Emigrant's remittances, Dutch Disease and capital accumulation in Pakistan

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Abstract

This paper examines macroeconomic impacts of emigrant remittances in Pakistan by using a vector autoregressive estimation framework. The contribution of this study is to investigate the threshold of remittance-GDP ratio that has real effects on the economy in terms of Dutch Disease and capital accumulation. Finding the threshold is significant because Pakistan has been one of the largest recipients of remittances in the world and her remittance inflows have experienced substantial fluctuations. The empirical results showed that: regarding the Dutch Disease effect, an increase in remittance-GDP ratio, if it exceeds the 6% threshold, leads to a decline in manufacturing-services ratio; and as for the capital accumulation effect, an increase in remittance-GDP ratio, when it exceeds the 5% threshold, leads to a decline in investment-consumption ratio. These outcomes suggested that the emigrants' remittance inflows in Pakistan, if they exceed certain levels relative to GDP, have aggravated industrialization (Dutch Disease effect) and capital accumulation.

Keyword: Pakistan, Emigrant's remittances, Dutch Disease, Capital accumulation, Vector auto-regressive estimation

JEL Classification Codes: F22; F39; O53

1. Introduction

International migrant remittances have become one of the major financial sources in terms of foreign-currency earnings for a large number of developing and emerging-market economies. According to the World Bank data, the total remittance received by low- and middle-income economies increased by around 178 times from 3.3 billion US dollars in 1975 to 588.1 billion US dollars in 2022, while their GDP grew only by 29 times during the same period.[1] Thus, the remittance-GDP ratio averaged in their economies jumped up from 0.25% in 1975 to 1.52% in 2015.

These increasing trends in remittance inflows towards developing and emerging-market economies have micro and macro-economic impacts on their recipient economies. At household level, the favorable effects of received remittances include the increase in income and standard of living, and the reduction in incidence of poverty. There have been massive empirical studies revealing positive impacts of remittances on household incomes, poverty alleviation, educational achievements, and entrepreneurship. From the macroeconomic perspectives, some studies argued that the recipient economies could enjoy a momentum of economic growth through capital accumulation from their remittance inflows. The other studies, however, demonstrated negative effects of the remittance inflows, typically, the "Dutch Disease" effect in which tradable manufacturing sectors are crowded out by non-tradable service ones through real exchange rate appreciation. As such, the empirical outcomes on macroeconomic effects of remittance inflows have so far been inconclusive. Thus, the remittance issue has attracted a lot of attentions for both academics and policy makers to enrich the empirical evidence and to formulate appropriate policies for managing received remittances.

This study examines macroeconomic impacts of emigrant remittances with a focus on Pakistani economy by using a vector auto-regression (VAR) estimation framework. The contribution of this study is to investigate the threshold of the received remittance ratio relative to GDP that has real effects on her economy in terms of Dutch Disease and capital accumulation. Finding the threshold would be significant because Pakistan has been one of the largest recipients of remittances in the world and her remittance inflows have experienced substantial fluctuations together with her economic growth in the long run. Table 1 shows that Pakistan received 31.3 billion US dollars as the value of remittances in 2021, which accounted for 5.5 percent of the total remittances received by low- and middle- income economies and ranked fifth among them. It also reports that

[1] The data of remittances and GDP are retrieved from World Bank Data: http://data.worldbank.org/.

Pakistan had her remittance-GDP ratio by 9.0 %, which is far higher than of the average ratio in the low- and middle- income economics (1.6 %). Figure 1 indicates that the remittance-GDP ratio has been far exceeding the net foreign aid-GDP ratio and net inward foreign direct investment-GDP ratio in Pakistan since the 2010s. Meanwhile, a long-term time-series observation for decades enables us to have an insight on the trends in macroeconomic impacts of remittance inflows in Pakistan. According to Figure 2, the remittance-GDP ratio experienced substantial fluctuations from 1.3% in 2000 to 10.2% in 1983 and its nexus with GDP growth rate represented some complexity: in some phase the remittance-GDP ratio was correlated with GDP growth but not in the other phase. These fluctuations and complexity motivate us to investigate the threshold of the remittance-GDP ratio by which the ratio would have different impacts on Pakistani macroeconomy.

The remainder of this paper is structured as follows. Section 2 describes the literature review on micro- and macro-economic impacts of remittance inflows, in particular, with a focus on their Dutch Disease and capital accumulation effects from macroeconomic perspectives. Section 3 conducts the empirical analysis of remittance impacts in Pakistan, containing the descriptions of a theoretical framework, data for key variables, methodologies for VAR estimation, and estimation outcomes with its interpretation. The last section summarizes and concludes this study.

