

IMPACT OF REMITTANCES ON FINANCIAL DEVELOPMENT

Impact of Remittances on Financial Development: A Case of Latin America and Caribbean Region

Bilal Sharif

Hailey College of Commerce
University of the Punjab Lahore, Pakistan
bilalsharif313@gmail.com

Sumaira Tufail

Hailey College of Commerce
University of the Punjab, Lahore Pakistan
Sumaira_08sep@yahoo.com

Sidra Amjad

Hailey College of Commerce
University of the Punjab Lahore, Pakistan
sidramjad@gmail.com

This paper has been presented in the



organized by

School of Business and Economics

University of Management and Technology, Lahore, Pakistan

This paper has been included in the conference proceedings with good intentions, where the conference and its organizers are not liable at all for the contents of this paper and / or any part of it. For more information about the conference please visit the conference website: <http://cgr.umt.edu.pk/icobm2013/index.html> or write the organizers at icobm@umt.edu.pk

ABSTRACT

The objective of this study is to investigate impact of remittances on financial development for the case of Latin America and Caribbean region. Financial development represented through three indicators namely ratios of bank deposits, bank credit, money and quasi money (M2) to GDP respectively. In order to explore this impact, 29 Latin America and Caribbean region is taken for period of 1991 to 2010. The study employed panel data techniques fixed effects and random effects model for investigating the impact of remittance on financial development. In order to select one technique from these Hausman test is applied. Overall results of all cases suggest that there is positive and significant impact of remittances on financial development. But first indicator financial development indicator (ratio of bank deposits to GDP) found insignificant. This study is very useful for researchers, policymakers, financial analysts, financial institutions and international organization for migration in making decisions regarding effective channelization of remittances and further exploration this issue by keep in viewing prevailing financial crisis.

Keywords: Remittances, Financial Development, Latin America and Caribbean Countries

INTRODUCTION

The term worker remittance means the inflows or money sent back to home by the overseas workers of any country. The individuals from developing countries can migrate to developed countries in order to earn more and securing their future. According to International Organization for Migration remittances are the financial flows associated with migration i.e. personal cash transferred by migrated worker or immigrant to his relatives in his country of origin (IOM, 2006). Worker remittance is the major and stable source of inflows now a day for developing countries as compared to other sources of external inflows like foreign direct investment. Many scholars argued that for developing countries most important source of foreign exchange is remittance, which comes after foreign direct investment (Ratha, 2005; Sirkeci, Cohen, & Ratha, 2012). The special characteristics of remittances is that it is least volatile component of inflows to developing countries.

After going abroad these individuals get settled in developed countries and send money to their families. These inflows are very useful for their country because these inflows enhance foreign exchange reserves of their country and help them in the economic and financial development of country. Basically remittances occur due to migration of emigrants and this is the major component of their salaries or wages which they send back to their home country. Emigrants normally remit more as a result of better wages in host country as compared to recipient country, also because of greater employment opportunities, reducing accommodation expenses in host country, secure and reliable channels that quickly transfer funds with minimum cost. If one or more than one components given above are not working properly then recipient country is unable to exploit productively the increased remittances inflows.

The remittances recipient country's families normally use these inflows for meeting their basic needs, for investment purposes and for welfare of society. Their basic needs of nourishment, clothing, accommodation, health and safety are accurately met through remittances. Another purpose of sending remittances to their families is for investment perspective, starting new businesses and constructing or refining houses. Remittances are also used for well-being of people as remittance recipient families received necessary funds which reduced the poverty. The last and foremost utilization of remittances is facilitating the remittance recipient country to lower down their burden of external debt and trade deficit (Sirkeci et al., 2012).

There are two distinct point of views that explain the remittances; one is optimistic view while other is pessimistic view (Englama, 2009). According to optimistic view, worker remittances has positive impact on remittances recipient country as it reduce poverty, boost economic growth and facilitate to lower down the external debt and deficit of the economy. On the other hand according to pessimistic view, remittances are normally accountable for huge consumption, promote dependency as family members do nothing in home country,

investment is really fruitless as it invest on houses and remittances can create income inequalities. So, remittances do not promote economic growth while it causes income inequalities and dependency among remittances recipient countries.

