ERASMUS UNIVERSITY ROTTERDAM
Erasmus School of Economics

Bachelor Thesis (Economics and Business Economics)

The Poverty Mitigating Effects Of Cross-Border Remittance Volume

Name student: Dorus Thomas Johannes Manuel
Student ID number: 453410

Supervisor: Prof. Dr. H.P.G. (Enrico) Pennings
Second assessor: Dr. T.L.P.R. (Thomas) Peeters

Date final version: 18-10-2020

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Abstract

Worldwide poverty, especially in under-developed regions, is one of humans greatest challenges. Poverty mitigation has been highly prioritized by the western world and has been part of the governmental agenda for a long time. The responsibility of poverty mitigation has generally been given to governmental bodies, such as policy makers. A popular way for policy makers to take up on these responsibilities is by giving poverty-stricken countries or regions direct aid such as, airdrops of money, supplies, building materials or knowledge. Besides the direct aid for poverty-stricken regions to reduce poverty, has also the decrease in immigration costs resulted in opportunities for workers from low-income regions to migrate to higher-income countries and aiding those with the possibility to rise out of poverty. This opened up the world to new remittance corridors with money flowing from rich developed countries to under-developed poor regions. This thesis investigates whether there is a positive relationship between cross-border remittance and poverty mitigation. This was tested by performing instrumental variable regression analyses and resulted in the following conclusion: There is a positive relationship between personal remittance received and the multidimensional poverty index. This means that there is a positive effect of cross-border remittance volume on poverty mitigation.

Introduction

In the past decade the world has grown into a true global market. Shipping containers connected supply and demand across the whole world and created the possibility of moving goods cost-efficiently. Information went from writing a letter and waiting a couple of days on an answer to being realtime and instantaneous and thereby unlocking possibilities never before imagined. Money, on the other hand, has had some minor improvements, but far from revolutionary, until recently.

Over the past two decades the cost of sending the equivalent of 200 US dollars across the world has decreased significantly, largely due to the digitalization of fiat currencies and the convergence of monetary policy across specific regions. So is the creation of the EMU a large contributor to the financial integration of countries in the European region (Fratzscher, 2001). TIBCO Software and SWIFT network connected banks and financial institution digitally all across the world. The global average costs of sending money has decreased from approximately 10% to just under 7% (Remittance Prices Worldwide, 2020). Moving money domestically, for most developed regions, has become free and instantaneous for the consumer, but settlement can still take a couple of days for enterprises. Moving money across borders has seen a significant decrease in costs and transaction time for major cross-border remittance corridors, but less financial integrated countries are still seemed as expensive and time-consuming. This is largely due to illiquid corridors, insufficient funds for specific financial development and lagging monetary legislation. Even now, for a consumer moving money from Europe to the USA it is sometimes cheaper and faster to buy a suitcase, fill it with 10.000 dollars cash, book a flight and deliver it in person, instead of letting a financial institution do it for you. Average remittance companies costs the consumer between 3% and 10% and can take up to 3 to 5 work days to process

(Remittance Prices Worldwide, 2020). Most financial institution can't move money more efficiently due to lacking (legislative) infrastructure and outdated technology. Adding to the hurdle of sending money for enterprises is the relative high failure rates accompanied by the use of current technology.

Fortunately, there is new innovation on the horizon solving most of the problems associated with cross-border remittance. This new technology makes it possible for financial institutions and cross-border remittance companies to send money across borders at a fraction of current costs and transaction time. Due to this innovation the world is seeing remittance corridors that before were seen as expensive and illiquid becoming opened up to the rest of the world and all possible benefits associated. One of the possible benefits it may bring for example is the effect on poverty mitigation. Poverty-stricken regions generally lack behind on technology adaption, even though they may benefit the most. On a yearly basis immigrants from poor countries whom traveled to rich countries in search for work send worth billions of dollars back to their home country to support their family and friends (Al-Assaf et al., 2014). For these people a decrease in remittance costs and transaction time, results in more money for food or education and thereby a higher overall household income.

In this theses I will investigate what the (possible) poverty mitigating effects are on the poverty-stricken homelands of immigrants. I will mainly focus on immigrant workers from a low financial integrated country working in a well-developed, highly financial integrated country, sending money back "home". Recent research has shown that, for Europe, reduced exchange rate uncertainty and monetary policy convergence have been a central driving force for the financial integration process in the region, with a higher level of financial integration generally associated with a more attractive region for investors, resulting an increase in GDP and economic growth (Fratzscher, 2001). When looking at prior research based on cross-border remittance for developing countries, Sub-Saharan Africa in specific, research has shown that an increase in receiving remittance volume is associated with direct poverty mitigation effects and the promotion of financial development. As costs for immigrants decrease, their disposable income increases, and therefore providing the opportunity for low-income households to access formal financial services such as basic saving products (Gupta et al., 2009).

Theoretical Framework

In this section of the thesis I will discuss the theoretical background of poverty and provide an overview of prior research written on this topic. I will continue by discussing the prior research written on cross-border remittance and the hypotheses for the possible relationship between poverty and cross-border remittance volume.

Poverty

Poverty mitigation is one of the most challenging tasks the world currently faces. Approximately 50.000 people a day lose their life due to poverty related causes (Perumal, 2004). These 18 million deaths per year result in poverty being the cause of one in three deaths around the world. According to the World Health Organization (The Economist, 2008) malnutrition, due to hunger,

starvation and disease, is seen as one of the greatest threats against the world's public health level. The undeveloped countries, such as Nigeria and Rwanda, situated in sub-Saharan Africa or Asia count for at least 85% of maternal deaths during childbirth (BBC News. 1998).