2. Literature Review and Contribution

The literature on the economic impacts of emigrant's remittance inflows is summarized in Table 2. The majority of the empirical studies has so far focused mainly on microeconomic aspects such as poverty alleviation and household incomes. To be specific, the favorable effects of remittances for the recipient developing economies were identified based on human capital formation such as school enrollment (e.g., Gorlich, et al., 2007; Koska, et al. 2013; Acharya and Leon-Gonzalez, 2014; Vania, 2014; Bouoiyour and Miftah, 2016; Azizi, 2018; Hibes and Simpson, 2019; Bare, et al 2022), on the improvements in poverty, health, and income distribution (e.g., Adams and Page, 2005; Siddiqui and Kemal, 2006; Acosta, et al., 2008; Shirazi et al., 2018; Huay and Bani, 2018; Berloffa and Giunti, 2019; Khan et al., 2021), on financial development (e.g., Aggarwal, et al., 2006; Chowdhury, 2011; Pal, 2023), and on entrepreneurship of micro enterprises (e.g., Woodruff and Zenteno, 2001; Yang, 2005).

For the macroeconomic viewpoint, theoretical frameworks have demonstrated the following two contrasting hypotheses: the negative impacts of received remittances by

the Dutch Disease effect and the positive ones by a capital accumulation effect. The Dutch Disease hypothesis in terms of "capital inflows" in small open economies has been generally represented by the Salter-Swan-Corden-Dornbusch model, which was initially proposed by Corden and Neary (1982). This model could also be applied to examine the economic impacts of emigrant's remittances, since they constitute a major component of capital inflows. Meanwhile, the capital accumulation hypothesis has been proposed by Sachs (2007), for instance, as a counter argument against the Dutch Disease effect through public investment in the long run. Bourdet and Falck (2007) combined the Dutch Disease and capital accumulation hypotheses consistently into a theoretical model for explaining the macroeconomic effects of remittance inflows, so that this study can follow it in the subsequent section.

Regarding the empirical studies of macroeconomic impacts of remittance inflows, there have been less studies than microeconomic ones in general, and their empirical outcomes have so far been inconclusive, particularly, on which effects of the Dutch Disease or capital accumulation would be dominant as their macroeconomic impacts. First, the Dutch Disease effect of received remittances was identified in numerous samples of developing, emerging, and transition countries (e.g., Lartey, et al., 2012; Daway-Ducanes, 2019; Fisera and Tiruneh, 2023), in a group of Asian developing countries (e.g., Basnet, et al., 2019; Phuc, et al., 2020; Roy and Dixon, 2016; Jongwanich and Kohpaiboon, 2019), in individual countries such as El Salvador (Acosta, et al., 2009), Pakistan (Makhlouf and Mughal, 2013), Bangladesh (Chowdhury and Rabbi, 2014). Among the above, some studies also noticed the conditional effectiveness of the Dutch Disease by arguing that the effect would be weakened by such factors as trade openness, floating exchange rate regime, and financial development (Chowdhury and Rabbi, 2014; Phuc, et al., 2020; Fisera and Tiruneh, 2023; Roy and Dixon, 2016; Jongwanich and Kohpaiboon, 2019). Second, the positive remittance effect including capital accumulation through overcoming the Dutch Disease was verified in a group of numerous countries (e.g., Fayad, 2011; Borja, 2014; Azam and Raza, 2016; Ito, 2019; Nicolas, et al., 2021), in four African countries (Yiheyis and Woldemariam, 2016), in Caribbean Islands (Ait Benhamou and Cassin, 2021), and Cape Verde (Bourdet and Falck, 2007).

One of the academic contributions of this study is, thus, to enrich the evidence of macroeconomic impacts of remittance inflows, on which the previous studies have revealed mixed results. In fact, the case of Pakistan was examined by, for instance, Makhlouf and Mughal (2013), which argued the existence of the Dutch Disease effect of received remittances by a Bayesian analysis sampling the period for 1980-2008. It should be significant, however, to update the analysis towards 2021 and apply a different method,

a vector autoregressive model (VAR), to address endogeneity problem among the variables. Another contribution is to investigate the threshold of the remittance-GDP ratio that has real effects on macroeconomies. There have been a limited number of previous studies finding out the threshold: Jongwanich and Kohpaiboon (2019), for instance, demonstrated that remittances generate negative and significant impacts on economic growth only if they reach 10 % of GDP or higher in Asia and the Pacific developing countries. Since Pakistan has been one of the largest recipients of remittances and her remittance inflows have experienced substantial fluctuations together with her economic growth, targeting Pakistan in this study is appropriate enough to examine the critical threshold on the remittance-GDP ratio.

3. Empirical Analysis

This section conducts the empirical analysis of remittance impacts in Pakistan, containing a theoretical framework, data, methodologies, and estimation outcomes with its interpretation.

3.1 Theoretical Framework

This subsection describes the theoretical framework for analyzing the Dutch Disease and capital accumulation effects of capital inflows (remittance inflows in this study) in small open economies, based on Bourdet and Falck (2006).

The Dutch Disease effects are decomposed into “spending effect” and “resource movement effect”. An increase in remittance inflows gives rise to the spending effect in the first place: a remittance gain leads to an increase in disposal income, thereby causing an increase in spending and demand in the economy, assuming positive income elasticity; then, there should be an excess demand for non-tradables since their supply is limited while tradables can be imported, pushing up the relative price of non-tradables against tradables (namely, appreciation of real exchange rate). Here comes resource movement effect as the next step: a hike of the relative price of non-tradables encourages a move of mobile production factors from tradable sectors to non-tradable ones due to an increase in the compensation to non-tradable sectors.

