coefficient is. A high t-statistic indicates that the coefficient is statistically significant. Prob.: 0.0847 (for WR_INFLOW) The p-value is associated with the t-statistic, representing the probability of observing the estimated coefficient (or a more extreme value) assuming that the true coefficient is zero. As the p-value > 0.05, the coefficient is not significant statistically at the 5% level.

Model Fit

R-squared: 0.129081 R^2 measure the fraction of the variance in inflation which is explain by WR_INFLOW. A low R-squared indicates that the model does not explain much of the variation in inflation. Adjusted R^2: 0.089494 is the modified version of R square that castigate for the number of forecasters in the model. A low adjusted R squared designate that the model is not a robust to the data.

Other Diagnostics

Durbin-Watson stat: 0.639822: This test is for autocorrelation in the residual. A value ≥ 2 indicates no autocorrelation. In this case, the value is < 2, pointing out some autocorrelation. F-statistic: 3.260674: This tests in general is significance of the regression model. A high F-statistic indicates that the model is significant. In this output, the F-statistic is not significant at the 5% level (p- value = 0.084663). Overall, the results suggesting that:

- The connection between WR_INFLOW and inflation is positive, but not significant statistically at the 5% level.
- The model is not giving details much for the variation in inflation (low R-squared).
- There may be some autocorrelation in the residuals (Durbin-Watson stat < 2).
- The overall model is not significant at the 5% level (F-statistic).

Their long-run relationship is established by the two-step Engel-Granger method. This table shows the results of the first step of this process. C= The constant term/ the intercept or y-intercept. which represent the value of the dependent variable (inflation) when the independent variable (workers' remittance) is zero. WR_INFLOW= is the coefficient of the independent variable (workers' remittance). Coefficient: The change in the dependent variable for a one-unit change in the independent variable, while holding all other variables constant. C (Constant) = 5.921901: is the intercept/ constant term of the regression equation, representing the expected value of inflation when WR_INFLOW=0. WR_INFLOW: 0.000252 The coefficient of the independent variable (WR_INFLOW). Representing the change in inflation for a 1- unit change in WR_INFLOW, while holding another variable constant. In this case, a 1-unit raise in WR_INFLOW is associated with a 0.000252 rise in inflation too. Std. Error: The standard error of the coefficient, which represents the variability or uncertainty of the estimate.

C: 2.307459, WR_INFLOW: 0.000139, t-Statistic: The t-statistic is a measure of how many standard errors away from zero the coefficient is. C: 2.566416, WR_INFLOW: 1.805734, Prob.: The p -value, which represents the possibility of observing the projected coefficient (or a more extreme value) assuming that the true coefficient is zero. C: 0.0176 (This is statistically significant at the 5% level, indicating that the intercept is significantly different from zero). WR_INFLOW: 0.0847 (This is not statistically significant at the 5% level, indicating that the relationship between workers' remittance and inflation is not statistically significant).

The intercept (C) is statistically significant, indicating that there is a significant constant effect on inflation. The coefficient of workers' remittance (WR_INFLOW) is positive, indicating that an increase in workers' remittance is associated with an increase in inflation. However, this relationship is not statistically significant at the 5% level. The standard error of the WR_INFLOW coefficient is relatively small, indicating that the estimate is relatively precise. The t-statistic and p-value for WR_INFLOW indicate that the relationship is not statistically significant, suggesting that other factors may be more important in explaining inflation. Keep in mind that this is just a simple interpretation, and you may want to consider additional factors, such as:

- Other independent variables that may influence

inflation

- Non-linear relationships between variables
- Time-series or panel data considerations
- Robustness checks for outliers or influential observations

Granger Causality

Granger Causality Test Results

The Granger Causality test is used to conclude whether one time series can be used to predict another time series. WR_INFLOW does not Granger Cause INFLATION, Null Hypothesis: WR_INFLOW do not Granger Cause INFLATION, F-Statistic: 1.49758, Prob.: 0.2517. The test results point out that we cannot reject the null hypothesis that WR_INFLOW do not Granger Cause INFLATION at the 5% significance level (p value = 0.2517). This propose that WR_INFLOW does not provide significant additional information for predicting INFLATION. INFLATION do not Granger Cause WR_INFLOW

- Null Hypothesis: INFLATION do not Granger Cause WR_INFLOW
- F-Statistic: 0.04993
- Prob.: 0.9514

The test results indicate that we cannot refuse the null hypothesis that INFLATION does not Granger Cause WR_INFLOW at the 5% significance level (p-value = 0.9514). This suggests that INFLATION does not provide significant additional information for predicting WR_INFLOW. The Granger -causality test result suggests that:

- WR_INFLOW do not Granger Cause INFLATION, indicating that WR_INFLOW does not provide significant additional information for predicting INFLATION.
- INFLATION does not Granger Cause WR_INFLOW, indicating that INFLATION does not provide significant additional information for predicting WR_INFLOW.

This implies that we have statistically insignificant causal association between WR_INFLOW (workers' remittances) and INFLATION in whither direction. In this context, the hypothesis of no co-integrating vector in any of the equations has been discarded by both Trace statistics as well as Eigenvalue statistics. However, in this last case, neither of the two other null hypotheses is discarded by either the outline or the Eigenvalue statistic, which establishes that indeed there is one co integrating vector in Equation 1.

CONCLUSION & RECOMMENDATION

This research study investigated the effects of remittances on the macroeconomic indicator inflation. In the analysis it is established that a co- integration among variables when we had reserved inflation as dependent variable. Interdependency of the variables has not been observed among them, that means remittances does not affect the Inflation. The study shows that inflation, and the remittances inflow. These can be regulated through monetary and fiscal policy. In short, the study accomplished that the increase in remittances increases country's output, but could not decline the inflation. The variables are not co-integrated when kept as dependent variable.

Competing Interest

The authors had no competing interests.

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