There are two major channels of remittances that transfer the remittances from host country to home country, which are formal and informal channels(Englama, 2009). Both of these channels are functioning but formal channel is more worthwhile as it aids the remittance recipient economy in the form of foreign exchange reserves.The remittance inflow transactions under this method are done through official financial system which is properly documented via banks and other official channels like post offices and currency transfer operators (Englama, 2009). In past demand drafts and post offices are used for the transfer of remittances from host country to home country and these sources are not secured and emigrants hesitate to send these remittances as it takes lots of time. But today due to banking sector development these funds are transfers online within seconds through from accounts to accounts and through western union. These new ways are more secure and reliable, as well as they promote the financial intermediation as families of remittance recipient can take now financial services and made customers of banks.

By receiving their remittance inflows, remittance recipient families can acquire many financial services which boost financial development as financial intermediaries work effectively. This channel is operational now a days and central bank of remittance recipient economy monitor the banking sector of their economy and make supporting and attractive policies that encourage the emigrants to transfer their funds through official channels with minimum cost and time. The remittances received through this channel are treated in this study for analysis as they are documented and acknowledged.

The transfer of funds from host country to home country through agents, relatives and third party rather than official exchange framework of economies is called informal channel(Englama, 2009). As in past the duration of transfer was too long and costly process, so emigrants normally send their funds through their relatives and agents to meet the immediate family needs. But this channel has lot of problems like theft and fraud. When a relative or agent takes the responsibility of funds transfer then there is very high uncertainty regarding security of funds. Lots of people or agents become the victim of thieves during the journey from host country to home country. Meanwhile lot of relatives and agents cheat the remittances recipient families by not giving those funds to their families.

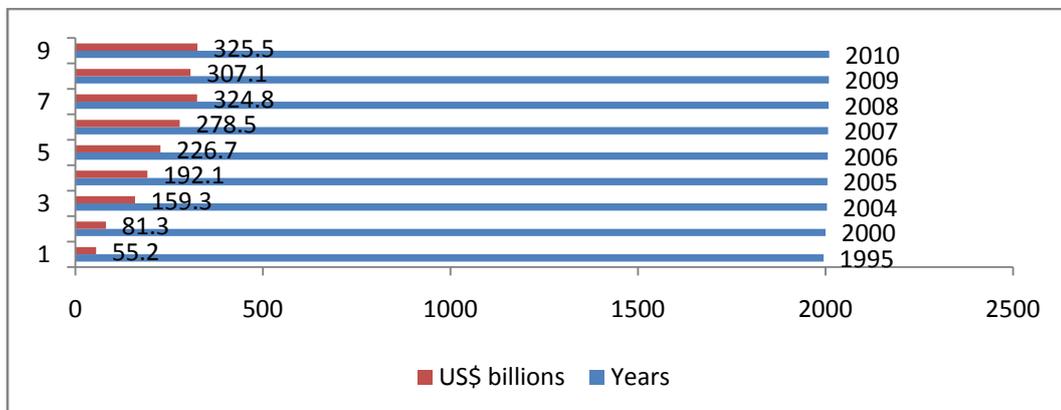
The major drawback of this channel is that there is no involvement of Government of remittance recipient country in transfer and agents can take funds in foreign currency. They do not transfer that foreign currency to the remittance recipient country while they give local currency to emigrants' families. So, foreign exchange reserves of remittance recipient country are not increased through this channel. Due to these drawbacks central banks of

developing countries or remittance recipient countries can take the responsibility to handle this issue and make effective policies to boost foreign exchange reserves.

Apart from these drawbacks, this channel is still widely used as the unskilled workers are not using the official channels due to their higher costs and huge documentation. Mostly unskilled workers and families are illiterate and unable to follow procedures of banks for transfer. So, this is big challenge for central or state banks of remittance recipient countries in order to boost remittances and promote financial sector of their country.

