DO WORKERS' REMITTANCES PROMOTE ECONOMIC GROWTH? A CASE STUDY OF PAKISTAN

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ABSTRACT

This study investigates the role of workers' remittances in promoting economic growth in Pakistan, using data from 1976-2017. Remittances are an important source of Sharia-compliant (mostly) FX inflows, which may contribute to the economic development of many Islamic and non-Islamic economies. Nonetheless, they are more relevant to Islamic economies, as they could potentially reduce the requirements of interest-based FX financing from donor agencies and/or from global capital markets. The impact of workers' remittances on the economic growth of Islamic developing economies remains a little explored area. Our research, which employs a case study of Pakistan, is first in this direction. We used the GMM estimation procedure to obtain efficient estimates in the presence of endogeneity and simultaneity bias. Our estimates show that an increase in remittance inflows positively affects the economic growth of Pakistan. The increase in per capita GDP could be primarily due to an increase in the consumption of low-income recipients. It is likely that this consumption demand promotes investment activity; however, the study could not establish the impact of remittances on such activity.

Keywords: Workers' remittances, GMM, Economic growth. **JEL Classification: E24; O40.**

Article history:Received: November 5, 2019Revised: March 24, 2020Accepted: August 27, 2020Available online: November 15, 2020

https://doi.org/10.21098/jimf.v6i4.1187

I. INTRODUCTION

1.1. Background

Workers' remittance inflows are one of the major sources of foreign exchange for developing countries, including Islamic ones. Workers' remittances are supposedly Sharia compliant, as the nature of the inflows has been little disputed by Sharia scholars. These inflows, without creating any debt or associated risks, have been financing the trade and primary income deficits of recipient countries for last fifty years. Specifically, the top twenty Islamic recipient countries together have received more than US\$ 1.8 trillion in workers' remittances since 1980; on average, US\$ 46.3 billion every year. In 2018 alone, these countries attracted such remittances worth US\$137 billion; around seven percent of their Gross Domestic Product (GDP).¹

These continuing inflows over the years may have contributed to the growth of these economies, with the widespread perception among people that they do. Contrary to the general perception however, the economic literature continues to debate the question, as the evidence that has emerged so far is inconclusive. Clearly, there are two different lines of argument. One strand of the literature views remittances as a means of consumption smoothing. Traditionally, migrants send remittances to their families to buy consumption necessities such as food, clothing, medicine and shelter. These inflows, therefore, have lifted a large number of people out of poverty by supporting their higher level of consumption. Studies on the poverty-alleviating impact of remittances have widely recognised this effect (Peković, 2017; Yoshino et al., 2017). At the same time, higher remittance inflows may even lower labour force participation and reduce work efforts. Therefore, the remittance inflow and growth nexus may become negative if such inflows are compensatory in nature, and if there are barriers to transforming them into productivity growth through investments.

Another strand of the literature argues that workers' remittances also promote investment activity, as well as supporting the consumption of the recipients. In this case, remittances are likely to act in a similar way to private capital inflows, which have a proven record of enhancing factor productivity and economic growth (İbrahim, 2012). Globally, however, the evidence favouring the investmentpromoting role of workers' remittances is sparse.

1.2. Objective

This research is an attempt to contribute to the literature on the impact of remittance inflows on economic growth in Islamic developing countries. Although there have been a significant number of conventional studies assessing workers' remittances and their growth-enhancing effect, their impact on the economic growth of Islamic developing economies remains a rarely explored area. Interestingly, remittances are more relevant to Islamic economies, as they could potentially reduce the requirement of interest (riba)-based FX financing from donor agencies and/or from global capital market. Our research is therefore the first to take this direction.

^{1.} Indonesia is the fifth of the top twenty largest recipients of remittances within Islamic countries, receiving US\$11.2 billion in 2018, around 1.12 percent of its GDP (Source: World Bank).

Ideally, to achieve the study objective, information from Islamic developing countries should have been pooled for the analysis. However, consistent data on the flow of remittances into Islamic countries over a time horizon long enough to allow for their impact on investment to be observed are not readily available. In contrast to other Islamic developing economies, Pakistan provides a long, reliable and consistent series of data on remittance inflow, which could be used for meaningful economic analysis. Therefore, this paper uses Pakistan as a case study to assess the impact of the inflow of remittances on its economic growth.