As explanation for the word poverty, the simple definition for poverty is not having enough material possession or income to fulfill a person's basic needs (Poverty, 2020). This may include elements such as, social, economic and political. To gain a better understanding of what poverty is and who can be counted as being poor, governments, (health)organizations, economists and philosophers, have created different metrics to measure poverty. The two most used metrics to measure poverty are absolute poverty and relative poverty. Absolute poverty refers to a standard, such as a poverty line, that is constant over time and in between countries. In 1990 the World Bank introduced the international poverty line, setting the standard for the poorest countries at $1.00 a day. Absolute poverty, also referred to as abject poverty or extreme poverty, is as quoted by the UN: "a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services."(U.N., 1995) Due to the difference in purchasing power parity most countries have calculated their own threshold poverty line. For example, is the absolute poverty line in America $15.15 a day (US Census Bureau, 2016), while in China it is $0.55 a day (The Government of China, 2017). As seen, the threshold set by the World Bank can be controversial and misleading as it measures everyone under the threshold the same. To provide a better understanding of what poverty is and who should be deemed as poor, economists have come up with a better metric to measure poverty, named relative poverty. Adam Smith (Smith et al., 1777) first coined relative poverty in Wealth of Nations as poverty is being succumbed by the inability to afford: "not only the commodities which are indispensably necessary for the support of life but whatever the custom of the country renders it indecent for creditable people, even of the lowest order, to be without". This variable threshold for poverty better fits the individual, but can be rather costly to identify. Countries and organizations such as America, the European Union and UNICEF have tried to identify a relative poverty threshold, by calculating the percentage of a household's income necessary to accommodate the basic needs or the expenses for a 3 meals per person per day for a typical four person household (European Commission, 2016) & (Mankiv, 2016).

In this paper the metric multidimensional poverty index (MPI) will be used to measure poverty. The multidimensional poverty index is an index built out of multiple different dimensions such as health, education and standard of living. This deeper measuring tool for poverty is in extension of the relative poverty metric. The multidimensional poverty index looks beyond the individual's income to form an understanding of how people experience poverty in simultaneous and multiple ways. It comprises of 10 different indicators in total and those who experience deprivation in at least one third of the weighted indicators is deemed as multidimensional poor. In the Data and Methods section I will dive deeper into the contents of this index.

Cross-border Remittance Volume

The word phrase cross-border remittance volume is built up on three different segments. To understand its meaning correctly, the definition will be giving for these three segments. The word cross-border stands for the involvement of movement or activity across a border between two countries. This can be neighboring country borders, but also borders divided by land and sea. Remittance is defined as the transfer of money between a sender and a receiver. Generally speaking, remittance is already linked to the transfer of money between a foreign worker and an individual in their home country. For a lot of developing countries remittances are a big part of the countrie's international capital flows and these remittances usually take up a high percentage of a countries GDP (Al-Assaf et al., 2014).

The word volume in economic terms means the amount, for example in dollars $, that is transacted or traded between a specific time period. In this paper, when talking about cross-border remittance volume, we talk about the amount of dollars transacted between one country and another during the time period of one year. Due to the aid of technological innovation in de past 20 years, cross-border remittance has seen a huge rise in dominance and has reached a recent global total volume all time high of $715 billion in 2019 (McKinsey & Company, 2019). With India being the top receiver of $80 billion in 2018 largely, due to its large overseas expats population and diaspora, it's that said cross border remittance volume is an important beneficial contributor to a countries development and economy (P., 2018).

In recent years, mainly due to the increase of cross-border remittance volume in developing countries, researchers have been investigating whether there is a relationship between cross-border remittance volume and poverty mitigation. Researchers Sanjeev Gupta, Catherine Pattillo and Smita Wagh noticed Sub-Saharan Africa, a largely poverty-stricken region on the continent of Africa, attracting increasing attention due to rapid rise in cross-border remittance volume. This led to the research, specific for this region, to whether this rapid increase is followed up by a decrease in overall poverty and even though they believe their research to be merely a first attempt in studying the impact of the increasing remittance flows for the region, it does conclude some interesting findings. As based on their conclusion, they find that the increase in cross-border remittance flows has a direct poverty mitigating effect and a positive impact on domestic financial development (Gupta et al., 2009). They found that remittances between migrants helped ease the immediate budget constraints of the receiving households and even provided opportunities for small savers to gain access to the formal financial sector. These are positive results, nevertheless the researchers warn that an increase in cross-border remittance should not be interpreted as a panacea to poverty-stricken regions. As they say: "there is no substitute for a sustained, domestically engineered development effort." (Gupta et al., 2009)

That there has not been one definitive conclusion formed on whether an increase in cross-border remittance volume lowers poverty for the receiving country is shown when taking other prior research into consideration. Older studies before the year 2000, as seen as the period pre-digitalization age of remittances, concluded that migration was more likely to increase inequality in rural regions because

only relatively richer house-holds could afford sending off a relative in search for better employment changes abroad (Lipton, 1980) & Stahl, 1982). This is largely due to the relative high expenses of moving across borders, especially when traveling across sea. However, a lot has changed since the year 2000. The costs of travelling by sea, land and air has become significant less than before resulting in even the poorest being able to migrate and work abroad. Technology has innovated and advanced to such a level that merely a cellular connection is needed to notify family members that cash is waiting for them at the local exchange office. As migration increases, Koechlin and Leon (Koechlin et al., 2006) noticed that in foreign countries migrant communities formed close networks, resulting in lowering the costs of migration even further. Other prior research by Adams & Page (Adams et al., 2005) and Spatafora (2005), based on investigating a large sample of countries, likewise draw the same conclusion that remittances tend to lower poverty.

(The Endogeneity Problem) Why use Instrumental Variable regression?

To attain any viable conclusion out of this research, it is important to take a step back and identify the possible causal nature relationship the dependent and the independent have or do not have. It is important to assess whether there is any causal relationship, and if there is, it is even more important to understand the direction of causality. In this thesis the endogeneity problem arises due to the possible relationship between cross-border remittance volume and poverty. Arguably, when there is a higher cross-border remittance volume poverty is less, as cross-border remittance volume depicts the amount of money that is transacted between countries. Countries with well performing economies transact more and are generally not poor. This is where the problem arises, countries where there is no poverty, education and financial integration is well sorted. Economies perform better and it is easier to migrate and send money back "home", resulting in a higher cross border remittance. Gupta, Pattillo and Wagh (Gupta et al., 2009) solve this endogeneity problem by introducing the instrumental variable regression to their research methodology. In this research paper the method of *Two Stage Least Squares* regression will be used with the instrumental variable *Transaction Speed*. I will dive deeper into the explanation and application of this method in the data and methodology section of this thesis. In this part of the thesis I will continue with the explanation of the endogeneity problem and why it is important to use an instrumental variable for this regression.