In the longer term, an increase in remittance inflows is supposed to boost capital accumulation through its effect on domestic saving and investment. However, the effect depends on the motivations for emigrants to emit: if the motivation is self-interest for emigrants, they tend to save their remittances, for instance, at their bank accounts with

favorable returns; however, if the remittances are motivated by altruism, they are used for the supports for their families and relatives left behind in the country of origin, which are inclined to be consumptions rather than savings. The capital accumulation contributes to increases in the productions of both tradables and non-tradables.

The subsequent sections put these theoretical hypotheses into empirical tests conducting a VAR model estimation.

3.2 Data for Key Variables

At the beginning, this subsection identifies economic variables for a VAR model estimation in Pakistan. For all the variables, we sample the time-series data for the maximum data-available period, i.e., 1976 - 2021. Since the purpose of analysis is to examine the economic impact of remittance inflows based on the theoretical framework in Section 3.1, the estimation picks up the following five variables: remittances-GDP ratio (*roy*), real exchange rate (*rer*), manufacturing-services ratio (*mos*), investment-consumption ratio (*ioc*), and real GDP per capita (*pcy*). Regarding their data sources, remittances-GDP ratio and indexes of consumer and wholesale prices (for computing real exchange rate) are retrieved from World Development Indicators (WDI) of the World Bank[2]. Manufacturing-services ratio (dividing "manufacturing in value-added term" by "services in value-added one"), investment-consumption ratio (dividing "gross fixed capital formation" by "final consumption expenditure"), and real GDP per capita are taken from the dataset of UNCTAD Stat.[3] The list of variables and data sources are presented in Table 3 and their descriptive statistics are displayed in Table 4.

Real exchange rate and manufacturing-services ratio are used for examining the Dutch Disease effect. The real exchange rate in this study is represented by the ratio in which consumer price index is divided by wholesale price index. The ratio can be a proxy for real exchange rate because the theoretical framework in Section 3.1 describes the real exchange rate as the relative price of non-tradables against tradables: consume prices cover tradable (goods) and non-tradable (services) sectors whereas wholesale prices target only tradable (goods) sector. The manufacturing-services ratio is a proxy of a ratio of tradable production relative to non-tradable production as in Lartey, et al. (2012). In the combination between remittances-GDP ratio and real exchange rate, the "spending effect" in the Dutch Disease effect could be identified if real exchange rate was positively affected by remittances-GDP ratio. The Dutch Disease effect would be followed by the

[2] See the website: http://data.worldbank.org/
[3] See the website: http://unctadstat.unctad.org/EN/.

"resource movement effect" if manufacturing-services ratio were negatively influenced by real exchange rate. Investment-consumption ratio is for examining the capital accumulation effect presented by Bourdet and Falck (2006). The capital accumulation effect could be suggested, if the ratio was positively affected by remittances-GDP ratio. The real GDP per capita is included as a control variable in the estimation, since the manufacturing-services ratio might also be affected by development stage of an economy, for example, according to the Petty-Clark's Law (Clark, 1940).

Another critical variable is a dummy to represent the threshold of remittance-GDP ratio by which the ratio would have different and asymmetrical impacts on Pakistani macroeconomy, which is attached to the coefficients of remittance-GDP ratio. The dummy is set at two kinds of intermediate points of remittance-GDP ratios, namely, 5 % (*dum*5) and 6 % (*dum*6), between the highest one (1.3% in 2000) and the lowest one (to 10.2% in 1983) in Pakistan. The dummy value takes unity when remittance-GDP ratios are over the thresholds, 5% or 6%.

Figure 4 displays the overviews of three key variables: remittance-GDP ratio, manufacturing-services ratio and investment-consumption ratio in Pakistan for 1976 - 2021. While the remittance-GDP ratio indicates substantial fluctuations, its relationships with the manufacturing-services and investment-consumption ratios represent complexities and asymmetries. This implies the existence of the threshold of the remittance-GDP ratio that produces different macroeconomic impacts. The observation should be statistically tested in a more sophisticated manner, i.e., VAR model estimation incorporating the threshold in the following sub-section.

3.3 Data Property

Before conducting a VAR model estimation, this subsection investigates the stationary property of the data by employing a unit root test for each variable. This study adopts the Ng and Perron test (Ng and Perron, 2001), which has better size and power than such conventional tests as augmented Dickey-Fuller (ADF) and the Philips-Perron tests. The test is conducted on the null hypothesis that a level of each variable has a unit root by including "intercept" and "trend and intercept" in the test equation. This test constructs four test statistics: modified forms of Phillips-Perron statistics (MZa, MZt), the Bhargava (1986) statistic (MSB), and the Point Optimal statistic (MPT). Table 5 reports the result of the Ng and Perron unit root test for the data for all five variables, i.e., remittances-GDP ratio (*roy*), real exchange rate (*rer*), manufacturing-services ratio (*mos*), investment-consumption ratio (*ioc*), and real GDP per capita (*pcy*). The test rejected a

unit root in their levels in either specification of "intercept" and "trend and intercept" at the conventional level of significance by more than 90 percent, thereby their level data showing stationary property. We thus finally utilize the level data of all five variables for a VAR model estimation.