A study on Pakistan represents an important contribution to the literature on the remittance–growth nexus in Islamic countries, not only because the country is the seventh largest recipient of global remittances inflows, but also because remittances contribute significantly to the overall FX inflow and support the country's trade account.² In this context, the study attempts to answer the following research question: "do remittance inflows promote economic growth in Pakistan?" The potential impact of endogeneity bias on the estimated coefficient remains a key concern. We used an instrumental variable approach, with a single equation and also a system of equations to control for endogeneity and simultaneity bias. Yearly data from 1976 to 2017 were used.

Our results suggest that an increase in remittances (in terms of GDP) leads to an increase in per capita income into an economy. This increase could be due to the increase in the consumption of low-income recipients, as well as investment in the economy. However, the study could not establish the impact of remittances on investment activity, although increased consumption demand itself is likely to fuel such activity in the economy in the long run. Nevertheless, our findings are supported by various previous studies on Pakistan, which show increased asset acquisition behaviour on the part of individuals and households receiving remittances.

The remainder of the paper is structured as follows. Section II comprises a review of the background theory and literature, while Section III discusses the data, model development and methodology adopted for the estimation. Section IV presents an analysis of the results and finally, Section V concludes the study.

II. LITERATURE REVIEW

2.1. Background Theory

In a comprehensive review of the channels through which workers' remittances contribute to economic growth, Gapen et al. (2009) identified the three key determinants, namely (i) capital accumulation, (ii) labour force participation and (iii) total factor productivity, which translate inflowing remittances into economic growth through investments.

First, remittances may affect investment activity directly by stimulating the rate of capital accumulation. This channel is activated either by reducing financing constraints, by lowering the cost of capital, by enhancing microeconomic stability, or by all of them acting at the same time. In the first case (alleviating financing constraint), if a recipient economy has a poor domestic financial structure,

^{2.} Migration and Development Brief No. 31, World Bank.

remittance inflows may allow households to increase the rate of accumulation of their physical and human capital, which may help in easing financing constraints in the economy. In the second case (lowering the cost of capital), workers' remittance inflows improve the creditworthiness of domestic investors, thereby lowering the cost of capital in the domestic economy. As a result, future remittance inflows not only act as collateral for additional borrowing, which may lead to new investments, but can also be used to service accumulated debt. In the third case (enhancing microeconomic stability), sustained remittance inflows make the domestic economy less volatile, thus reducing the sovereign risk premium on which firms weigh heavily when making their investment decisions. Therefore, remittance inflows enhance investment activity through direct investments by foreign firms in the domestic economy.

However, the investment enhancement effect of the remittances is not always guaranteed. For example, remittance inflows may increase household consumption, instead of promoting investment, if these inflows are compensatory in nature. Moreover, the investment effect of remittances may be weakened if the domestic economy is highly integrated with world financial markets. Foreign financial inflows may leave less room for recipient households to make efficient investment decisions. In such situations, remittance inflows may not promote economic growth.

Second, labour force participation is another important channel through which remittances can influence economic growth. Efficient investment decision making hinges on perfect information between the remitter and recipient, with monitoring of the latter. On the other hand, asymmetric information between the agents and lack of monitoring may encourage moral hazard amongst the recipients. As a result, recipients may be encouraged to enjoy consumption by reducing the labour supply in the market.

Third, remittances may also affect growth in the total factor productivity in a number of ways. For example, it has been empirically proven that the inflow of remittances tends to lead to appreciation of the real exchange rate of the recipient economy. This appreciation results in a contraction of exports from the manufacturing sector and hence may lead to a decline in domestic investments. Moreover, if the recipient is unskilled in capital allocation and makes investment decisions on behalf of the remitter, then remittances may result in a decrease in the efficiency of domestic investment. In either case, remittances may not be very supportive of economic growth.

Additionally, there is political economy channel through which remittances may increase economic growth. For instance, bigger depositors (of remittance recipients) can pressurise the government to make financial sector reforms. These reforms could aim to increase productive lending in the economy or to enhance safety, so that financial institutions invest in safer assets. The outcome may depend on the government's response to the pressure from depositors. Moreover, large remittance inflows may hamper good domestic governance, as the recipient may become less interested in monitoring government performance. This has widespread implications for the quality of the policy environment, which may negatively affect capital accumulation, TFP growth and growth in labour inputs.

