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IMPACT OF HOST COUNTRIES' MACROECONOMIC FACTORS ON RECEIVING COUNTRY'S REMITTANCE INFLOW IN PRESENCE OF ICT PENETRATION: A PANEL DATA ANALYSIS OF BANGLADESH ECONOMY

Md. Mahbubul Alam - Bangladesh University of Professionals, Bangladesh

Email: mahbubul.alam@bup.edu.bd

ORCID: 0000-0002-1011-5421

Abstract

While the whole world was struggling and stumbling during the global pandemic, the economy of Bangladesh miraculously experienced a comparatively lower stagnation than its contemporaries owing to larger remittance inflow intertwined with the surge of ICT services. This study attempts to find answer to the overwhelming performance considering the macroeconomic factors in host countries that are top in remittance outflow towards Bangladesh. The findings indicate significant positive effects of ICT as well as macroeconomic factors like government expenditure, trade balance and FDI on the remittance inflow of recipient country. Despite being unique in perspective, the paper is confined to the usage of secondary data and limited data availability due to institutional constraints for few countries. The paper concludes with prescribing an ICT friendly infrastructure for both host and recipient country together with emphasis on selected macroeconomic variables.

Keywords: Remittance, ICT, Macroeconomic factors, Receiving country, Host country, Panel Data, Fixed Effects, Random Effects

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1. INTRODUCTION

Income received from migrant workers in form of remittance is one of the most crucial sources of growth factors for many countries, identified from the fact that as many as 70 countries around the world rely on remittance inflow the amount of which accounts for more than 4% of these countries' gross domestic product (GDP) (International Fund for Agricultural Development (IFAD), 2021; Meyer & Shera, 2016). According to a report published by World Bank titling "Migration and Development Brief 36", for Bangladesh remittance inflow has become the most influential factor over the past couple of years for achieving economic growth reflected from Bangladesh's unwavering 7th position among the top 10 remittance receiving countries of the world in the year 2021 (Ratha, Kim, Plaza, Riordan, & Chandra, 2022). Bangladesh has been able to achieve an impressive substantial growth in remittance inflow, even during the COVID-19 pandemic, which accounts for a staggering value of $22 billion (Ratha, Kim, Plaza, Riordan, & Chandra, 2022).

Evidently, remittance inflow in Bangladesh has become one of the leading contributors of Bangladesh's continuous economic growth over the past few years. Bangladesh's steady GDP growth of over 7% is due to its continuous investment in manufacturing & service sector fueled by a large pile of foreign reserve of over $40 billion much of which is the result of high remittance inflow (The Business Standard (TBS), 2022). A soaring remittance inflow is facilitating Bangladesh to minimize & balance its trade deficit as well (Mehedi Hasan, 2020). Remittance inflow helps developing countries like Bangladesh to maintain and hold adequate foreign currency reserve (Khan, Amin, & Ahmed, 2021) and the deficiency of remittance inflow can double the current account deficit (as a percentage of GDP) as reported by World Bank in one of its report (Maimbo & Ratha, 2005).

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Since remittance inflow became a cardinal factor of economic growth, there's growing concern regarding the cost of remittance inflow. Currently the currency conversion fee, transaction fee, etc. accounts for 7% on global average and this can lead to a substantial loss for the remittance receiving country because on average, migrant workers sent only $200 to $300 to their home countries (International Fund for Agricultural Development (IFAD), 2021). United Nations Development Program (UNDP) (2016) describes the sustainable development goals (SDGs) & target 10.c is one of the targets under goal 10 which pledges to reduce the global average cost of remittance by 3% within year 2030. ICT penetration can play a vital role in reduction of remittance cost which is already evident from the high remittance inflow around the globe, thanks to the worldwide digitalization both in terms of mobile and online services that are working as catalysts and resulted in an increase in the amount of remittance sent by staggering 65% or a value of $2.1 trillion in 2020 (Andersson-Manjang & Naghavi, 2021).

Receiving country receives remittance inflow from different corners of the world from their expatriates. Hence, wide range of economic constituents which influence these host countries' economic environment have significant impact on remittance inflow of the receiving country. There are only a handful of studies exploring the impact of host countries' macroeconomic factors on receiving country's remittance inflow and rarely any identifying the impact of these factors in presence of ICT penetration. The purpose of this study is to pinpoint the impact of host countries' macroeconomic factors on receiving country's remittance inflow in presence of ICT penetration for both receiving country & host countries. Therefore, this paper can append a new dimension to the study of remittance inflow & can help to identify how to reduce the global cost of remittance transaction. For the analysis, we have taken Bangladesh as the remittance receiving country, whereas United Arab Emirates (UAE), Bahrain, United Kingdom, Kuwait, Qatar, Oman, Saudi

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Arabia, Malaysia, United States and Singapore are taken as the 10 host countries. These top 10 host countries have been identified based on the remittance inflow reported by the Bangladesh Bank (BB) Quarterly (Bangladesh Bank (BB), 2001-2020) from year 2001-2020. Several macroeconomic factors which can have significant impact on host countries' economic environment were considered together with the level of ICT penetration measured in four different dimensions for both receiving country Bangladesh and ten host countries. In this study, we have employed strongly balanced panel data and for analysis purpose, different modeling techniques like Panel Regression, Fixed Effect & Random Effect model have been used and the robustness of the techniques as well as the acceptance of the models were tested.

In second section of the paper, we discuss existing literature defining the nexus between remittance inflow & macroeconomic factors. The third section of the paper discusses the methodology as well as the empirical framework, data sources & variables. Next, in fourth section we present the findings of our analysis along with discussion & in fifth section we draw conclusion while recommending relevant policies based on our findings.

2. LITERATURE REVIEW

Bangladesh, the 8th largest populous country in the world, supplies more than 400,000 overseas workers each year according to the information of International Labor Organization (ILO) (International Labour Organization (ILO), n.d.). Myriad of reasons exhort labors to migrate from one place to another both internally or internationally, among which better employment system, wage level and more comfortable living conditions for their families are the most significant reasons as identified by researchers (Todaro, 1969; Reubens, 1983; Courgeau, 1995; Engman, 2009; Vadean & Piracha, 2009; Beguy, et al., 2010; Babayan, 2010; Singh, 2010; Kaur, et al.,

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2011; Castles, 2016; Rahman, et al., 2020). The host country is economically benefitted by labor migration as it receives the earning of these expatriated workers in form of remittance. Several economic indicators of the origin country of labor migration positively affect the remittance inflow, whereas the cardinal non-economic indicators of remittance inflow emphasize the altruistic motive of workers as they want to support their families and offer them a better living standard (Schiopu & Siegfried, 2006; Barua, 2007; Erik & Marta, 2008; Rahman & Wadud, 2014; Tabit & Moussir, 2016; Hor & Pheang, 2017; Mustafa & Ali, 2018; Yoshino, Taghizadeh-Hesary, & Otsuka, 2019).