3.4 VAR Model

This subsection constructs a VAR model and conducts its estimation. The reason why we adopt a VAR model for the impact analysis of remittance is that the VAR model allows for potential endogeneity between the variables of concerns, and also for tracing out the dynamic responses of variables to exogenous shocks overtime. The model equation is specified as follows:

$$y_t = \mu + V_1 y_{t-i} + V_2 z_t + \varepsilon_t$$

where y_t is a column vector of the endogenous variables with year t, i.e., y_t = (*roy*, *roy*dum*5(or 6), *mos*)' for examining the total Dutch Disease effect, and y_t = (*roy*, *roy*dum*5(or 6), *ioc*)' for examining the capital accumulation effect. The former vector for the Dutch Disease analysis is further decomposed into y_t = (*roy*, *roy*dum*5(or 6), *rer*)' for examining the "spending effect", and y_t = (*rer*, *rer*dum*5(or 6), *mos*)' for examining the "resource movement effect". The other vectors are: z_t is a vector of the control variable of real GDP per capita (*ypc*); μ is a constant vector; V_1 and V_2 is a coefficient matrix; y_{t-i} is a vector of the lagged endogenous variables, and ε_t is a vector of the random error terms in the system. Regarding the lag interval, the equation takes a one-year lag length (i = 1), following the Akaike and Schwarz and Information Criterions with the maximum lags being equal to three-year lags under the limited number of time-series data. Based on the specification above, the analysis conducts the VAR model estimation, and then examines the Granger causalities and impulse responses among the endogenous variables.

3.5 Estimation Outcomes and its Interpretations

Table 6 reports the estimation outcomes of VAR model for examining Dutch Disease effect, and Table 7 reports those for examining capital accumulation effects. Both contain two cases with 5 % and 6 % as the thresholds of remittances-GDP ratio. Table 8 shows the results of Granger causality tests and Table 9 presents those of accumulated impulse responses, based on VAR model estimations.

Regarding the Granger causalities on Dutch Disease effect in Table 8 based on the estimated VAR model in Table 6, as far as the causality from remittance-GDP ratio (*roy*) to manufacturing-services ratio (*mos*) as the total effect of the Dutch Disease is concerned, it is in the case of 6 % threshold, but not in 5% one, that a negative causality from the cross-term of *roy*dum* to *mos* is identified at a 99 % level of significance. It means that an increase in remittance-GDP ratio leads to a decline in manufacturing-services ratio, when remittance-GDP ratio exceeds the 6% threshold. Focusing on the case of 6 % threshold, the total Dutch Disease effect could be further decomposed into spending effect and resource movement effect. Both effects are identified as expected, because the positive causality from *roy*dum*6 to real exchange rate (*rer*) and the negative causality from *rer*dum*6 to *mos* are confirmed at a 95% and 90% significant levels, respectively.[4]

As for the Granger causalities on capital accumulation effect in Table 8 based on the estimated VAR model in Table 7, it is in the case of 5 % threshold, but not in 6% one, that a negative causality from the cross-term of remittance-GDP ratio (*roy*dum*) to investment-consumption ratio (*ioc*) is identified at a 95 % level of significance. It means that an increase in remittance-GDP ratio leads to a decline in investment-consumption ratio, when remittance-GDP ratio exceeds the 5% threshold.

The impulse response analysis in terms of accumulated response to one-precent-point shock over ten-year horizons in Table 9 focuses on the two cases where the Granger causalities are significantly identified above: the negative causality from *roy*dum*6 to *mos* and that from *roy*dum*5 to *ioc*. The Dutch Disease effect over the 6 % threshold of remittance-GDP ratio is confirmed by the consecutive negative response of manufacturing-services ratio (*mos*) to the shock of remittances-GDP ratio beyond the 6 % threshold (*roy*dum*6) at a 95% significant level : one percent-point increase in remittances-GDP ratio leads to a decline in manufacturing-services ratio by 1.2-1.3% point after two-year intervals. The negative capital accumulation effect over the 5 % threshold of remittance-GDP ratio is also verified by the consecutive negative response of investment-consumption ratio (*ioc*) to the shock of remittances-GDP ratio beyond the 5 % threshold (*roy*dum*5) at a 90% significant level : one percent-point increase in remittances-GDP ratio leads to a decline in investment-consumption ratio by 2.5-3.0% point after two-year intervals.

All in all, emigrants' remittance inflows in Pakistan, if they exceed certain levels relative to GDP, aggravate industrialization (Dutch Disease effect) and capital accumulation. These empirical outcomes are consistent with the previous study,

[4] The weak significant levels in the spending and resource-movement effects might come from the usage of the ratio between consumer prices and wholesale prices as a proxy of real exchange rate.

Jongwanich and Kohpaiboon (2019), which argued that remittances generate negative and significant impacts on economic growth when they reach a threshold or higher in Asia and the Pacific developing countries. The reason why larger remittance inflows prevent capital accumulation is that marginal emigrants would have stronger altruistic motivations to support their families and relatives left behind in the country of origin, thereby their remittances being used for consumptions rather than savings, based on the theoretical framework by Bourdet and Falck (2006) in Section 3.1.