The most basic and easy to understand explanation of what causality is, is given by Granger (Granger, 1980). He says, if X and Y are not just correlated, but there is a causal relationship, then the following conditions must be met: X must happen before Y in time, there must not be other causes that can explain the relationship, it may not be due to chance and the relationship must be constant in space and time. Generally, to test this causal relationship and the effects it may have, relatively simple statistical test methods are used such as the probit, logit and ordinary lest squares regressions. However, endogeneity may lead to possible overestimation and underestimation when using such methods. So, in

order to attain reliable statistical test results it is important for the independent variables to not be correlated with the error term. When using the instrumental variables regression to estimate the causal relationship, it allows the estimation of the treatment effect without having data on omitted variables. It deals with the problem of having unobservable and time variant factors tampering the results. To be able to implement this statistical method an instrumental variable Z, in our case *Transaction Speed*, must be designated. This variable must have a causal effect on the independent variable, *Personal Remittances Received*. It cannot be correlated with the error term and it has no direct effect on the dependent variable, *Multidimensional Poverty Index*. When these *Two Stage Least Squares* regression assumptions hold, this means that the instrumental variable has an effect on the dependent variable through the independent variable. Eliminating the worry of omitted variable bias, because the instrumental variable is not correlated with the error term and solving the problem of reversed causality as the instrumental variable can only have an effect on the dependent variable and not vice versa.

Hypotheses

Remittances are generally initiated by immigrant workers sending money from high-income countries to low-income countries. Looking at the UK specific, for example, a recent survey by The Migration Observatory found that for non-EU residences the main reason for remitting is to support family and friends back home (Migration Observatory, 2020). Prior research has suggested that there is a relationship between cross-border remittance volume and poverty mitigation. In this research paper I aim to find additional evidence to back these claims by performing an *ordinary least squares* regression analysis and a *Two Stage Least Squares* regression on a self-developed pooled panel-data set built up on data form The World Bank (2020) and The United Nations Development Program (Human Development Reports, 2019). An unique contribution to this ongoing research is the until now not before combined different datasets, the unique (control) variables and new instrumental variable. As a lot has changed in the world since the latest research (Gupta et al., 2009), this research focusses more on the technological innovation cross-border remittances has experienced in the last decade and the 'after financial crisis' shift.

The first hypotheses is as follows: *"There is a negative relationship between cross-border remittance volume and poverty"*

Due to endogeneity problems and possible reverse causality between the variables (Gupta et al., 2009), I will perform *Two Stage Least Squares* regression analysis to mitigate these effects. Instrumental variables analyses is a feasible method to use when explanatory variables are possibly correlated with the error term. In this case it is *Personal Remittances Received* that is correlated with the error term.

The second hypotheses is as follows: *"Even when controlling for endogeneity, there is a negative causal relationship between cross-border remittance volume on poverty"*

Instrumental Variable: Transaction Speed

In this research paper cross-border remittance volume is generally seen as the independent variable. As discussed in the theoretical framework, cross-border remittance volume will be used to explain the increase or decrease of the dependent variable multidimensional poverty index. Due to expected endogeneity problems arising, a second hypotheses instrumental variable analysis will be used to control for these problems. In this case a new variable, consisting of the transaction speed of cross-border remittances, will be used as independent variable or instrument to the now dependent variable cross-border remittance volume. The argumentation to using transaction speed as instrument is largely on the basis on prior literature and anecdotal evidence.

When looking back at the age before digitalization, communicating or sending money to friends, family, associates or clients was done by envelop. This envelop was picked up by the mail man and after a couple of days delivered to the recipient. This time consuming transaction resulted in the letter or cash needing to be of an high amount or volume and not more but the necessary. When e-mail came around transactions costs and transaction time decreased, even making the transaction time near instantaneous. This resulted in more e-mails being send and a high influx of emails sent with low amount of written information. We are seeing this same development currently with cross-border remittance transactions. In the past two decades transaction costs and transaction speed has decreased, while at the same time cross-border remittance volume increased to new highs in 2005 of $150 billion (Freund et al., 2008) to expected staggering new highs in 2021 of $597 billion for just low- and middle income countries (World Bank Group, 2019). Researches Caroline Freund and Nikola Spatafora (Freund et al., 2008) noticed in 2005 the rapid increase of cross-border remittance volume. This sparked their interest in understanding what the cause was to this sudden increase. They concluded in their research that remittance inflows positively depend on the country's stock of migrants abroad and the use of formal payments channels, which of transaction time reduced dramatically in de past years. Not surprisingly, they concluded that transactions costs had a negative relationship to remittance inflows and for that reason reduction in these costs should be taken seriously by policy makers. The reduction in transaction speed can be assigned to technological innovation is this sector starting from the age of digitalization in the 21st century. In the models and results part of this research paper, the relationship between the transaction speed and cross-border remittance volume will be formal proven. As can be derived from the argumentation above, transaction speed is exogeneous to poverty and therefore suited to be an instrumental variable for this research. Important notice to this variable is the adaptation of new technology to increase transaction speed is dependent on the remittance companies in that specific country. Therefore the value of the variable is different per country over time.

Data and Methodology

The data from this research is derived from a self-built dataset consisting of data from multiple free to use accessible datasets. This self-built, 'Frankenstein' dataset, makes use of World Bank data from 2011 to 2018 as primary source. The World Bank, Remittance Prices Worldwide, available at http://remittanceprices.worldbank.org (Remittance Prices Worldwide, 2020) dataset is used to create the variables on Personal Remittances Received and Transaction Speed. The dataset consist of quarterly data on cross-border remittances based on different corridors and companies. As secondary source, the World Banks' World Development Indicators (WDI) is used (World Bank Open Data, 2020). This dataset is the primary World Bank collection of development indicators, compiled from officially recognized international sources. It presents the most current and accurate global development data available, and includes national, regional and global estimates. As third and final data source Human Development Reports from the United Nations Development Programme is used primarily for the Multidimensional Poverty Index variable (Human Development Reports, 2019). This dataset is jointly developed by the United Nations Development Programme and the Oxford Poverty and Human Development Initiative at the University of Oxford. The 2019 Global MPI offers data from 101 countries covering 76 percent from the population (Human Development Reports, 2019).