There's a plethora of literature identifying the determinants of remittance inflow which are based on the economic condition of the receiving country, but only a handful numbers of research had been conducted identifying the impact of host countries' economic condition on remittance inflow in receiving countries. It is presumed that receiving country's economic conditions have a positive impact on remittance inflow, but several studies have identified that the amount of remittance received by the receiving country is more sensitive to the monetary states of the host country itself (El-Sakka & McNabb, 1999; Al-Assaf & Al-Malki, 2014; Dilanchiev1 & Sekreter, 2016; Mustafa & Ali, 2018). Among various economic indicators, inflation rate of both receiving country & host countries has contrasting impact on remittance inflow. Receiving country's inflation rate negatively affect the remittance inflow whereas remittance inflow in the receiving country is positively affected by host countries inflation rate (Barua, 2007; Ncube & Brixiova, 2013; Mukoswa, 2016; Abbas, Masood, & Sakhawat, 2017). According to the quarterly report published by Bangladesh Bank (BB), as of December 2021 more than half (52.71%) of the total remittance of Bangladesh's was received from Gulf region (Bangladesh Bank (BB), 2021). Therefore, the impact of oil price on receiving country's remittance inflow is also notable. The economy of

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middle eastern countries is largely dependent on the price of oil, hence, any shock in oil price can deteriorate these countries revenue generation affecting the remittance outflow as well (Naufal & Termos, 2009; Islam & Nasrin, 2015; Umair & Waheed, 2017).

Any financial crisis experienced by the host country due to devastating global economic condition as the world experienced back in 2008-09, has very significant negative impact on home countries remittance inflow. Adamu, (2009) examined the impact of global financial crisis on remittance inflow in Nigeria and found a declining trend in remittance inflow as financial crisis has reduced the foreign direct investment (FDI) inflow in host countries. Similar types of result were exhibited in several papers which indicate a devastating impact on the remittance inflow of home country due to the economic downturn in the host countries (Ratha, Dilip, Mohapatra, & Silwal, 2010; Bayangos & Jansen, 2010; Borja, THE IMPACT OF THE US RECESSION ON IMMIGRANT REMITTANCES IN CENTRAL AMERICA, 2012; Borja, What drives remittances to Latin America? A review of the literature, 2012; Borja, HOME AND HOST COUNTRY BUSINESS CYCLES AND REMITTANCES: THE CASE OF EL SALVADOR AND THE DOMINICAN REPUBLIC, 2013).

Several studies concluded that substantial adoption of ICT and related services induces a significant impact on remittance flows (Mia, Nasrin, Nourani, Naghavi, & Baskaran, 2015; Makun & Jayaraman, 2018; Kumar, Nexus between financial and technology inclusion, remittances and trade openness vis-`a-vis growth: a study of Nepal, 2011; Adejo & Etowa, 2016). Although scholars around the world were concerned about the relationship between ICT and remittance earlier, recent upsurge of the global pandemic as well as emergence of the 4th industrial revolution necessitates to re-evaluate this issue. Not only does the effect of ICT steer directly to remittance inflow but also it is translated through diversified channels indirectly. A study from Sub-Saharan

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Africa suggests that ICT complements remittance flow in easing the access to business and a particular threshold for ICT penetration allows to break through the constraints (Asongu, Biekpe, & Tchamyou, 2019). Mobile banking technology as well as internet related services have been identified as catalytic factors in attracting bulk of remittance flow via reducing one of the most critical constraints— *transaction costs* (Ratha D. , Workers' remittances: an important and stable source of external development finance, 2003; Angelakopoulos & Mihiotis, 2011; David, Dana, & Abel, 2013; Siegel & Fransen, 2013; Kosse & Vermeulen, 2013). Again, ICT services are likely to be concomitant with tourism and remittance flow via financial system that induces a higher growth of income (Kumar, Linking remittances with financial development and ICT: a study of the Philippines, 2013; Siraji, Khalid, & Sobhan, 2009). Kumar and Vu (2014) showed a bidirectional causality between capital per worker and remittance while an unidirectionally causality has been observed between ICT and remittance.

Nevertheless, the extant literature unveils that little attempt has been made to analyze the integrated effect of ICT and macroeconomic variables on remittance inflow while scholars emphasized solely on either one of the criteria. Moreover, ICT penetration in one country only depicts a partial picture of impact on remittance flow since two-way infrastructural development ensures efficient flow of remittances and thus ICT structure in both host countries and receiving country is required to be analyzed which is the primary objective of this study.

3. METHODOLOGY

3.1 MODEL

Let's assume that each individual i remit z amounts of money at time t which can be represented by z_{it}. Therefore, the specification of the model which exhibits the impact of host countries' (h)

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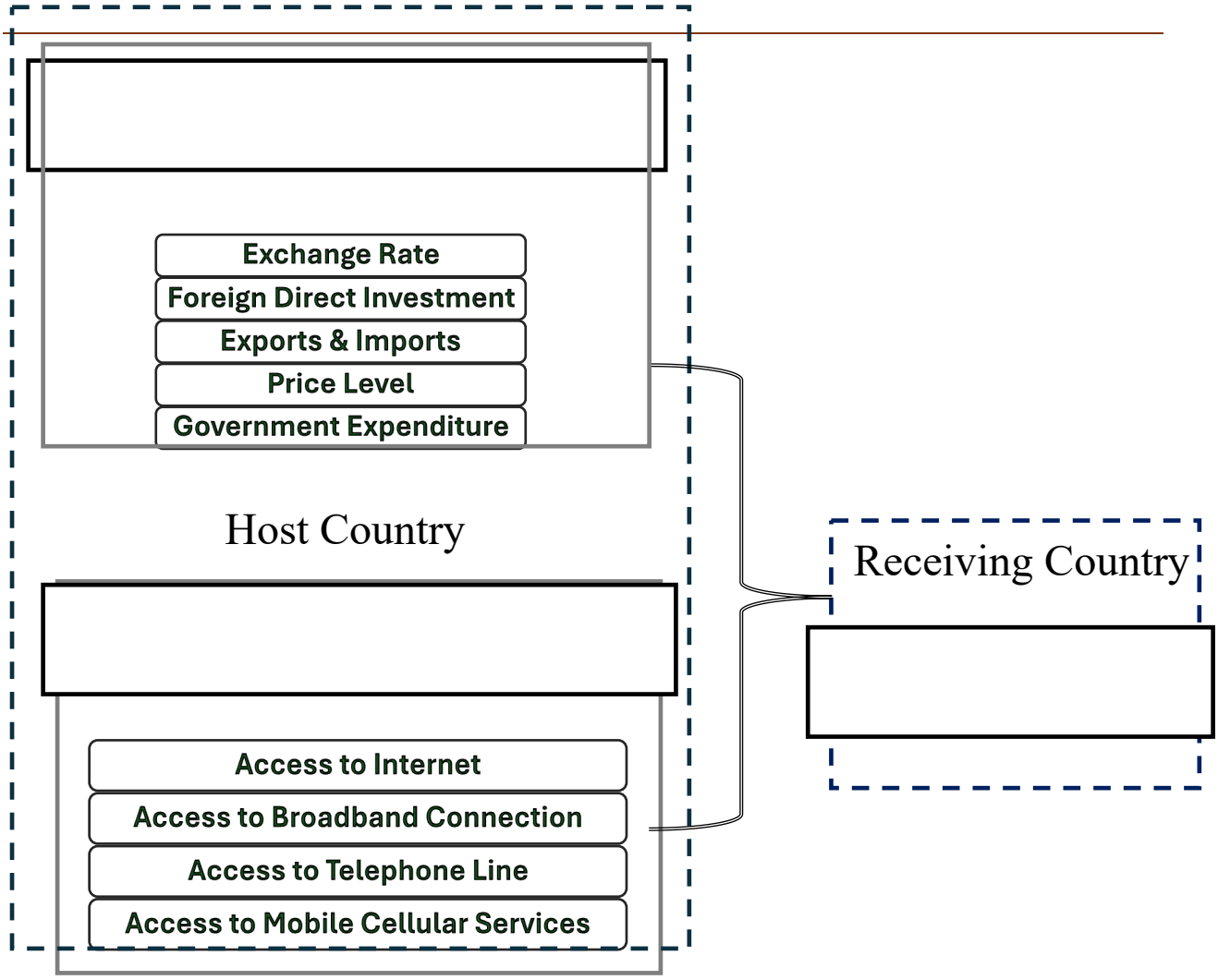
macroeconomic factors on receiving country's (r) total remittance inflow from host countries in presence of both receiving country's & host country's ICT penetration is written as:

$$R_{ht} = \sum z_{it} = f(ex, f, e, m, p, g, ict_{rht}) \quad (1)$$

ict_{rht} is the level of ICT penetration in both receiving country & host countries at time t measured in four different dimensions— (1) percentage of population using internet (int_{rh}), (2) percentage of population using fixed broadband (fbb_{rh}), (3) percentage of population using fixed telephone line (tel_{rh}) & (4) percentage of population using mobile cellular service (mob_{rh})

3.2 THEORETICAL FRAMEWORK



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3.3 EMPIRICAL FRAMEWORK

The focus of this study is to identify the impact of host countries' macroeconomic factors on receiving country's total remittance inflow in presence of both receiving country's & host countries' ICT penetration. In this paper we have used the panel data estimation techniques to solve the problem of endogeneity due to the unobserved heterogeneity. Panel data has been emerging as a popular approach amid scholars around the world since it can grasp more variability and explore more issues than other approaches (Baltagi, 2001; Kennedy, 2008; Hsiao, 2022; Chamberlain, 1984). Panel data has some other advantages over cross-sectional or time-series analysis as panel data can equip us with more observations and can help to remove endogeneity problem (Hsiao, 2007).

The general specification of the panel model used for the model is following:

$$lnremit_{ht} = \beta_0 + \beta_1 \ln exrate_{ht} + \beta_2 \ln fdi_{ht} + \beta_3 \ln export_{ht} + \beta_4 \ln import_{ht} + \beta_5 \ln cpi_{ht} + \beta_6 \ln govex_{ht} + \beta_8 \ln ict_{rht} \quad where,\ h = 1, 2, 3, \dots\dots, H \ and \ t = 1, 2, 3, \dots\dots, T \qquad (2)$$

Here, subscript h refers to the cross-sectional dimension for host countries & t refers to the time-series dimension. The error term is denoted by ε_{ht}.

3.4 DATA SOURCE & VARIABLE DESCRIPTION

In this study, *remittance inflow* is deemed as the dependent variable. *Exchange rate* depreciation is likely to exhibit a negative relationship with remittance received (Faini, 1994). This implies to a decrease in remittance inflow to receiving country while currency of host country depreciates i.e., exchange rate increases and vice versa (Rahman & Banerjee, 2011). For a depreciation, host

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countries must spend more to convert local currency into USD and thus, receiving country experiences a lesser inflow. Besides, Singer (2010) argued that policy makers seem to prefer a fixed exchange rate regime to regulate the flow of remittance.

Several studies have been dedicated to comprehending the relation of *Foreign Direct Investment* (FDI) as well as remittance inflow with economic growth while rarely any evidence is found on the relation between FDI and remittance inflow (Wang, Hong, Kafouros, & Wright, 2012). Recent studies unearthed the effect of FDI to be positive in drawing remittances inwards (Piteli, Kafouros, & Pitelis, 2021; Coon & Neumann, 2018; De Simone & Manchin, 2012; Javorcik, Özden, Spatareanu, & Neagu, 2011). FDI can be expected to bring about a drastic shift in growth of the host country which in result, translate into anticipation of higher remittance flow towards the receiving country. Two studies particularly investigating the impact of host countries' macroeconomic factors on Bangladesh's remittance inflow had found negative impact of FDI on Bangladesh's remittance inflow (Alam & Khan, 2021; Hasan & Rubayyat, 2015). Hence, host countries FDI inflow has an ambiguous impact of receiving country's remittance inflow.

Dewan Muktadir-Al-Mukit, A. Z. M. Shafiullah and Anamul Haque Sajib (2013) opined that, imports to receiving country or in essence, exports from host countries exerts a positive shock on remittance flow towards the receiver. On the other hand, exports are positively associated with remittance inflow in particular, remittance used for investment (Saadi, 2020). A trade surplus is supposed to be coherent with lugging remittance while a trade deficit does the opposite.

Earlier literature primarily focuses on the impact of remittance inflow on inflation instead of the impact of inflation on remittance inflow particularly, considering the host countries and receiving country (Ball, Lopez, & Reyes, 2013; Khan & Islam, 2013; Mia, Nasrin, Nourani, Naghavi, &

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Baskaran, 2015). In general, a higher price level or inflation would initially reduce the purchasing power of the migrants, but this would exert pressure on wage demand and consequentially increase their income level in the long run. A percentage of this increased income will then contribute to remittance outflow in host countries i.e., remittance inflow to receiving country. Contrasting result also been found in past literatures regarding the impact of host countries' price level on Bangladesh's remittance inflow. Rahman & Banerjee (2011) looked into the determinants of expatriates' remittance sending trend to Bangladesh from Kingdom of Saudi Arabia & found that there's a negative impact of price level of Kingdom of Saudia Arabia on Bangladesh's remittance inflow though the result was not significant. Contrastly positive impact of price level on Bangladesh remittance inflow had been found in several studies (Alam & Khan, 2021; Hasan & Rubayyat, 2015). Thus the impact of host countries price level on Bnagladesh's remittance inflow is also equivocal.

Akin to the argument of inflation, most researchers inquired about the impact of remittances on government expenditure (Chowdhury & Rabbi, 2014; Ahmed, 2013; Nishat & Bilgrami, 1991; Akayleh, 2011) ignoring influence of government disbursement on remittance inflow. However, Mehmood & Sadiq (2010) confirmed the existence of relationship between government expenditure and poverty along with remittances. Intuitively, remittance flow towards receiving country tends to increase provided that host countries' government budget increases. People in host countries will have better standard of living along with additional spare money to send to their home.

In appendix, we've also provided the descriptive statistics of all the variables used in this analysis along with graphs which delineate the nexus among ICT indicators, remittance inflow in Bangladesh and macroeconomic factors of host countries.

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The data sources of the variables used for the analysis in this paper are mentioned in the following table:

Variables	Description	Expected Sign	Data Source
$remit$	Remittance inflow in receiving/home country (million USD)	N/A	Bangladesh Bank (BB) quarterly publications
$exrate$	Exchange rate of host countries (Local Currency per USD)	-	World Development Indicators (WDI)
fdi	Foreign direct investment inflow in host countries (million USD)	+/-	World Development Indicators (WDI)
$export$	Total export amount of host countries (million USD)	+	World Development Indicators (WDI)
$import$	Total import amount of host countries (million USD)	-	World Development Indicators (WDI)
cpi	Price level of host countries (at constant USD 2010)	+/-	World Development Indicators (WDI)
$govex$	General government final consumption expenditure of host countries (million USD)	+	World Development Indicators (WDI)
ict	Level of ICT penetration for both receiving country & host countries (ICT indicators)	+	International Telecommunication Union (ITU)

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The variables have been selected analyzing previous literature as well as current economic phenomena predominant in majority of countries. Although numerous variables may affect remittance inflow of a particular country, the aforementioned variables coupling with the impact of ICT penetration reflects an archetype of the economy while other variables appear to be trivial. One of the popular concerns about this study might be the setting that has been chosen for analysis including host countries and receiving country. Vargas-Silva & Huang (2018) advocated that macroeconomic alteration in host countries affect the receiving country more than that of its own macroeconomic scenario in terms of remittance flow.