2.2. Previous Studies

A number of studies have explored the impact of workers' remittances on economic growth; however, their results have been inconsistent. A few (such as Driffield & Jones, 2013; Acosta et al., 2008; Meyer & Shera, 2017; Giuliano & Ruiz-Arranz, 2009; Ramirez & Sharma, 2008 and Imai et al., 2014} found a significant and positive effect of remittances on economic growth. However, others (for example, Chamiet al., 2005; Gapenet al., 2009 and Karagoz, 2009) found no or surprisingly negative impacts of remittances on economic growth.

Driffield and Jones (2013) investigated the relative impact of workers' remittances, FDI and official development assistance on economic growth in developing countries. They concluded that both remittances and FDI had a positive impact on economic advancement in such countries, provided that the recipient country had a strong institutional environment, a stable law and order situation, and robust mechanisms to protect investors. Acosta et al. (2008), using extensive cross-country panel data, found that remittances in Latin American and the Caribbean (LAC) had reduced inequality and poverty significantly through an increase in per capita income. Meyer and Shera (2017), employing panel data from six countries, explored the relationship between workers' remittances and economic growth. Their finding shows that remittances significantly contributed towards economic development.

Similarly, Giuliano and Ruiz-Arranz (2009) analysed whether domestic financial sector depth affected the impact of remittances on GDP growth in the recipient country. Using data from 100 developing countries, their findings reveal that workers' remittances had enhanced economic growth in countries where the financial sector was less developed, suggesting that remittances provided an alternate avenue for finance investments. Ramirez and Sharma (2008) examined the impact of remittances on economic growth by employing annual data from 23 Latin American countries from 1990 to 2005. Their findings corroborate the earlier results of Giuliano and Ruiz-Arranz (2009), that remittances can act as a substitute for the financial sector, especially in the countries where the level of income is low. Similarly, Imai et al. (2014) investigated the effect of remittances on the growth of GDP per capita using panel data from 24 Asian and Pacific countries. They concluded that remittance inflows were not only beneficial for economic turnaround, but also made a major contribution to poverty reduction. However, their study also suggests that any volatility in remittances and FDI was a source of shocks to economic growth.

On the other hand, a study by Chami et al. (2005) revealed that the impact of remittances differed from that of capital flows. Their empirical estimation shows that remittances are compensatory in nature, intended to compensate the recipient for the bad economic outcomes. Therefore, they are negatively related to per capita GDP growth, whereas capital flows such as FDI are profit driven and have a positive relationship with economic output. Addressing the limitations of the study of Chami et al. (2005), Gapen et al. (2009) also worked on the similar question with updated instruments and techniques; however, they arrived at a similar conclusion.

The notable country-specific studies also show a similar trend. For example, Kumar (2013), studying the relationship between remittances and economic

growth in Guyana, reports that remittances are significantly and positively related to economic growth in both the short and long run. On the contrary, the findings of Ahmed (2010) and Karagoz (2009) indicate that remittances had no effect in Bangladesh, or a negative one in Turkey, on GDP growth. Interestingly, a similar study by Alvin (2007), which considered the remittance-growth nexus in the Philippines at national and regional levels, was inconclusive, finding that remittances did influence economic growth positively and significantly at the national level, but at regional level this result may not apply.

Country-specific studies of Pakistan are relatively rare, although the subject has received more attention recently. Interestingly, the relevant literature covering Pakistan is more consistent in its findings, indicating that remittances have a positive effect on economic growth in the long run. For example, Qayyum et al. (2008) examined the impact of remittances on poverty and economic growth over the period 1976 to 2006. Their study shows that remittances have a significant and positive effect on economic growth. Moreover, as the impact broadens over time, remittances can lead to sustainable growth and welfare improvement for poor households. Similarly, Kumar (2011) concluded that in the long run, remittances and economic growth are positively related; however, in the short run, remittances are an insignificant contributor towards such growth. Jibran et al. (2016) investigated the effect of remittances on per capita growth in Pakistan. Their analysis reveals that remittances have a significant and positive effect on per capita growth, and that this effect is observed not only in the short run, but also in the long run. Despite this consensus, the quantum impact of remittance inflows on per capita income remains to be agreed upon.