The final dataset, built out of the sets of data discussed above, is a panel dataset from 2011 to 2018 consisting of 17 different countries and 18 variables. This results into 136 observations and the dataset being perfectly balanced. In the following part of this research paper the dependent, independent, control and instrumental variables will be discussed more thoroughly.

To determine the fitting countries for this research, it was important to take two factors into consideration namely, data availability and country significance in the cross-border remittance and immigrant sector. At first, countries were chosen on world rank remittances and percentage of GDP value contributed by received remittances. Then, data availability was checked resulting in 17 countries from years 2011 till 2018 being the best interval without any missing values. The country list can be found in the appendix *Country Overview* (table 9). As can be seen from the list, some well known remittance countries such as India, Mexico and the Philippines were chosen due to their absolute size in remittances, with India being the largest receiver worldwide at approximately $7.88E+10 in 2019. Besides being ranked top 3 worldwide remittance receivers, the percentage of GDP which is contributed due to remittances is below 10%. This shows the mere scale the economies of these developing countries already are. Besides picking well known and large remittance corridors for the country list, lesser known but highly dependent of remittances countries have been added to the list. Countries such as Nepal and Tajikistan from which 27.8% and 26.9% respectively of GDP is contributed due to received remittances.

Dependent variable: Multidimensional Poverty Index (scale 0-1, MPI)

The dependent variable Multidimensional Poverty Index is the primary variable of interest. New data on this variable is yearly provided by the United Nations Development programme in the Global MPI report (Human Development Reports, 2019). The MPI report provides a comprehensive and in-depth visualization of global poverty. Its main goal is to track the progress of the Sustainable Development Goals initiative (Goal 1, 2019). This initiative has set the goal of eradicating extreme poverty in all forms by 2030. The variable Multidimensional Poverty Index consist of three key dimensions: Health, Education and Standard of Living. 10 indicators, each with their own weight, result into a number between 0 and 1. Where close to zero means being in all dimensions extremely poor and where close to one means being in all dimensions rich. People who experience deprivation in at least one third of these weighted indicators fall into the category of multidimensionally poor.

Independent variable: Personal Remittances, Received ($, PRR)

The independent variable Personal Remittances Received is the secondary variable of interest. Data on this variable is provided by the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) and consists of yearly, aggregate data on personal remittances received. The variable is depicted in dollars and on every receiving country.

Instrumental variable: Transaction Speed (Speed_Code)

The instrumental variable Transaction Speed is the third variable of interest. This variable is not in its original form. The data pre-modification for this variable comes from The World Bank Remittance Prices Worldwide dataset (Remittance Prices Worldwide, 2020). This dataset provides data on every major remittance provider per country and the specific date, transaction time and form of payment. As this research is being migrant specific (with a focus on the lowest tier of society), the data must be organized to extract only the necessary cross border transactions. For most of the migrants, cash to cash is still the dominant choice, which means that all other data on payment types needs to be filtered. Because indicating what type of transaction has been done was noted as plain text, a categorical variable was generated. By generating 6 different categories, one category could be created that was of interest for this research. Category 4, is the category designated that was purely filtered on cash payments/receiving. This newly filtered data on cash related payments provided information on the transaction time quarterly from 2011 till 2018 per dominant payment providers for every country. This was then transformed to average transaction time per year and per country. Finally, the categorical variable Transaction Speed was created. Due to the data being in plane text, this new generation resulted in 6 new categories, ranging from 1 to 6: “less than an hour”, “Within 24 hours”, “Next day”, “2 days”, “3-5 days”, “6 days or more”.

Control Variables

Current Health Expenditure per capita ($, CHE)

Current Health Expenditure per capita represents the government health expenditure for that year converted into dollars per inhabitant. This data is extracted from the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018 per country.

Education Expenditure ($, AEE)

Education Expenditure represents the total amount of government expenditure per year per country converted into dollars. This data is extracted from the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018.

Age Dependency Ratio (%, ADR)

The Age Dependency Ration represents the measurement of age structure of the population. It relates to the number of individuals who are likely to be dependent on the support of others for their daily living, so generally speaking the young and the elderly, to the number of those individuals who are capable of providing this support. The Age Dependency Ration used in this research paper is the sum of the two ratios, the young-age dependency (under 15) ratio and the old-age dependency ratio (aged 65 years and over). This data is extracted from the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018.

Education Index (scale 0-1, EI)

The Education Index variable represents a scale ranging from 0 to 1 and is measured by combining average adult years of schooling with expected years of schooling for children. The Education Index is yearly published by the United Nations (Human Development Reports, 2019) and is a major component of well-being and is used in the measurement of economic and quality of life development. These are key factors in determining a country's development status.

Adjusted Net Savings (% of GNI, ANS)

The Adjusted Net Savings as percentage of Gross National Income variable is derived from the standard national accounting measurement of gross saving by making four adjustments. One; the consumption of fixed capital is deducted to obtain the net national savings. Two; current public education expenditure is added to account for investment in human capital. Three; estimations of the depletion of a variety of natural resources is deducted to provide a reflection of the decline in asset values associated with the extraction and depletion. Four; damages from carbon dioxide and particulate emissions are deducted. Finally, the indicator is generated by dividing Adjusted Net Savings by Gross National Income(World Bank, 2007). This data is extracted from the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018 per country (population).

GNI per capita (Atlas, $, GNI)

The variable Gross National Income per capita represents the total domestic and foreign output claimed by residents of a country. The variable consists of gross domestic product, added to that the factor incomes by foreign residents, subtracting the income earned in the domestic economy by nonresidents. This data is extracted from the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018 per country (population) and the Atlas Method is used. The World bank uses the Atlas conversion factor instead of simple exchange rates to depict the value in dollars for every country. The purpose behind using the Atlas method is to mitigate as much exchange rate fluctuations as possible.

Inflation (%, IGDP)

Inflation variable represents the increase in the general price level of goods and services in a countrys economy over a specific period of time. This data is extracted from the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018 and given over a yearly time interval. When price level increases, each unit of currency can buy less goods than before. This is called inflation and it reflects the decrease of purchasing power per unit of money.