3.5 SAMPLE SIZE

Observations on each variable for 10 host countries & 1 receiving country were collected for the years 2001 to 2020. The timeframe of data collection was decided based on the availability of data for each variable. The data set contains total of 200 observations ($h \times t = 10 \times 20 = 200$).

3.6 HYPOTHESIS

The null hypothesis for the model states that there is statistically significant impact of host countries' macroeconomic factors on receiving country's remittance inflow in presence of both receiving country's & host countries' ICT penetration.

3.7 ESTIMATION STRATEGIES

This paper followed three panel data estimation techniques to confirm the robustness of the result obtained. These three estimation techniques were used to obtain the result of the co-efficient for each variable in case of the model showing the impact of host countries' macroeconomic variables on the remittance inflow to receiving country in presence of both receiving country's and host

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countries' ICT penetration. Pooled Ordinary Least Squares (POLS), Fixed Effect Model (FEM) & Random Effect Model (REM) are the three estimation techniques used for the model.

First, we run the POLS model to obtain the value of the coefficients and then we run the FEM & compare it to the POLS model. Lastly REM was run, and we determined the best model through Hausman test.

3.7.1 POOLED ORDINARY LEAST SQUARED MODEL (POLS)

The POLS model combines both the cross-sectional & time-series aspects of the data used. Let's assume a model as following:

$$y_{it} = \beta x_{it} + \varepsilon_{it} \quad for\ i = 1, 2, 3, \dots\dots, N\ \&\ t = 1, 2, 3, \dots\dots, T \qquad (3)$$

Here i is the cross-sectional aspect of the data & t is the time-series aspect of the data. In case of this model, we can simply run the OLS regression & obtain the POLS estimators. The assumptions for POLS model are also identical to the OLS model which is estimated for time-series data. The result obtained from POLS model is compared with the result obtained from FEM to show that, it is statistically significant & the best fitted model.

3.7.2 FEM AND REM

In FEM and REM model, we allow for individual specific effects i.e., each cross-sectional unit has a different intercept term in FEM & REM. Both the models take the following functional form:

$$y_{it} = \omega_i + \beta x_{it} + \varepsilon_{it} \qquad for\ i = 1, 2, 3, \dots\dots, N\ \&\ t = 1, 2, 3, \dots\dots, T \qquad (4)$$

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Here ω_i is the individual specific effect which is treated as unobserved random variable correlated with the observed regressors x_{it}. In case of Random effect model ω_i is treated as random variables that are distributed independently of the regressor.

4. RESULT

Table 1: Impact of host countries macroeconomic factors in presence of Internet penetration

Variables	POLS		FE		RE	
2001-2020	Coefficient	P > |t|	Coefficient	P > |t|	Coefficient	P > |z|
lnfdi	-.013	.777	-.047	.234	-.026	.526
lngovex	.884***	0	1.872***	0	.95***	0
lnexport	.91***	0	.585**	.026	.585**	.026
lnimport	-1.612***	0	-1.402***	0	-1.269***	0
lncpi	.125	.928	-1.33	.226	-.88	.436
lnexrate	.134*	.052	-.944	.197	-.086	.562
lnintrh	.32***	0	.278***	.001	.379***	0
Constant	2.568	.674	.45	.937	6.095	.235
Obs.	153		153		153	
R^2	0.774		0.768		0.740	
Hausman (1978) specification test						
Chi-square test value						18.795
P-value						.009

*Note: *** p<.01, ** p<.05, * p<.1*

Source: Authors' Calculation

Table 1 shows the impact of host countries' macroeconomic variables on receiving country's remittance inflow when considering both host countries & receiving country's percentage of population using internet. From POLS model host countries' government final consumption

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expenditure, amount of export & import shows a statistically significant result at 1% level of significance where both government final consumption expenditure & amount of export has a positive sign while import has a negative sign.

Table 2: Impact of host countries macroeconomic factors in presence of fixed broadband penetration

Variables	POLS		FE		RE	
2001-2020	Coefficient	P > |t|	Coefficient	P > |t|	Coefficient	P > |z|
lnfdi	.115**	.046	.065	.181	.111**	.05
lngovex	.734***	0	1.382***	.005	.734***	0
lnexport	.408	.145	.308	.239	.393	.158
lnimport	-1.119***	0	-.339	.467	-1.1***	0
lncpi	4.405***	.001	-1.972	.192	4.052***	.002
lnexrate	.161**	.019	.889	.303	.148**	.04
lnfbbrh	-.018	.747	.15**	.028	-.003	.963
Constant	-14.629**	.019	-.164	.98	-13.022**	.034
Obs.	109		109		109	
R^2	0.671		0.559		0.670	
Hausman (1978) specification test						
Chi-square test value						20.822
P-value						.004

*Note: *** p<.01, ** p<.05, * p<.1*

Source: Authors' Calculation

Exchange rate & level of internet penetration for both host countries & receiving country are also statistically significant while exchange rate is significant at 10% level of significance & internet penetration at 1% respectively. Moving to FE & RE model, host countries government final consumption expenditure, amounts of export & amounts import are also statistically significant

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but in FE & RE model amounts of export is significant at 5% level of significance. On the other hand, exchange rate now has a negative coefficient though the value of coefficient is not statistically significant in both FE & RE model. The level of internet penetration is statistically significant in both FE & RE model at 1% level of significance. The result of Hausman Test has a small p-value close to zero indicating that FE model is appropriate for our analysis.

The impact of host countries macroeconomic factors on receiving country's remittance inflow in presence of both host countries & receiving country's percentage of people using fixed broadband is presented in Table 2. In both POLS & RE model, foreign direct investment inflow in host countries has significant impact on receiving country's remittance inflow at 5% level of significance. Government final consumption expenditure, amounts of import & price level of host countries has statistically significant coefficient at 1% level of significance in both POLS & RE model where the coefficient of amounts of import has a negative sign. Both POLS & RE model shows a significant coefficient of exchange rate at 5% level of significance. Moving to FE model, only government final consumption expenditure & fixed broadband penetration for both host countries & receiving country shows a significant coefficient while government final consumption expenditure is significant at 1% & fixed broadband penetration is statistically significant at 5% level of significance. The result of Hausman test gives us a statistically significant output at 1% level of significance leading to the rejection of RE model.