			Estimates of Remittances and GDP Growth	
Study	Period	Method	Short Run	Long Run
Jibran et al. (2016)	1976-2013	ARDLa	0.039*	0.074*
Qayyum et al. (2008)	1973-2007	ARDL	-0.92*	0.465*
Kumar (2011)	1980-2009	ARDL	-0.05*	0.083*
Ahmad et al. (2013)	1978-2011	OLSb	Nil	0.25*
Hussain and Anjum (2014)	1973-2011	GMMc	Nil	0.28*
Iqbal and Sattar (2010)	1972-2003	OLS	Nil	0.45*

 Table 1.

 Literature on the Impact of Remittances on Economic Growth in Pakistan

*Significant; a ARDL: Autoregressive Distributed Lag; bOLS: Ordinary Least Squares; c GMM: Generalized Method of Moments

For example, Jibranet et al. (2016) and Kumar (2011) report that almost 0.08 percent of the impact on growth is caused by a one percent increase in the remittance inflows, while Qayyumet al. (2008) report a 0.46 percent impact (**Table 1**). This study, therefore, contributes to the debate by using an extended data set and the latest available techniques and instruments.

III. METHODOLOGY

3.1. Data

Following Gapen et al. (2009), we used real GDP per capita and the remittance to GDP ratio as indicators of economic growth and remittance inflows in Pakistan, respectively. Moreover, also in line with their study, we used a number of control variables, such as the FDI to GDP ratio, money supply (M2) to GDP ratio, fiscal deficit to GDP ratio, inflation, population growth, and investment to GDP ratio.

As for the instruments, we used the lag of most of the variables and also the world remittance inflows to GDP ratio (excluding Pakistan) as an instrument for remittance inflow into Pakistan. In addition, we used trade openness (the ratio of the sum of imports and exports to GDP) and telecom, which indicates the number of telephones in use, including fixed and mobile connections. Improvements in telecommunications are expected to enhance the inflow of remittances; however, their contribution to GDP remains almost negligible.

The study used data from 1976 to 2017 in logarithmic form, as some of the variables were available since the start of the period. All the data were acquired either from the State Bank of Pakistan or from Haver Analytics. Most of the variables are in US dollars; in the case of real variables, base year 2010 US dollars were used.

3.2. Model Development

For estimation, we adopted the model specified by Gapen et al. (2009) with minor modifications, as this study is country-specific. The economic model used to gauge the impact of remittances on real GDP growth is specified below:

$$(GDP \text{ per capita})_{t} = \beta_{0t} + \beta_{1t}^{*} (Remittances to GDP)_{t} + \alpha_{t}^{*} (Controls)_{t} + \varepsilon_{t}$$
(1)

Moreover, similar to their study, we used a number of control variables to control the impact of the key determinants, beyond remittances, driving national economic growth. The introduction of these drivers is helpful in isolating the impact of remittances on economic growth. For this purpose, we introduced the FDI to GDP ratio, money supply (M2) to GDP ratio, fiscal deficit to GDP ratio, population growth, and investment to GDP ratio. Interestingly, FDI, fiscal deficit, population and investments (where used in the model) capture growth based on real economic activity. On the other hand, money supply and inflation capture growth if the nominal drivers are creating money illusion, and are responsible for short-term growth spurts.

We used the generalized method of moments (GMM) regression modelling technique, which is efficient in dealing with endogeniety and simultaneity bias. Generally, estimation of the remittance inflow and the economic growth relationship suffers from two-way causality. Often, low economic growth in a country promotes migration of the productive labour force to higher-income countries. These immigrants send their earnings back home to support their family, which increases the remittance inflow into the domestic economy and may enhance economic growth through the investment effect. Moreover, it is possible that other variables, such as governance, may affect both remittance inflow and the growth of the domestic economy. Precisely, poor domestic governance could encourage higher migration, which may lead to higher remittance inflows. At the same time, higher outflow of productive labour may stifle the growth of the domestic economy, as far as the remittances they send back are used for consumption smoothening.

Besides the feedback effect, the presence of autocorrelation due to the imposition of time aggregation on the variables and the presence of lagged values of the dependent variables as explanatory variables also leads to biased estimates. Therefore, controlling endogeneity remains a key concern. To circumvent the problem, an instrumental variable is often used, which correlates closely with the original variable, but remain uncorrelated with the error. Moreover, choice of the appropriate estimation procedure also plays an important role in obtaining consistent and the most efficient estimates. The GMM technique provides estimates that are consistent in the presence of one or more endogenous regressors, while its system estimates mitigate endogeneity and auto-correlation problems.