Export of Goods and Services ($, EOGAS)

Export are the goods and services produced in one country and purchased by residents of another country (World Bank, 2007). It is irrelevant how it is sent, if it is produced domestically and sold to someone in a foreign country, it falls under the term export. This data is extracted from the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018 per country and converted into dollars.

Import of Goods and Services ($, IOGAS)

Import of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from nonresidents to residents of general merchandise, nonmonetary gold, and services. This data is extracted from the World Development Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018 per country and converted into dollars.

Domestic Credit Provided by Financial Sector (% of GDP, DCP)

The variable Domestic Credit Provided by Financial Sector represents all credit to various sectors on a gross basis, with the exception of credit to the central governments. The financial sector includes al monetary authorities and deposit money banks, as well as other financial corporations where data is available (World Bank Open Data, 2020). This data is extracted from the World Development

Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018 per country and presented as percentage of GDP.

Country Identification (country_id)

The County Identification variable represent an unique number for every country. The reason for the generation of this variable is due to STATA needing a numeric identifier for every separate country to be able to run the regressions.

Government Effectiveness (GEE)

The Government Effectiveness variable is an estimator that captures the perception of the quality of public services and civil services and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The estimate gives the country's score on the aggregate indicator level, in units of a standard normal distribution ranging from -2.5 to +2.5. This data is extracted from the Worldwide Governance Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018.

Political Stability and Absence of Violence/Terrorism (PSAA)

Political Stability and Absence of Violence / Terrorism variable is an estimator that measures the perception of likelihood of political instability and / or politically motivated violence, terrorism included. The estimate gives the country's score on the aggregate indicator level, in units of a standard normal distribution ranging from -2.5 to +2.5. This data is extracted from the Worldwide Governance Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018.

Regulatory Quality (PQE)

Regularity Quality Estimator is a variable that captures the perception of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The estimate gives the country's score on the aggregate indicator level, in units of a standard normal distribution ranging from -2.5 to +2.5. This data is extracted from the Worldwide Governance Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018.

Rule of Law (ROLE)

Rule of Law Estimator is a variable that captures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The estimate gives the country's score on the aggregate indicator level, in units of a standard normal distribution ranging from

-2.5 to +2.5. This data is extracted from the Worldwide Governance Indicators by The World Bank dataset (World Bank Open Data, 2020) from 2011 to 2018.

Descriptive Statistics

In the following table, *Descriptive Statistics Variables (Table 1),* the variables are presented showing the amount of observations, the mean, standard deviation and the minimum and maximum value. Notably, is that certain variables are presented in the logarithmic form, this is due to the variables being highly skewed and not normal distributed. The logarithmic transformation solves the problem of the nonlinear variable distribution.

Descriptive Statistics Variables (Table 1)

Variable	Obs	Mean	Std.Dev.	Min	Max
Year	136	2014.5	2.3	2011	2018
ADR	136	56.929	14.114	36.554	88.592
MPI	136	.66	.087	.479	.767
EI	136	.585	.116	.32	.797
ANS	136	13.594	10.254	-5.1	39.4
IGDP	136	6.098	5.551	-2.118	38.882
DCP	136	68.614	42.421	12.682	218.308
GEE	136	-.326	.475	-1.186	.497
PSAA	136	-.911	.77	-2.81	.487
RQE	136	-.33	.448	-1.093	.496
ROLE	136	-.522	.329	-1.354	.075
LN_CHE	136	4.847	.933	3.098	6.426
LN_AEE	136	22.48	1.685	19.534	26.215
LN_PT	136	18.035	1.591	14.854	21.055
LN_LE	136	4.256	.085	3.939	4.345
LN_GNI	136	7.931	.765	6.413	9.26
LN_EOGAS	136	24.534	2.01	20.53	28.608
LN_IOGAS	136	24.854	1.671	21.796	28.567
LN_PRR	136	23.053	.998	21.178	25.09
LN_speed_code	136	.425	.27	0	.987

Correlation Matrix

In the following table presented in the appendix *Correlation Matrix (Table 2)*, the correlation is shown between the multiple variables. It is important to take correlation of the variables into consideration due to the problem of multicollinearity. If there are highly correlated variables at least one of the two variables must be removed as the regression analysis would otherwise generate unreliable coefficients. As expected, export of goods and services is highly correlated with import of goods and services. For that reason, export of goods and services is removed from the dataset.

Models and Results

In this part of the research paper I will investigate empirically the relationship between cross-border remittance volume and poverty. This will be done by statistically testing the two hypotheses. In the first part of the analysis I systematically test the statistical significance of the control variables and the independent variable *Personal Remittances Received* on the dependent variable *Multidimensional Poverty Index* through OLS. In order to investigate the relationship between cross-border remittances and poverty the following model is estimated:

$$
\begin{aligned}
&Multidimensional\ Poverty\ Index \\
&\quad = \beta 0 + \beta 1\ Health\ Expenditure\ (log) + \beta 2\ Education\ Expenditur\ (log) \\
&\quad + \beta 3\ Age\ Dependency\ Ratio + \beta 4\ Population\ Total\ (log) \\
&\quad + \beta 5\ Government\ Effectiveness + \beta 6\ Education\ Index + \beta 7\ Adjusted\ Net\ Savings \\
&\quad + \beta 8\ GNI\ per\ capita\ Atlas + \beta 9\ Inflation \\
&\quad + \beta 10\ Political\ Stability\ and\ Absence\ of\ Violence\ and\ Terrorism \\
&\quad + \beta 11\ Import\ of\ Goods\ and\ Services\ (log) + \beta 12\ Domestic\ Credit\ Provided \\
&\quad + \beta 13\ Personal\ Remittances\ Received\ (log) + \beta 13\ Regulatory\ Quality \\
&\quad + \beta 14\ Rule\ of\ Law + \varepsilon
\end{aligned}
$$

The built dataset used for this research paper consists of per country specific data during the time period between 2011 and 2018. For this reason, the dataset is considered a panel dataset. Due to the relative low amount of observations, 136 in total, and variance in the variables, the data is pooled. The results of the pooled OLS estimator are depicted in Table 3. As can be seen, health expenditure, education expenditure, age dependency ratio and population total are not significant. On the other hand, education index, adjusted net savings, GNI per capita, domestic credit provided and personal remittances received are significant at the 5% level. When taking inflation and import of goods and services into consideration, it can be seen that these variables are significant on the 10% level. However, as discussed before cross-border remittance volume is potentially endogenous to poverty.