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Table 3: Impact of host countries macroeconomic factors in presence of fixed telephone penetration

Variables	POLS		FE		RE	
2001-2020	Coefficient	P > |t|	Coefficient	P > |t|	Coefficient	P > |z|
lnfdi	.006	.892	-.067	.106	-.035	.431
lngovex	.863***	0	2.278***	0	1.05***	0
lnexport	1.184***	0	.75***	.005	.867***	.002
lnimport	-1.786***	0	-1.229***	.003	-1.396***	0
lncpi	4.751***	0	1.225	.211	4.485***	0
lnexrate	.047	.561	-.399	.586	-.364	.107
lntelrh	-.11	.496	.195	.237	.218	.209
Constant	-17.96***	0	-18.736***	0	-20.125***	0
Obs.	153		153		153	
R^2	0.752		0.758		0.614	
Hausman (1978) specification test						
Chi-square test value						35.209
P-value						.000

*Note: *** p<.01, ** p<.05, * p<.1*

Source: Authors' Calculation

Table 4: Impact of host countries macroeconomic factors in presence of mobile cellular penetration

*Note: *** p<.01, ** p<.05, * p<.1*

Source: Authors' Calculation

The level of fixed telephone usage in both host countries & receiving country don't have any significant impact on receiving country's remittance inflow as represented in Table 3. But government final consumption expenditure, amounts of export & amounts of import all three variables have a statistically significant coefficient at 1% level of significance in all three models. Price level of host countries is significant at 5% in both POLS & RE model. The result of Hausman test is significant at 1% level of significance indicating FE model is more appropriate.

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In Table 4, except the price level of host countries all other variables are statistically significant at different level of significance in POLS model. In both FE & RE model, the foreign direct investment inflow in host countries, government final consumption expenditure & amounts of import are statistically significant at 5%, 1% & 1% level of significance respectively while only amounts of import has a negative impact on remittance inflow in receiving country. The coefficient for mobile user penetration in both host countries & receiving country has a highly significant positive coefficient in all three models. The result obtained from Hausman test leads us to the rejection of RE model in this case as well.

Since the F test allows us to reject the null hypothesis of having no fixed effect among the host countries while the B-P LM test suggests no random effect, the fixed effects model is chosen as the best fitted model for the analysis. Moreover, the Hausman specification test also supports a fixed effect model. All the four tables illustrate that *government expenditure* is highly significant as well as consistent with the expected relationship discussed in section 3.4. The finding goes in line with the extant literature. Regardless of other factors, greater budget and its implementation on host countries attract higher remittances toward Bangladesh. Import and ICT indicators are found to be significant in three of the models while export is significant in two making them the variables of interest while assessing an economy. Import as well as export are consistent with their sign in all the models. Hence, the result obtained from the models showing the impact of host countries' trade balance on receiving country's remittance inflow are also commensurate with existing literatures. At the same time, it is natural to find the ICT indicators significant in all the models except 'fixed telephone users' since telephone has so far been replaced by easier and more compatible technology of mobile cellular service. Bangladesh has also experienced a surge in usage of mobile phones while telephone remained major mode of communication for a shorter

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span. As of December 2020, the number of unique mobile subscribers in Bangladesh was 90 million which is expected to grow further to 127 million by 2030 (Farheen S Rahman, 2021). However, exchange rate and price level have not been found to be significant in any of the models. This does not necessarily mean for these variables to lose importance in the model. Remittance may be affected by the exchange rate and price channel affects but only to a negligible extent. Unless there is any external shock in exchange rate or price level of host countries, a gradual change in these variables will only bring about little changes in remittance inflow. The effect of FDI appears to be ambiguous from the results of the tables. This might happen due to the country-specific policy measure and the use of FDI in particular sectors. Among all the variables of interest, government expenditure of host countries exceeds all others in terms of volume.

5. CONCLUSION

Over the last couple of years, remittance inflow has become one of the most pivotal, deciding & proven determinants of economic growth in Bangladesh. From supporting the families residing in receiving country to minimizing the trade gap, remittance inflow is desideratum which is leaving its imprints in every aspect of Bangladesh's economic arena. For a developing country like Bangladesh, a high remittance inflow is a key factor that can burgeon high level of consumption, demand, investment & the overall level of income. Thus, identifying the key factors which are exhorting a high remittance inflow has been the subject of great interest to researchers. Though most of the research focusing on pinpointing the factors of a high remittance inflow maneuvered around the local economy, the number of research focusing on the economic factors of the countries that are the source of remittance is dearth. The aim of this study was to find out the

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economic factors of the host countries which are out of the control of Bangladesh yet have consequential impact on its remittance inflow.

While observing the impact of host countries macroeconomic factors on Bangladesh's remittance inflow we have also incorporated the level of ICT penetration for both Bangladesh & its top 10 host countries to capture the impact of ongoing 4th Industrial Revolution (4IR). According to the result obtained in our analysis, all the macroeconomic factors of the host countries show significant impact on remittance inflow of Bangladesh in presence of different dimension of ICT penetration. Though it's not possible for a receiving country to control the economic factors of host countries, yet the result has very significant implication for policymakers. Bangladesh is one of the most populous countries in the world & this increasing population is creating a substantial pressure on its resources. Bangladesh is inundated with multifaceted problems due to large population & exporting manpower can be one of the feasible solutions for Bangladesh to tackle these problems. Hence, identifying the optimal host countries that can better serve our workers with handsome wage is crucial while grooming & equipping our workers with knowledge, training & expertise. Bangladesh should focus on sending its workers to those countries that have a better economic outlook & potential countries can be selected based on the result obtained in this analysis. Based on the macroeconomic factors that we have incorporated in our analysis Bangladesh can unravel new markets for its workers & at the same time by managing its own internal factors Bangladesh can bolster its remittance inflow in the long run.

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APPENDIX

A.1 DESCRIPTIVE STATISTICS

TABLE 1 DESCRIPTIVE STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
lnremit	200	6.204	1.293	1.946	8.298
lnfdi	186	8.751	2.433	1.286	13.145
lngovex	197	10.687	1.918	7.346	14.94
lnexport	168	12.039	1.499	8.796	14.747
lnimport	168	11.831	1.688	8.475	14.953
lncpi	194	4.594	.16	4.124	4.862
lnexrate	200	.198	1.01	-1.314	1.459
lnintrh	199	4.964	2.412	-.498	7.816
lnfbbrh	138	2.238	2.284	-3.761	5.504
lntelrh	199	2.709	.576	1.473	3.937
lnmobrh	200	7.772	2.219	1.562	9.948

Source: Authors' Calculation

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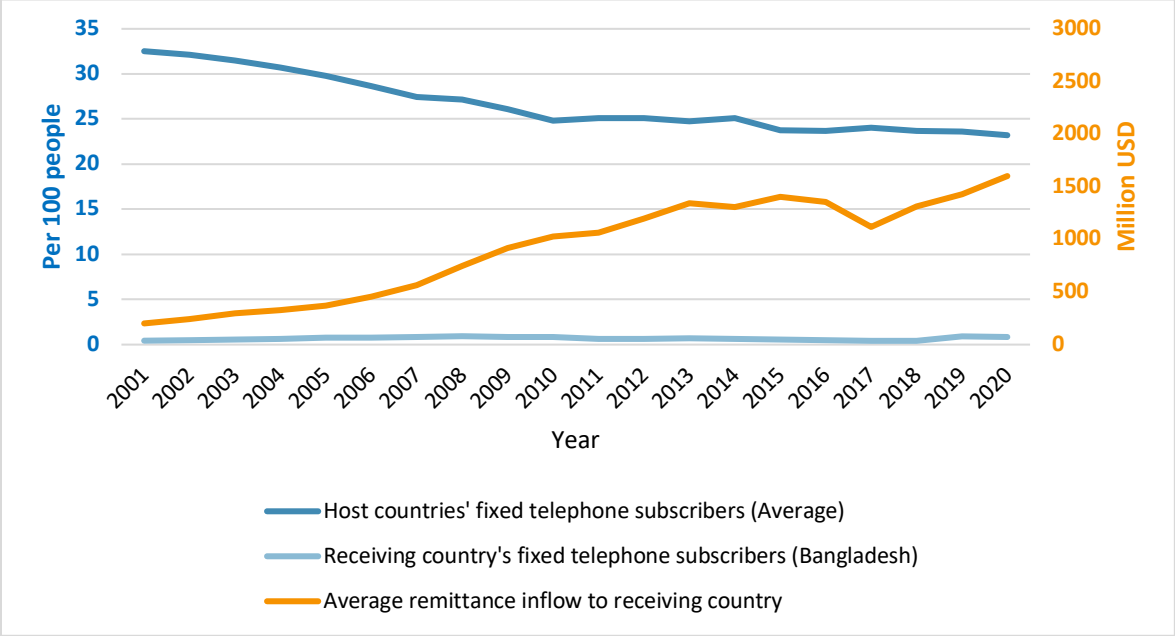
A.2 DATA VISUALIZATION