3.3. Method

GMM estimation is one of the most extensively used estimation methods when dealing with structural issues. Unlike maximum likelihood estimation (MLE), which can also be used in structural equation estimation, GMM does not require full information on the distribution of the data. Instead, it uses assumptions about specific moments of the random variables, which are called moment conditions. In some cases, this approach makes GMM more robust than maximum likelihood. In models in which there are more moment conditions than model parameters, GMM estimation provides more efficient estimates.

Let us assume that equation (2) is to be estimated, as given by the matrix notation

$$y = X\beta + u, \tag{2}$$

where $E(uu) = \Omega$. The regressor matrix X is of order *nxK*, where n is the number of observations. Moreover, it is assumed that the K₁ regressors are endogenous under the X₁ part of the partitioned X matrix, and (K-K₁) are the remaining regressors under X₂ that are assumed to be exogenous. The full set of instrumental variables Z, which is *nxL*, are assumed to be exogenous, i.e., $E(Z_iu_i) = 0$. Similar to X, matrix Z is also partitioned into (Z_1, Z_2) , where the L₁ instruments Z₁ are excluded instruments, and the remaining (L – L₁) instruments Z₂ = X₂are the included instruments.

A GMM estimator can be obtained as follows:

$$\beta_{GMM} = (X'ZWZ'X)^{-1}X'ZWZ'y \tag{3}$$

with distribution of the variance covariance matrix given by:

$$V(\beta_{GMM} = \frac{1}{n} (Q'_{XZ} W Q_{XZ})^{-1} (Q'_{XZ} W S W Q_{XZ}) (Q'_{XZ} W Q_{XZ})^{-1}$$

where W is the optimal weighing matrix and S is the covariance matrix of the moment condition, which is $S = \frac{1}{2} E(Z'uu'Z)$.

This study also reports results from two-stage least squares (2SLS) and limited information maximum likelihood (LIML) for the robustness check of the GMM estimates. Both 2SLS and LIML are K-class estimators used to obtain parameter estimates of the structural equations and differs significantly from GMM in estimation philosophy.

Two-stage least squares is a predecessor of GMM, and is an extension of ordinary least squares (OLS). This method is used when the error terms are correlated with the independent variables. Similar to GMM, the procedure also uses instrumental variables to estimate the values of the predictor(s) in the first stage, and then to estimate a linear regression model of the dependent variable in the second stage, using the values computed in the first stage. Since the estimates are based on the instrumental variables that have no correlation with the errors, the results of 2SLS are likely to be optimal.

Similar to 2SLS, the LIML method is in fact a linear combination of the OLS and 2SLS estimates, with the weights depending on the structure of the data. These weights are calculated in such a way that they roughly minimise the 2SLS bias. Among the single equation estimators, the LIML estimator is efficient when the error terms are normally distributed. The LIML procedure uses a priori information only related to the relevant equation(s) whose parameters are to be estimated. Moreover, a priori this procedure does not impose restrictions on the parameters.

IV. RESULTS AND ANALYSIS

Table 2 shows the reduced form estimates using GMM, LIML and 2SLS. However, this study only draws inferences from the GMM estimates, as it is a widely accepted procedure for addressing the potential problems of endogeneity and simultaneity bias. The estimates from LIML and 2SLS are reported for the robustness check of the results.

	GMM	LIML	2SLS
Remittances to GDP	0.1511	0.1513	0.1483
	(0.000)	(0.000)	(0.000)
FDI to GDP	0.0919	0.0877	0.0873
	(0.000)	(0.000)	(0.000)
Inflation	-0.0115	-0.0167	-0.0167
	(0.672)	(0.549)	(0.547)
Fiscal Deficit to GDP	0.1088	0.0926	0.0920
	(0.004)	(0.027)	(0.028)
Population Growth	-0.9760	-1.0194	-1.0158
	(0.000)	(0.000)	(0.000)

 Table 2.