3.6 Policy Implication

The policy implication of the empirical results above is that the over-dependence on emigrants' remittance in an economy would be detrimental to the economic performances from sectoral and intertemporal perspectives. It also implies that even without high dependence on remittance inflows, economic growth could be attainable. In fact, it could be observed in Pakistan from Table Figure 2 and 3 that during the 2000s (the era under President Musharraf), a high economic growth and increases in manufacturing and investment ratio were achieved in spite of lower remittance-GDP ratio (under 5 %).

The possible alternative external resource to contribute to economic growth would be an inward foreign direct investment (FDI) in industrial sectors. Actually, Figure 1 shows that FDI-GDP ratio increased from 2000 to 2007 and reached at the same level as remittance-GDP ratio in 2007. The inward FDI is considered to lead directly to the economy's industrialization without inducing the Dutch Disease. A number of previous empirical studies have supported the significant positive role of FDI inflows in economic growth in Pakistan (e.g., Ahmad, et al., 2012; Suleman and Amin, 2015; Sarfraz and Liu, 2015; Raza and Hussain, 2016; Sohail and Li, 2023). The FDI inflows in Pakistan during the early 2000s were closely related to the policy regime under former President, Musharraf, for 2001-2008. Burki (2007) argued that the continuity in policymaking brought foreign capital into the country through an increase in investor confidence, and a series of successful economic policies such as privatizations induced new foreign capital and the premise of new management practices into some vital industrial sectors. Gulzar and Salik (2016) also demonstrated that the government under President Musharraf had taken a series of policies to give a number of incentives: the issuance of a negative list of industrial activities for private investment; removing of restrictions on maximum holding of equity by foreigners; the cancellation of the permission of State Bank for remittances of dividends and disinvestment proceeds; and permitting of foreign firms to raise equity capital from the domestic market on a reportable basis.

In sum, the estimation outcomes in this study suggest that Pakistan's economy should break away from too much dependence on remittance inflows, which prevents her industrialization and capital accumulation.

4. Concluding Remarks

This study examined macroeconomic impacts of emigrant remittances in Pakistan by using a VAR estimation framework. The contribution of this study was to investigate the threshold of remittance-GDP ratio that has real effects on the economy in terms of Dutch Disease and capital accumulation. Finding the threshold was significant because Pakistan has been one of the largest recipients of remittances in the world and her remittance inflows have experienced substantial fluctuations.

The empirical results through the VAR model estimations showed that: regarding the Dutch Disease effect, an increase in remittance-GDP ratio, if it exceeds the 6% threshold, leads to a decline in manufacturing-services ratio; and as for the capital accumulation effect, an increase in remittance-GDP ratio, when it exceeds the 5% threshold, leads to a decline in investment-consumption ratio. These outcomes suggested that the emigrants' remittance inflows in Pakistan, if they exceed certain levels relative to GDP, have aggravated industrialization (Dutch Disease effect) and capital accumulation.

The policy implication from the empirical results is that the over-dependence on emigrants' remittance in an economy would be detrimental to the economic performances from sectoral and intertemporal perspectives. Thus, Pakistan's economy should break away from too much dependence on remittance inflows, and could invite inward FDIs in industrial sectors as a possible alternative external resource contributing to her economic growth.

The limitation of this study is the lack of microeconomic analyses on emigrants' behaviors on how to use their emittances: spending for housing or education, for instance may produce different economic outcomes. Conducting microeconomic analyses could make it possible for policy makers to come up with concrete policy prescriptions for mitigating the Dutch Disease effect and for promoting the capital accumulation effect, caused by remittance inflows.

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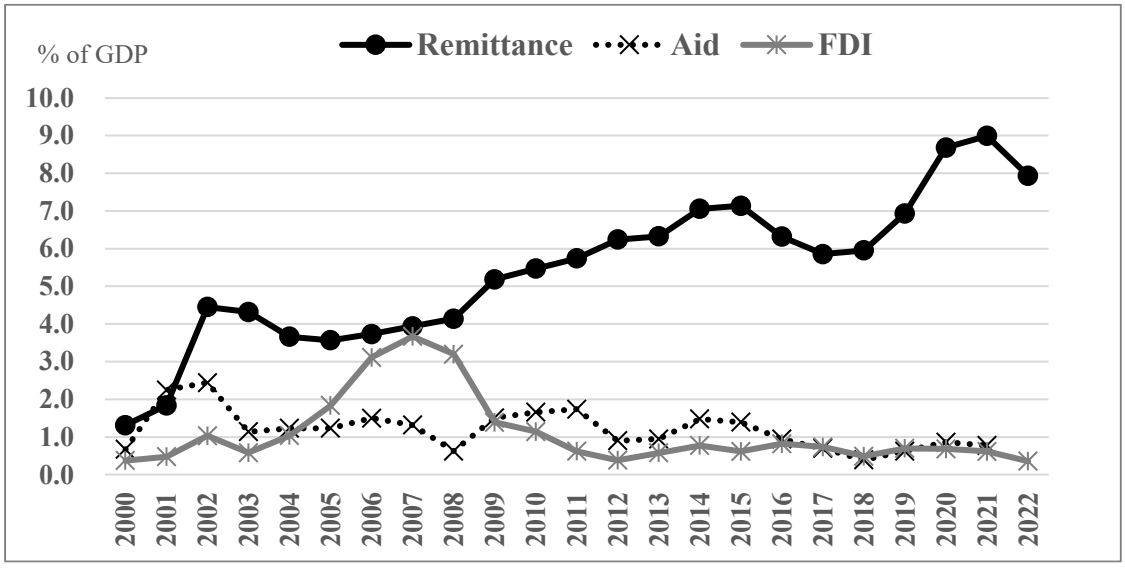
Table 1 Major Recipients of International Emigrant Remittances in 2021