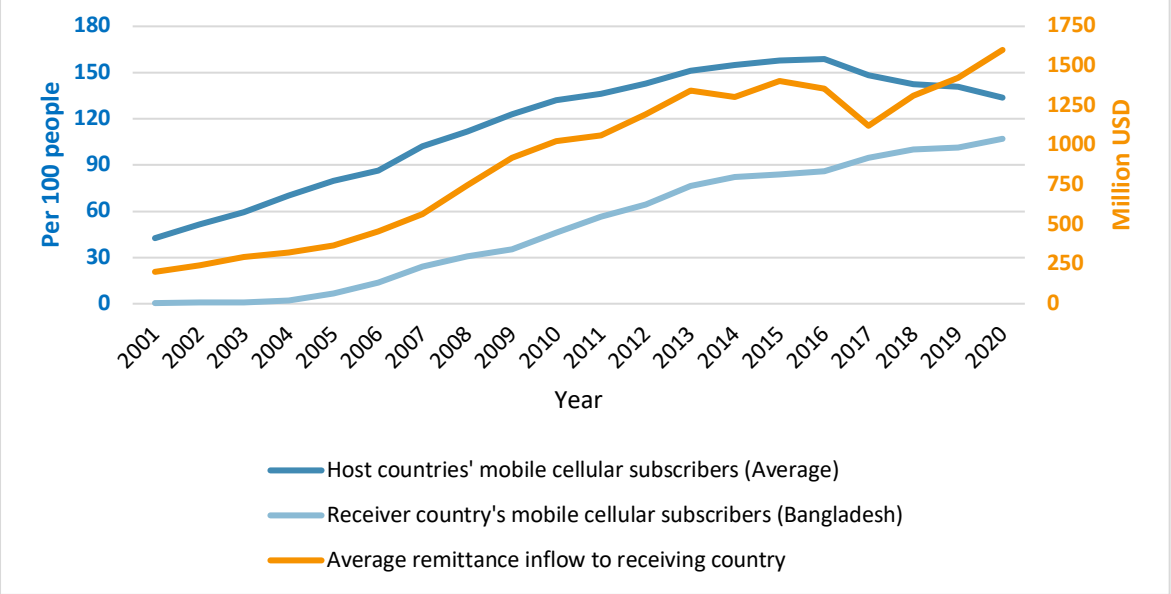
FIGURE 1 REMITTANCE INFLOW AND FIXED TELEPHONE SUBSCRIBERS

A.2.1 Remittance inflow to receiving country and ICT indicators of host countries and receiving country



Source: Authors' Analysis

FIGURE 2 REMITTANCE INFLOW AND MOBILE CELLULAR SUBSCRIBERS



Source: Authors' Analysis

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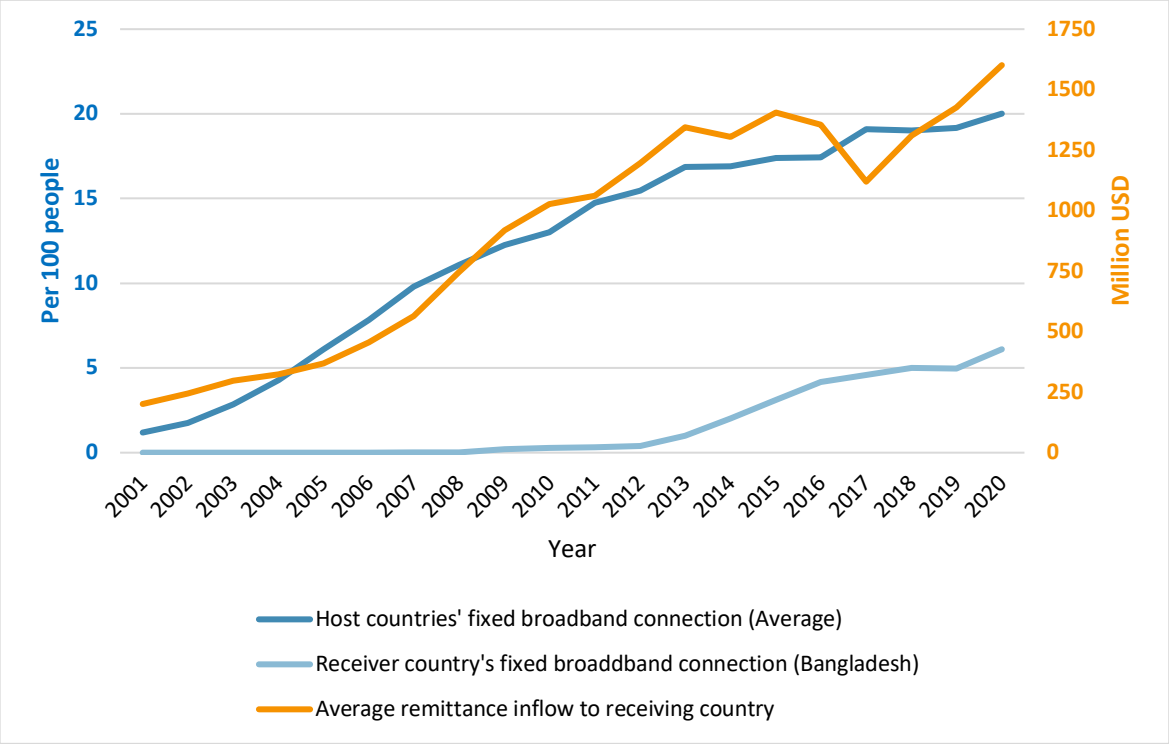
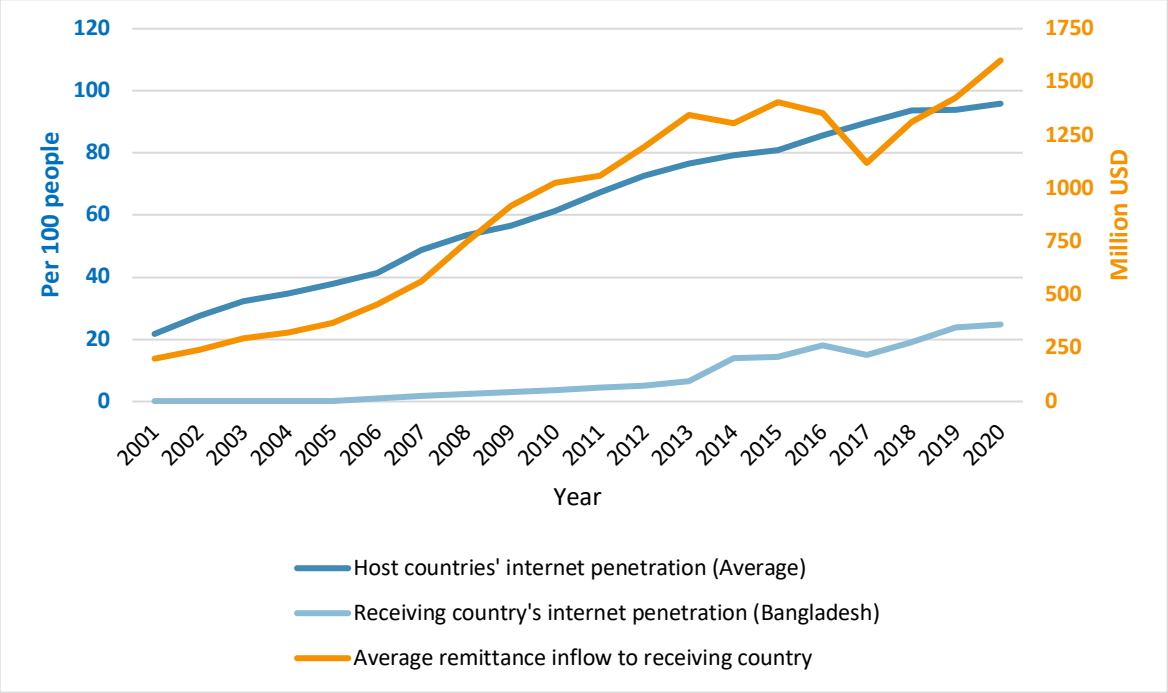
FIGURE 3 REMITTANCE INFLOW AND FIXED BROADBAND CONNECTIONS