 Estimates of the Relationship between Per Capita Income and Remittances

	GMM	LIML	2SLS
Money Supply (M2) to GDP	0.1887	0.2444	0.2484
	(0.310)	(0.215)	(0.204)
Investment to GDP	-0.1637	-0.1286	-0.1335
	(0.318)	(0.445)	(0.423)
Intercept	7.0414	6.8093	6.8103
	(0.000)	(0.000)	(0.000)
Underidentification tests			
Kleibergen-Paap rk LM statistic [Chi-sq(3)]	20.3180	20.318	20.318
	(0.000)	(0.000)	(0.000)
Weak identification test			
Kleibergen-Paap Wald rk F statistic	27.4830	27.483	27.483
Stock-Yogo weak ID test critical values:			
5% (10% for LIML) maximal IV relative bias	13.910	6.460	13.910
Overidentification test of all instruments			
Hansen J statistic [Chi-sq(2)]	1.8440	1.8350	1.8350
	(0.398)	(0.400)	(0.400)

 Table 2.

 Estimates of the Relationship between Per Capita Income and Remittances (Continued)

The upper panel of Table 2 shows the estimates of Equation 1. These estimates are consistent with the GMM, LIML and 2SLS estimators, and are therefore robust. The estimates suggest that remittances have a positive effect on economic growth. A one percent increase in the remittances to GDP ratio leads to a 0.15 percent increase in GDP per capita. Our results, therefore, are in sharp contrast to those of Gapen et al. (2009) and others who argue that remittances have no significant impact on economic growth. In other words, remittance inflows in Pakistan not only support the consumption of the recipients, but also contribute to investment activity, albeit marginally. We will discuss later the findings related to the impact of remittances on investment activity in the country in more detail. Nevertheless, our estimates are consistent with earlier studies which have reported that remittances contribute to economic growth in Pakistan.

With regard to the impact of control variables, FDI appears to have a significant effect on per capita income; however, its impact is very low. An almost one percent increase in FDI leads to 0.1 percentage point increase in per capita income. The literature generally reports a higher impact of FDI. For example, Khan and Khan (2011), in their analysis of the impact of FDI on GDP growth in Pakistan, reported an impact of around 0.31 percent using data from 1981 to 2008. The lower FDI coefficient of our study may be due to the extended sample size, which includes the latest period of low FDI inflow into Pakistan.

Similarly, fiscal deficit also has a positive and significant impact on per capita income, with a one percent increase leading to an almost 0.11 percent increase in per capita income. In addition, our result shows that population growth has a

negative relationship with per capita income. A one percent increase in population leads to an almost similar reduction in real per capita income. Our results show that money supply, inflation and investment have no impact on per capita income. An insignificant impact of money supply and inflation on real per capita income is expected; however, the insignificant impact of investment on per capita income could be due to the inclusion of FDI, which probably also captures the variation in investment. Dropping investment from the analysis does not change our results. Therefore, we have retained the variable following Gapen et al.'s (2009) specification, as adopted for this study.

With regard to diagnostics, we used an LM test for the under-identification of the equation. In the null hypothesis, the equation is under-identified; that is, the excluded instruments are correlated with the endogenous regressors. The Kleibergen-Paap (Rank) LM test for under-identification is essentially a rank test of a matrix of reduced-form coefficients with rank=K₁-1, which includes L₁ excluded instruments and K₁ endogenous regressors. The null hypothesis is rejected at the five percent level of significance, indicating that the correlation matrix is full column rank and the model is identified. For the weak identification test, we used robust Kleibergen-Paap Wald (Rank) F-statistic. When the excluded instruments are weakly correlated with the endogenous regressors, the performance of estimators may suffer. The calculated test statistics are higher than the Stock and Yogo (2005) critical values, indicating that the equation is not weakly identified.

To test for over-identifying restrictions, we used the Sargan-Hansen/J-test. The joint null hypothesis is that the instruments are valid and uncorrelated with the error term. In this case, our test statistics failed to reject the null hypothesis, indicating that the instruments used for the estimation were valid. For the efficient GMM estimator, the reported test statistic is Hansen's J statistic; however, for the 2SLS estimator, the test statistic is Sargan's statistic, typically calculated from a regression of the IV residuals on the full set of instruments. With the assumption of conditional homoscedasticity, Hansen's J statistic becomes Sargan's statistic.

Importantly, investment plays an important role, channelling the inflowing remittances for the growth of the economy. To capture this role, we introduced an interaction term incorporating investment and remittances into the specification. However, with the inclusion of the this term, the estimates become too distorted to draw meaningful economic inferences.