Country	USD mil.	% of Low & Middel Incomers	% of GDP
India	89,375	15.7	2.8
Mexico	54,130	9.5	4.3
Philippines	36,685	6.5	9.3
Egypt	31,487	5.5	7.4
Pakistan	31,312	5.5	9.0
China	22,480	4.0	0.1
Bangladesh	22,206	3.9	5.3
Nigeria	19,483	3.4	4.4
Ukraine	18,060	3.2	9.0
Guatemala	15,408	2.7	17.9

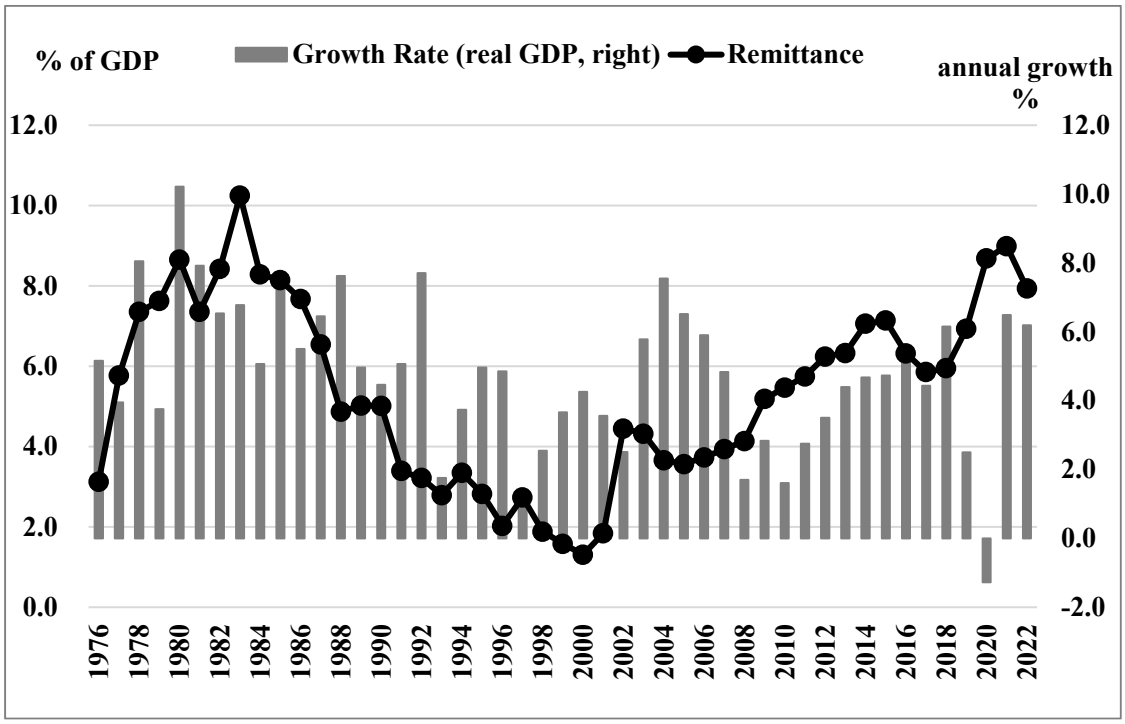
Source: Authors' estimation

Figure 1 Remittance, Aid and FDI as a percentage of GDP in Pakistan



Sources: Authors' estimation

Figure 2 Trends in Remittance-GDP Ratio and GDP Growth Rate in Pakistan



Sources: Authors' estimation

Table 2 List of Reviewed Literature

Microeconomic Benefits	Human Capital, School Enrollment	Gorlich, et al. 2007; Koska, et al. 2013; Acharya & Leon-Gonzalez 2014; Vania 2014; Bouoiyour & Miftah 2016; Azizi 2018; Hibes & Simpson 2019; Bare, et al 2022
	Poverty, Health, Income Distribution	Adams & Page 2005; Siddiqui & Kemal 2006; Acosta, et al. 2008; Shirazi et al. 2018; Huay & Bani 2018; Berloffa & Giunti 2019; Khan, et al. 2021
	Financial Development	Aggarwal, et al. 2006; Chowdhury 2011; Pal 2023
	Entrepreneurship	Woodruff & Zenteno 2001; Yang 2005
Macroeconomic Impacts	Dutch Disease	Acosta, et al. 2009; Lartey, et al. 2012; Makhlouf & Mughal 2013; Chowdhury & Rabbi 2014; Roy & Dixon 2016; Daway-Ducanes 2019; Basnet, et al 2019; Jongwanich & Kohpaiboon 2019; Phuc, et al 2020; Fisera & Tiruneh 2023
	Capital Accumulation, etc.	Bourdet & Falck 2007; Fayad 2011; Borja 2014; Azam & Raza 2016; Yiheyis & Woldemariam 2016; Ito 2019; Ait Benhamou & Cassin 2021; Destrée, et al. 2021