Source: Authors' Analysis

FIGURE 4 REMITTANCE INFLOW AND INTERNET ACCESS



Source: Authors' Analysis

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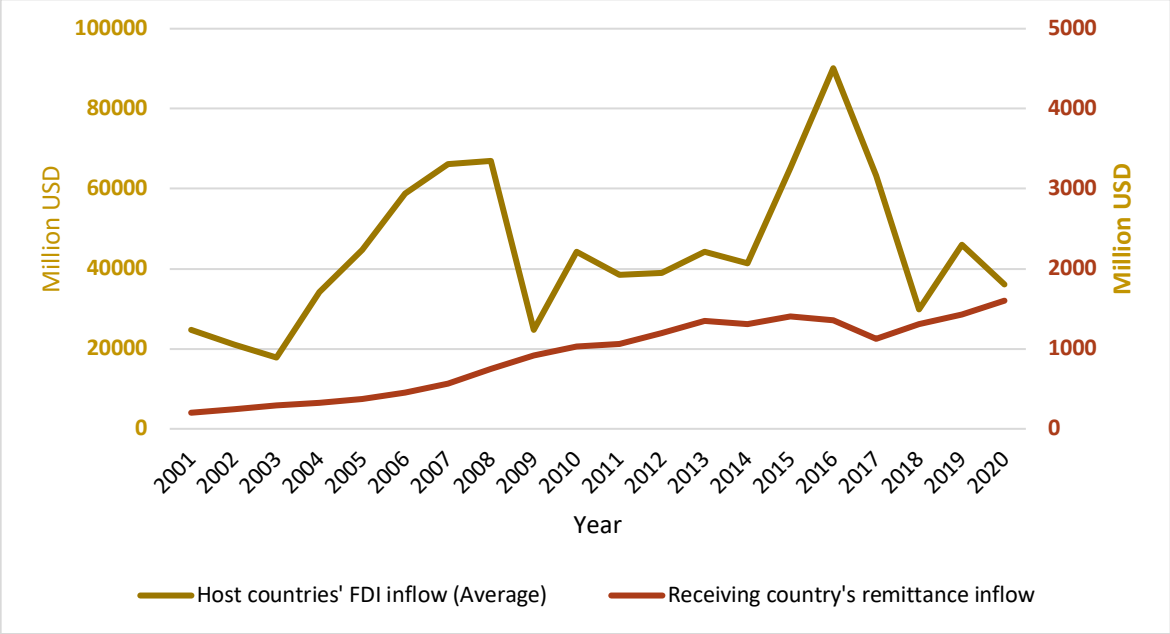
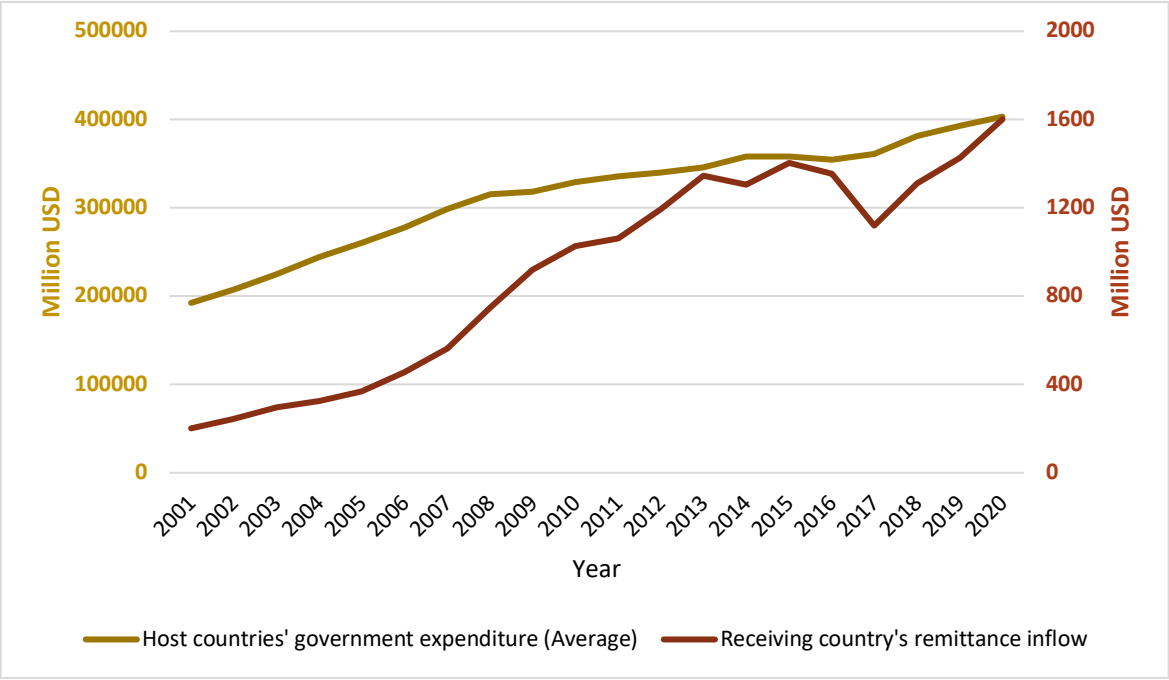
A.2.2 REMITTANCE INFLOW TO RECEIVING COUNTRY AND MACROECONOMIC VARIABLES IN HOST COUNTRIES