Pooled OLS Estimator (Table 3)

MPI	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Year	0.001	0.001	2.16	0.033	0.000	0.002	**
ADR	-0.002	0.000	-9.46	0.000	-0.002	-0.001	***
EI	0.341	0.027	12.43	0.000	0.286	0.395	***
ANS	0.000	0.000	0.89	0.374	0.000	0.001	
IGDP	0.000	0.000	0.29	0.774	0.000	0.001	
DCP	0.000	0.000	1.20	0.232	0.000	0.000	
GEE	-0.013	0.008	-1.70	0.091	-0.029	0.002	*
PSAA	-0.001	0.003	-0.21	0.834	-0.007	0.005	
RQE	0.011	0.012	0.93	0.356	-0.012	0.034	
ROLE	0.004	0.008	0.47	0.642	-0.012	0.020	
LN_CHE	-0.012	0.007	-1.78	0.078	-0.026	0.001	*
LN_AEE	0.026	0.005	5.68	0.000	0.017	0.035	***
LN_PT	-0.017	0.005	-3.80	0.000	-0.026	-0.008	***
LN_GNI	0.044	0.007	6.55	0.000	0.031	0.058	***
LN_IOGAS	-0.015	0.004	-3.32	0.001	-0.024	-0.006	***
LN_PRR	0.007	0.004	1.80	0.075	-0.001	0.015	*
Constant	-2.113	1.070	-1.98	0.051	-4.232	0.005	*

Mean dependent var	0.660	SD dependent var	0.087
R-squared	0.982	Number of obs	136.000
F-test	414.300	Prob > F	0.000
Akaike crit. (AIC)	-795.938	Bayesian crit. (BIC)	-746.423

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Instrumental Variable regression 2SLS

In the second part of models and results, the endogeneity problem will by attempted to be solved by introducing the instrumental variable transaction speed (speed_code). To assess whether transaction speed is a decent instrumental variable the first-stage OLS regression is performed, followed by the F-test. For this regression, the dependent variable is *Personal Remittances Received* and the independent variable is *Speed Code.* The results of the regression is presented in table 4. As can be seen, the variable *Speed Code* is within the significance level of 1%. The F-test results in 28.83, being well above the minimum of 10 (Table 5). The result of the first-stage OLS regression and de F-test is a positive indicator that shows that transaction speed is a possible instrumental variable to explain cross-border remittance volume.

First-Stage OLS Regression of Instrumental Variable on Personal Remittances Received (Table 4)

LN_PRR	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LN_speed_code	1.437	0.268	5.37	0.000	0.908	1.966	***
Constant	22.437	0.137	163.72	0.000	22.166	22.708	***

Mean dependent var	23.048	SD dependent var	1.000
R-squared	0.151	Number of obs	136.000
F-test	28.831	Prob > F	0.000
Akaike crit. (AIC)	364.091	Bayesian crit. (BIC)	369.902

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

F-Statistics (Table 5)

(1) LN_speed_code = 0
F(1, 133) = 28.83
Prob > F = 0.0000

The second step to verify whether transaction speed is a decent instrument to use, the variable *Speed Code* is tested on the dependent variable *Multidimensional Poverty Index.* The OLS regression of transaction speed on poverty is run to verify if the instrument is exogenous. The results are shown in table 6 and conclude that the instrument has no relation to the dependent variable. The results are insignificant on the 10% level, proving exogeneity and therefore verifying further that *Speed Code* is a viable instrumental variable.

OLS of Instrumental Variable on Multidimensional Poverty Index (Table 6)

MPI	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LN_speed_code	-0.027	0.024	-1.13	0.260	-0.075	0.020	
Constant	0.671	0.012	57.06	0.000	0.648	0.695	***
Mean dependent var		0.660	SD dependent var			0.087	
R-squared		0.007	Number of obs			136.000	
F-test		1.279	Prob > F			0.260	
Akaike crit. (AIC)		-274.732	Bayesian crit. (BIC)			-268.921	

*** *p<0.01, ** p<0.05, * p<0.1*

In the third part of models and results the 2SLS regression will be performed. The 2SLS regression consist of two separate parts. First, all control variables will be tested as independent variables on the dependent variable *Personal Remittances Received.* As seen in table 7, all variables, but *Speed Code, Population Total, Inflation, Current Health Expenditure and GNI* are significant within the 10% level. These results are then used to formulate a prediction on *Personal Remittances Received,* dubbed *PRR_HAT*.

First-Stage OLS regression Control Variables on Personal Remittances Received (Table 7)

LN_PRR	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Year	0.045	0.012	3.65	0.000	0.021	0.069	***
ADR	0.014	0.005	2.87	0.005	0.004	0.024	***
EI	1.842	0.495	3.72	0.000	0.862	2.821	***
ANS	0.035	0.005	7.62	0.000	0.026	0.044	***
IGDP	0.014	0.006	2.20	0.030	0.001	0.026	**
DCP	-0.013	0.001	-11.53	0.000	-0.015	-0.010	***
GEE	0.402	0.140	2.87	0.005	0.125	0.678	***
PSAA	-0.222	0.068	-3.27	0.001	-0.356	-0.088	***
RQE	-1.546	0.179	-8.64	0.000	-1.900	-1.192	***
ROLE	0.626	0.182	3.43	0.001	0.265	0.987	***
LN_CHE	-0.140	0.164	-0.86	0.394	-0.465	0.184	
LN_AEE	0.307	0.089	3.44	0.001	0.130	0.483	***
LN_PT	-0.129	0.096	-1.34	0.184	-0.320	0.062	
LN_GNI	0.211	0.134	1.58	0.118	-0.054	0.477	
LN_IOGAS	0.446	0.111	4.02	0.000	0.227	0.666	***
LN_speed_code	0.261	0.159	1.65	0.103	-0.053	0.575	
Constant	-85.966	24.572	-3.50	0.001	-134.626	-37.306	***
Mean dependent var		23.048	SD dependent var			1.000	
R-squared		0.932	Number of obs			136.000	
F-test		198.805	Prob > F			0.000	
Akaike crit. (AIC)		53.993	Bayesian crit. (BIC)			103.382	

*** *p<0.01, ** p<0.05, * p<0.1*

The prediction calculated for the independent variable *Personal Remittance Received* is used for the second part of the OLS instrumental variable regression. The Instrumental variable regression 2SLS is conducted with the dependent variable *Multidimensional Poverty Index,* independent variable *Predicted Value Personal Remittances Received* and all the remainder control variables. The results are shown in table 8 and as can be seen *PRR_HAT* has a positive sign and is significant on the 1% level. These results provide the information that there is indeed a relationship between de dependent, independent and control variables. In the following section of this paper I will dive deeper into what this means.