Source: Authors' description

Table 3 List of Variables and Data Sources

Variables	Description	Sources
roy	*Personal remittances, received (% of GDP)*	WDI
rer	*real exchage rate, consumer prices devided by wholesale prices (2010 = 1.0)*	
mos	*Manufacturing' divided by 'services' and 'construction' in value added term (%)*	UNCTAD
ioc	*Gross fixed capital formation' divided by 'final consumption expenditure' (%)*	
pcy	*GDP per capita, constant (2015) prices (logarithm term)*	

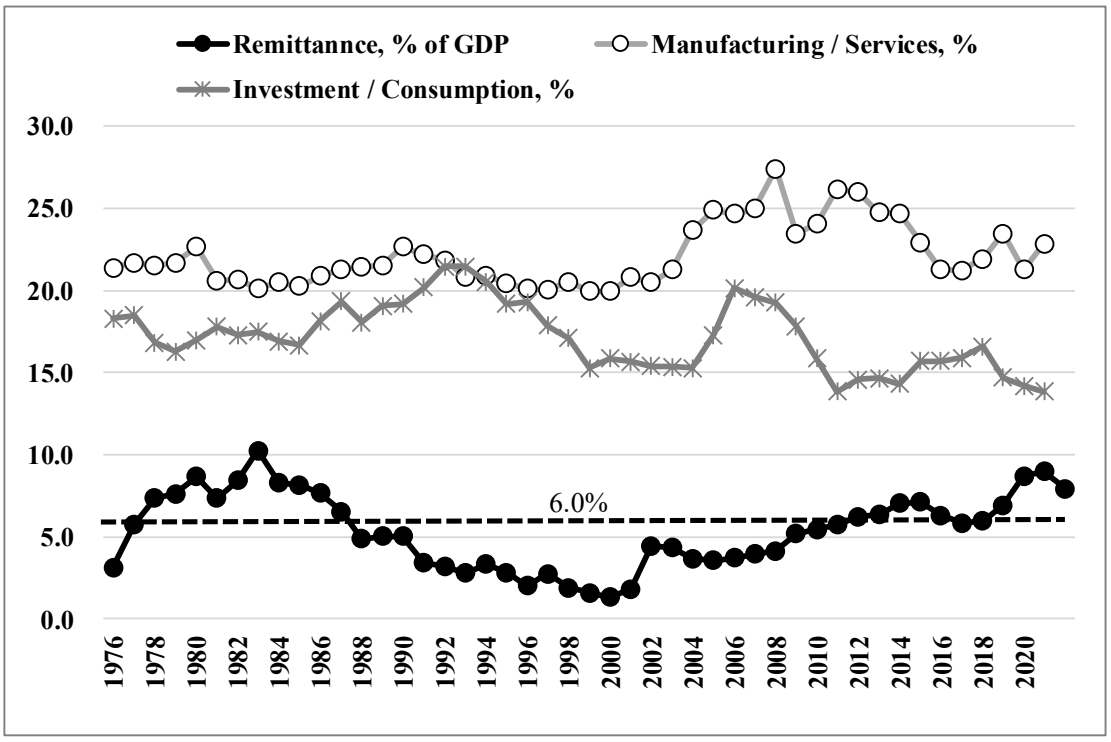
Source: Authors' description

Table 4 Descriptive Statistics

Variables	Obs.	Median	Std. Dev.	Min.	Max
roy	46	5.325	2.285	1.310	10.250
rer	46	1.100	0.175	0.940	1.910
mos	46	21.450	1.880	19.940	27.420
ioc	46	17.040	2.048	13.830	21.470
pcy	46	6.836	0.218	6.404	7.401

Source: Authors' estimation

Figure 3 Overviews on Key Variables in Pakistan



Sources: Authors' estimation

Table 5 Ng and Perron Unit Root Tests

Intercept	MZa	MZt	MSB	MPT
roy	-24.934 ***	-3.410 ***	0.137 ***	1.376 ***
rer	-11.998 **	-1.875 *	0.156 ***	4.031 *
mos	-10.171 **	-2.240 **	0.220 **	2.469 **
ioc	-19.588 ***	-3.007 ***	0.154 ***	1.680 ***
pcy	0.218	0.104	0.476	18.664
Trend & Intercept	MZa	MZt	MSB	MPT
roy	-23.017 **	-3.340 **	0.145 **	4.270 **
rer	-14.916 *	-2.136	0.143 **	9.243
mos	-19.237 **	-3.097 **	0.161 **	4.762 **
ioc	-54.643 ***	-5.211 ***	0.095 ***	1.746 ***
pcy	-19.287 **	-3.077 **	0.160 **	4.895 **

Source: Authors' estimation
Note: Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively.