To obtain an indication of the role of investment, we then estimated the system of equations with remittances, per capita income, money supply and investment as key endogenous variables defining the system equations. The table in the appendix shows the estimates of per capita income and investment equations. Most of the coefficients defining the 'per capita income' equation (first column) become insignificant with the inclusion of the investment variable in the system. When investment is dropped from the system, the coefficients of the 'per capita income' equation (second column) become significant and meaningful. Specifically, this system estimate shows that a one percent increase in remittances leads to 0.19 percent increase in income per capita – very close to the earlier estimates of Table 1. Moreover, the system estimate including investment (third column) shows that remittances have an insignificant impact on investment, although FDI has a positive and significant impact. Although the study has not been able to substantiate the impact of remittances on investment behaviour, previous studies report that remittances inflows help recipients to accumulate assets in Pakistan. For instance, Junaid et al. (2018) examined the asset accumulation pattern of remittance recipients and reported that the households treated inflows as transitory and precautionary income. The recipients used the inflows to acquire consumer durables, housing and financial assets. On a similar note, Fatima and Qayyum (2015), focusing on the association between workers' remittances and migrants' household asset accumulation, concluded that remittances play a pivotal role in the asset accumulation of households in Pakistan. Besides these recent studies, Nishat and Bilgrami (1993) showed that remittance inflows are positively related to individuals' self-interest, such as the accumulation of property, and their future planning for business motives.

V. CONCLUSION AND RECOMMENDATIONS

This case study has investigated the role of workers' remittances in promoting economic growth in Pakistan using data from 1976-2017. This topic remains unexplored for most Islamic countries, although the level of remittances flowing into these countries is significant in terms of their GDP. Our research using a case study of Pakistan is a first to take such an approach. Further studies on this subject could investigate the impact of remittance inflows on the panel of Islamic countries. The study has used the GMM estimation procedure, as the remittance inflows and economic growth relationship suffers not only from two-way causality, but also from the influence of other indirect variables.

Our estimates show that an increase in remittances (in terms of GDP) leads to an increase in per capita income. This increase in per capita GDP could be primarily due to the increase in the consumption of low-income recipients. At the same time, this consumption demand may support some investment activity. Some studies have reported on the asset accumulation pattern of remittance recipient households in Pakistan. Such behaviour may augment investment activity in the economy in the long run. However, this study was unable to identify the impact of remittances on investment activity. Therefore, a more detailed study of this impact on investment growth in the country is required to assess the changing pattern of household asset accumulation over time in line with remittance inflows. This could be an agenda for future research.

Importantly, our results also have implications for the other developing Islamic economies which are prone to economic boom and bust cycles, and consequently frequently visits international financial institutions or global capital markets. These economies could design policies facilitating remittance inflows in their country. This may reduce their dependence on interest (riba)-based financing from global capital markets.

Based on the finding of our study, we recommend that both the governments and central banks of Islamic countries should focus more on policy interventions designed to attract more remittances from its diaspora. This enhanced inflow is likely to boost domestic economic growth at low cost, with no exchange rate or interest rate risks. The second of these is more pernicious, as capital inflows based on interest rates dilute the very foundation of Islamic economics.

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APPENDIX

	Per Capita Income		Investment to GDP	
	With	Without	With	Without
	Investment	Investment	Investment	Investment
Remittances to GDP	0.1295	0.1873*	-0.0029	
	(0.195)	(0.000)	(0.952)	
FDI to GDP	0.0622	0.0031	0.1318*	
	(0.799)	(0.964)	(0.001)	
Money Supply to GDP	1.6776	1.8334*	0.4202*	
	(0.192)	(0.000)	(0.043)	
Population Growth	-1.0276	-1.2963*		
	(0.372)	(0.000)		
Fiscal Deficit to GDP	0.4389	0.3082*		
	(0.229)	(0.005)		
Investment to GDP	-0.7998			
	(0.575)			
Per Capita Income			-0.2962	
			(0.181)	
Telecom (-1)			0.0116	
			(0.691)	
Intercept	2.8076	0.2892	4.5282*	
	(0.673)	(0.880)	(0.002)	

System GMM Estimates of the Impact on Remittances on Income and Investment

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