Instrumental Variable Regression 2SLS (Table 8)

MPI	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
PRR_HAT	0.119	0.028	4.25	0.000	0.064	0.174	***
Year	-0.003	0.001	-2.55	0.012	-0.005	-0.001	**
ADR	-0.004	0.001	-7.05	0.000	-0.005	-0.003	***
EI	0.111	0.064	1.73	0.086	-0.016	0.238	*
ANS	-0.004	0.001	-3.86	0.000	-0.007	-0.002	***
IGDP	-0.002	0.000	-3.38	0.001	-0.003	-0.001	***
DCP	0.001	0.000	4.13	0.000	0.001	0.002	***
GEE	-0.054	0.015	-3.70	0.000	-0.082	-0.025	***
PSAA	0.026	0.007	3.73	0.000	0.012	0.040	***
RQE	0.186	0.046	4.00	0.000	0.094	0.277	***
ROLE	-0.071	0.020	-3.64	0.000	-0.110	-0.033	***
LN_CHE	-0.002	0.007	-0.32	0.748	-0.015	0.011	
LN_AEE	-0.014	0.011	-1.31	0.193	-0.035	0.007	
LN_PT	0.000	0.005	-0.05	0.960	-0.010	0.010	
LN_GNI	0.023	0.008	2.82	0.006	0.007	0.039	***
LN_IOGAS	-0.064	0.012	-5.16	0.000	-0.089	-0.040	***
Constant	5.475	2.129	2.57	0.011	1.259	9.690	**

Mean dependent var	0.660	SD dependent var	0.087
R-squared	0.985	Number of obs	136.000
F-test	1104.589	Prob > F	0.000
Akaike crit. (AIC)	-811.396	Bayesian crit. (BIC)	-762.006

*** *p<0.01, ** p<0.05, * p<0.1*

In the instrumental variable regression results presented above the coefficient of the variable PRR_HAT is given 0.119 with a standard error of 0.028 and t-value consisting of 4.25. To interpret the magnitude of the coefficient, the value is transformed that results in the following: an 1% increase in PRR_HAT results in a 0.18% increase in MPI, ceteris paribus. This means that when all stays equal, an 1% increase in the predicted value of personal remittances received in dollars per year, the value of the multidimensional poverty index increases by 0.18%. This effect is statistically significant on the 1% level as the p-value is lower than 0.01. As government indicators are generally seen as important factors that determine poverty, the coefficients of these indicators are as follows. The variable GEE has a coefficient of negative 0.054 resulting in an elasticity of 0.08%. This means that an 1% increase in government effectiveness decreases the MPI by 0.08%, ceteris paribus. This effect is statistically significant on the 1% level as the p-value is lower than 0.01. The variable PSAA has a coefficient of 0.026 resulting in an elasticity of 0.04%. This means that an 1% increase in political stability and absence of violence / terrorism increases the MPI by 0.04%, ceteris paribus. This effect is statistically

significant on the 1% level as the p-value is lower than 0.01. The variable RQA has a coefficient of 0.186 and an elasticity of 0.28%. This means that an 1% increase in regulatory quality increases the MPI by 0.28%, ceteris paribus. This effect is statistically significant on the 1% level as the p-value is lower than 0.01. The last coefficient discussed in these results is the coefficient depicted by the variable ROLE, negative 0.071. The elasticity is -0.10% and this means that an 1% increase in rule of law results in a decrease of MPI by 0.10%, ceteris paribus. This effect is statistically significant on the 1% level as the p-value is lower than 0.01.

When comparing the results from the Pooled OLS to the Instrumental Variable regression two significantly different results are depicted. Where the variable LN_PRR had a coefficient value of 0.007 and a p-value of 0.075 for the Pooled OLS regression (Table 3), the Instrumental Variable regression resulted in a coefficient of 0.119 on the 1% significance level (Table 8). This shows that the Pooled OLS estimator underestimated the effect of the variable *Personal Remittances Received.*

Conclusion

In this paper I have investigated whether an increase in cross-border remittance due to migrant workers has an positive effect on poverty and therefore an increase in cross-border remittance volume would result in effective poverty mitigation. Poverty mitigation has been highly prioritized by the western world and has been part of the governmental agenda for a long time. The responsibility of poverty mitigation has generally been given to governmental bodies, such as policy makers. A popular way for policy makers to take up on these responsibilities is by giving poverty-stricken countries or regions direct aid such as, airdrops of money, supplies, building materials or knowledge. The effectiveness of this type of poverty mitigation is not to be discussed in this paper, merely whether this type of aid could be supplemented by the increase of migration spending. Immigration is nothing new and has been a viable part in the way of living and survival of our human race since existence. Looking for opportunities outside our country borders in search for a better life has been a popular driving force for a lot of poverty-stricken regions. Due to globalization, it has become easier for people from low income countries to migrate to high income countries to support themselves and their families. The migration costs have declined significantly and also the costs of sending money abroad has seen a significant decline. Although, the costs of sending money abroad has declined, there are still costs associated decreasing the amount of money transacted and received by the party at the end of the line. For example, the migrants' friends or family.