FIGURE 5 REMITTANCE INFLOW AND FDI INFLOW



Source: Authors' Analysis

FIGURE 6 REMITTANCE INFLOW AND GOVERNMENT EXPENDITURE



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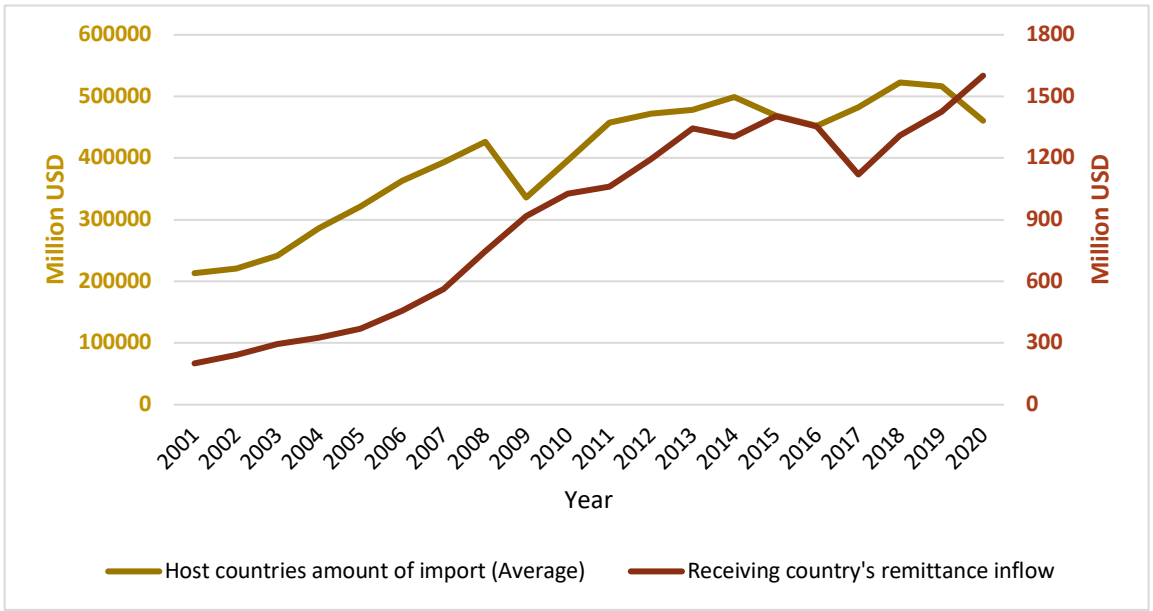
Source: Authors' Analysis

FIGURE 7 REMITTANCE INFLOW AND EXPORTS

Source: Authors' Analysis

FIGURE 8 REMITTANCE INFLOW AND IMPORTS



Source: Authors' Analysis

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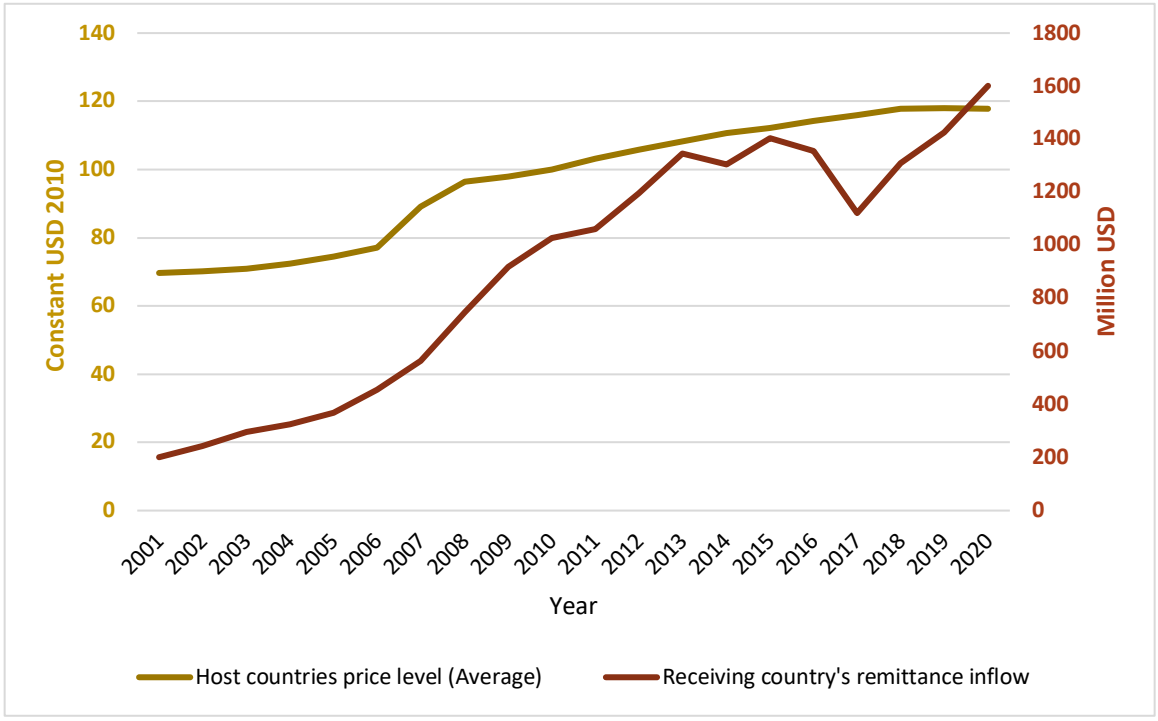
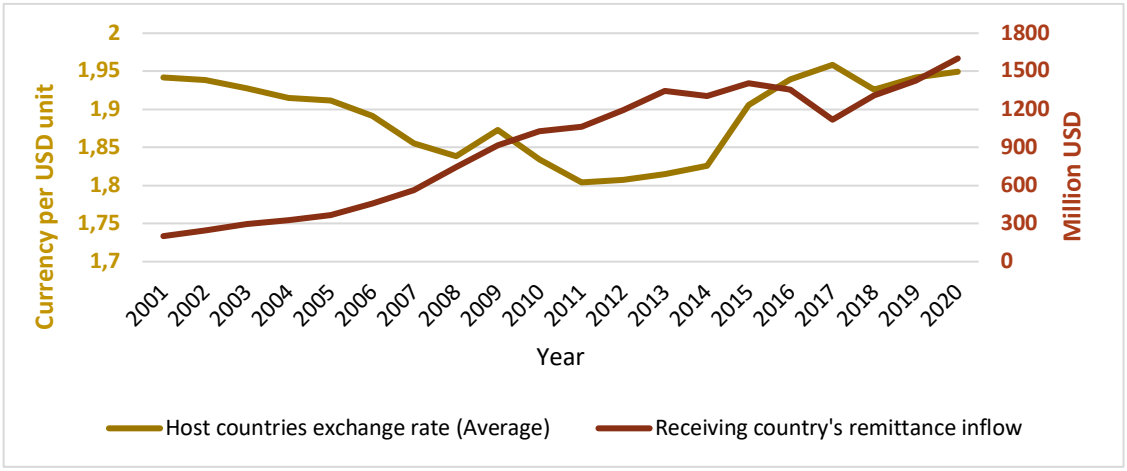
FIGURE 9 REMITTANCE INFLOW AND CONSUMER PRICE INDEX (CPI)



Source: Authors' Analysis

FIGURE 10 REMITTANCE INFLOW AND EXCHANGE RATE



Source: Authors' Analysis

DISCLOSURE OF CONFLICT

The author(s) declare that they have no conflicts of interest.