Table 6 Estimated VAR Model for Examining Dutch Disease Effect

[Threshold: *roy* = 5%]

roy & mos	*roy*	*roy*dum5*	*mos*
roy -1	0.662 ***	0.478	0.080
	[3.365]	[1.228]	[0.347]
*roy -1 *dum5*	0.137	0.555 **	-0.064
	[1.147]	[2.354]	[-0.455]
mos -1	0.158 *	0.230	0.763 ***
	[-1.685]	[1.241]	[6.945]
C	5.439	2.352	-0.839
	[1.275]	[0.279]	[-0168]
pcy	-1.108	-1.177	0.865
	[-1.576]	[-0.847]	[1.050]
adj. R^2	0.807	0.712	0.892

[Threshold: *roy* = 6%]

roy & mos	*roy*	*roy*dum6*	*mos*
roy -1	0.913 ***	0.803 ***	0.321 **
	[6.657]	[2.739]	[2.216]
*roy -1 *dum6*	-0.028	0.372 **	-0.238 ***
	[-0.333]	[2.106]	[-2.726]
mos -1	0.126	0.163	0.717 ***
	[1.329]	[0.804]	[7.162]
C	4.315	6.381	1.213
	[1.025]	[0.709]	[0.272]
pcy	-0.944	-1.785	0.592
	[-1.352]	[-1.196]	[0.801]
adj. R^2	0.801	0.681	0.710

roy & rer	*roy*	*roy*dum6*	*rer*
roy -1	0.948 ***	0.833 ***	-0.005
	[7.102]	[2.948]	[-1.398]
*roy -1 *dum6*	-0.042	0.374 **	0.005 **
	[-0.516]	[2.170]	[1.963]
rer -1	0.730	0.450	0.919 ***
	[0.384]	[0.112]	[18.650]
C	-0.344	-2.953	0.098 *
	[-0.160]	[-0.650]	[1.771]
adj. R^2	0.795	0.678	0.910

rer & mos	*rer*	*rer*dum6*	*mos*
rer -1	0.947 ***	-0.106	1.868 *
	[37.780]	[-0.302]	[1.724]
*rer -1 *dum6*	0.010	0.784 ***	-0.556 *
	[1.404]	[7.483]	[-1.723]
mos -1	0.002 *	0.010	0.918 ***
	[1.818]	[0.605]	[17.320]
adj. R^2	0.910	0.580	0.667

Source: Authors' estimation

Note: Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively. The figure in parenthesis [ ] indicates t value.

Table 7 Estimated VAR Model for Examining Capital Accumulation Effect

[Threshold: *roy* = 5%]

roy & ioc	*roy*	*roy*dum5*	*ioc*
roy -1	0.808 ***	0.697 *	0.446 **
	[4.203]	[1.892]	[2.175]
*roy -1 *dum5*	0.046	0.400 *	-0.281 **
	[0.377]	[1.716]	[-2.163]
ioc -1	-0.083	-0.206	0.816 ***
	[-0.985]	[-1.284]	[9.101]
C	2.345	2.384	1.868
	[1.508]	[0.800]	[1.126]
adj. R^2	0.800	0.720	0.720

[Threshold: *roy* = 6%]

roy & ioc	*roy*	*roy*dum6*	*ioc*
roy -1	0.938 ***	0.808 ***	-0.046
	[7.127]	[2.932]	[-0.301]
*roy -1 *dum6*	-0.045	0.355 **	0.056
	[-0.570]	[2.143]	[0.632]
ioc -1	-0.096	-0.246	0.873 ***
	[-1.181]	[-1.449]	[9.561]
C	2.192	2.008	2.199
	[1.401]	[0.613]	[1.248]
adj. R^2	0.815	0.694	0.690

Source: Authors' estimation

Note: Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively. The figure in parenthesis [ ] indicates t value.

Table 8 Granger Causality Tests

roy & mos	Lags	Null Hypothesis	Chi-sq
roy = 5	1	*roy*dum5* does not Granger Cause *mos*	0.207 (-)
	1	*roy*dum6* does not Granger Cause *mos*	7.428 *** (-)
roy = 6	1	*roy*dum6* does not Granger Cause *rer*	3.855 ** (+)
	1	*rer*dum6* does not Granger Cause *mos*	2.970 * (-)
roy & ioc	Lags	Null Hypothesis	Chi-sq
roy = 5	1	*roy*dum5* does not Granger Cause *ioc*	4.679 ** (-)
roy = 6	1	*roy*dum6* does not Granger Cause *ioc*	0.400 (+)

Source: Authors' estimation
Note: Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively.

Table 9 Accumulated Impulse Responses to One-precent-point Shock

	Response of *mos* to *roy*dum6*	Response of *ioc* to *roy*dum5*
1st year	0.000	-0.091
2nd year	-0.238 **	-0.515
3rd year	-0.507 **	-0.977 *
4th year	-0.738 **	-1.399 *
5th year	-0.919 **	-1.767 *
6th year	-1.053 **	-2.080 *
7th year	-1.147 **	-2.344 *
8th year	-1.210 **	-2.566 *
9th year	-1.251 **	-2.751 *
10th year	-1.274	-2.905 *

Source: Authors' estimation
Note: **, * denote rejection of null hypothesis at the 95% and 90% level of significance, respectively.