In this paper the effect of cross-border remittance on poverty mitigation has been researched by looking at the increase or decrease of receiving cross-border remittance volume and the change in the multidimensional poverty index for highly ranked remittance receiving countries and poverty-stricken regions, during the time period between 2011 and 2018. I carry out this research by using the Instrumental Variable Method instead of OLS to derive my conclusion. This is due to the expected endogeneity problem arising when using Pooled OLS. The results have shown clearly that if solely the

Pooled OLS results have been used the conceived effect would have been underestimated. Controlling for endogeneity resulted in a significant larger estimated effect. By using an instrumental regression model I was able to conceive this effect and form the following conclusion. There is a positive effect of personal remittances received on the multidimensional poverty index. This means that an increase in cross-border remittances increases the multidimensional poverty index and thereby decreasing poverty. Increasing migrant remittances is thereby effective in poverty mitigation. This concluding result could have some important policy implications as the costs and speed of cross-border remittances is largely due to government policies and incentives. Implementing policy that reduces these costs and transaction time and focusses on increasing cross-border remittances volume could therefore be an interesting supplement to current poverty mitigating policy.

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Appendix

Correlation Matrix (Table 2)

Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) LOG_CHE	1.000																		
(2) LOG_AEE	0.429* 0.000	1.000																	
(3) ADR	-0.511* 0.000	-0.508* 0.000	1.000																
(4) LOG_PT	-0.104 0.229	0.821* 0.000	-0.189* 0.027	1.000															
(5) MPI	0.845* 0.000	0.442* 0.000	-0.808* 0.000	-0.056 0.521	1.000														
(6) LOG_LE	0.492* 0.000	0.266* 0.002	-0.821* 0.000	-0.124 0.151	0.752* 0.000	1.000													
(7) EI	0.698* 0.000	0.224* 0.009	-0.699* 0.000	-0.180* 0.036	0.903* 0.000	0.564* 0.000	1.000												
(8) ANS	-0.350* 0.000	0.033 0.702	-0.119 0.168	0.280* 0.001	-0.231* 0.007	0.079 0.363	-0.313* 0.000	1.000											
(9) LOG_GNI	0.952* 0.000	0.537* 0.000	-0.483* 0.000	0.045 0.599	0.801* 0.000	0.432* 0.000	0.594* 0.000	-0.289* 0.001	1.000										
(10) IGDP	-0.135 0.116	-0.109 0.207	0.012 0.890	-0.045 0.600	0.007 0.932	-0.128 0.139	0.172* 0.046	-0.283* 0.001	-0.198* 0.021	1.000									
(11) LOG_EOGAS	0.419* 0.000	0.955* 0.000	-0.502* 0.000	0.809* 0.000	0.416* 0.000	0.184* 0.032	0.219* 0.010	0.084 0.332	0.544* 0.000	-0.112 0.193	1.000								
(12) LOG_IOGAS	0.379* 0.000	0.974* 0.000	-0.529* 0.000	0.846* 0.000	0.412* 0.000	0.223* 0.009	0.218* 0.011	0.129 0.134	0.498* 0.000	-0.115 0.182	0.987* 0.000	1.000							
(13) DCP	0.217* 0.011	0.595* 0.000	-0.637* 0.000	0.490* 0.000	0.371* 0.000	0.457* 0.000	0.214* 0.012	0.322* 0.000	0.244* 0.004	-0.077 0.376	0.601* 0.000	0.640* 0.000	1.000						
(14) LOG_PRR	-0.042 0.631	0.740* 0.000	-0.161 0.060	0.873* 0.000	0.051 0.553	-0.153 0.076	-0.019 0.824	0.263* 0.002	0.102 0.237	0.056 0.514	0.736* 0.000	0.770* 0.000	0.311* 0.000	1.000					
(15) LOG_speed_code	0.072 0.408	0.291* 0.001	0.180* 0.037	0.344* 0.000	-0.085 0.330	-0.183* 0.033	-0.195* 0.024	0.369* 0.000	0.115 0.184	-0.071 0.411	0.266* 0.002	0.297* 0.000	0.155 0.073	0.388* 0.000	1.000				
(16) GEE	0.626* 0.000	0.561* 0.000	-0.619* 0.000	0.160 0.062	0.646* 0.000	0.615* 0.000	0.419* 0.000	0.096 0.267	0.674* 0.000	-0.368* 0.000	0.566* 0.000	0.547* 0.000	0.458* 0.000	0.137 0.111	0.051 0.556	1.000			
(17) PSAA	0.410* 0.000	-0.103 0.235	-0.330* 0.000	-0.404* 0.000	0.360* 0.000	0.509* 0.000	0.292* 0.001	0.113 0.192	0.282* 0.001	-0.314* 0.000	-0.072 0.405	-0.092 0.289	0.197* 0.021	-0.398* 0.000	-0.120 0.166	0.448* 0.000	1.000		
(18) RQE	0.741* 0.000	0.342* 0.000	-0.369* 0.000	-0.122 0.156	0.588* 0.000	0.488* 0.000	0.347* 0.000	-0.097 0.260	0.762* 0.000	-0.353* 0.000	0.336* 0.000	0.289* 0.001	0.070 0.419	-0.117 0.174	0.078 0.367	0.818* 0.000	0.381* 0.000	1.000	
(19) ROLE	0.327* 0.000	0.420* 0.000	-0.392* 0.000	0.147 0.088	0.325* 0.000	0.473* 0.000	0.065 0.455	0.209* 0.015	0.362* 0.000	-0.355* 0.000	0.406* 0.000	0.390* 0.000	0.446* 0.000	0.088 0.308	0.083 0.339	0.781* 0.000	0.460* 0.000	0.654* 0.000	1.000

* shows significance at the 0.05 level

Country	Personal Remittances Received ($, 2019)	% of GDP (2019)	World Rank Remittances
Nepal	8.29E+09	27.8	18
China	2.43E+10	0.2	7
Senegal	2.43E+09	10.1	55
Jamaica	2.50E+09	16.2	50
Mexico	3.58E+10	2.8	2
India	7.88E+10	2.5	1
Philipines	3.38E+10	8.8	3
Egypt	2.55E+10	7.2	5
Nigeria	2.43E+10	5.4	6
Pakistan	2.12E+10	7.5	8
Vietnam	1.60E+10	6.1	10
Bangladesh	1.56E+10	4.5	11
Ukraine	1.47E+10	9.8	12
Colombia	6.36E+09	1.9	27
Dominican Republic	6.81E+09	7.7	24
Thailand	7.47E+09	1.4	19
Tajikistan	2.18E+09	26.9	56

Country Overview (Table 9)