The remittances inflows to the developing countries increased significantly in last two decades. As people in developing economies are poor and in order to get better jobs and earn more money, these unskilled workers start migration to the developed economies with the intention of earning more and more money and sending back to their families for their consumption on necessity of life. On the other hand when skilled workers fail to find suitable jobs in developing countries, they also decide to migrate in developed countries in order to get more suitable jobs and improving their living standard. As the time passes both skilled and unskilled emigrants get reasonable jobs and even nationalities of developed countries then they sent huge funds to their families for meeting their needs, constructing houses and donations for the well-being of the people in their countries. The inflows of remittances to developing countries are shown in figure 1.

Figure 1: Inward Remittances to Developing Countries



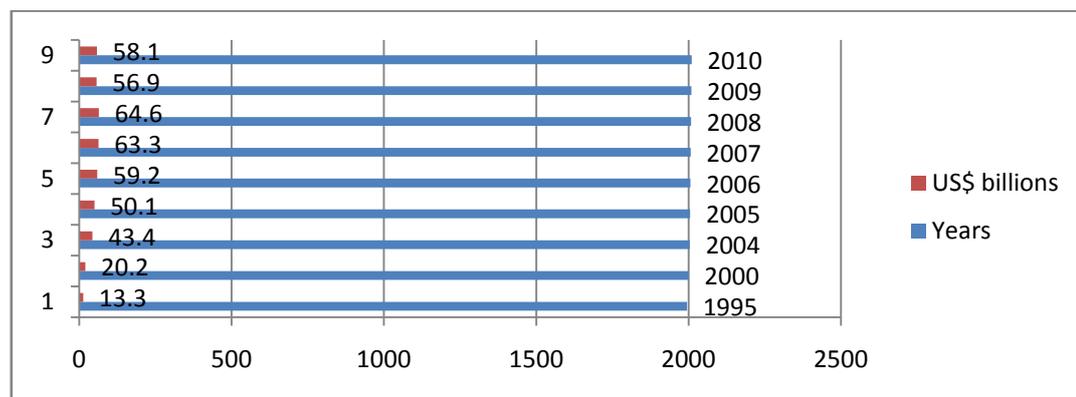
Source: World Bank (2011)

Figure 1.1 depicts that inflows of the remittances is very significantly increased from 55.2 billion US\$ in 1995 to 325.5 billion US\$ and the upward trend of inflows is observed till 2008 while there is slight drop in 2009 where inflows were 307.1 billion US\$ as compared to 324.8 billion US\$. There is upward movement in inflows of remittances in 2010 from 307.1 billion US\$ to 325.5 billion US\$. So there is great improvement in the inflows for developing countries. The top ten remittance recipient developing countries in 2010 are (US\$ billions): India 55.0, China 51.0, Mexico 22.6, Philippines 21.3, Bangladesh 11.1, Nigeria 10.0, Pakistan

9.4, Lebanon 8.2, the Arab Republic of Egypt 7.7, Vietnam 7.2 (World Bank, 2011). Out of these top ten nations three countries belong to south Asia (1-India, 5-Bangladesh and 7-Pakistan) which shows the importance of this region.

The remittances inflows in Latin America and Caribbean region are provided in Figure 2. The remittances inflows are increased significantly from US\$ 13.3 billion in 1995 to US\$ 64.6 billion in 2008. There is upward trend from 1995 to till now which shows that this remittance inflow in this region is improved significantly but in 2009 it drops slightly when the remittance inflows to developing countries were reduced due to financial crisis.

Figure 2: Inward Remittances in Latin America and Caribbean Countries



Source: World Bank (2011)

Due to the higher growth of worker remittances inflows the policy makers, analysts and researchers in developing countries have a point of view that these inflows can contribute in credit market development. So there is a big question mark that, do these increased remittance inflows can promote financial development in Latin America and Caribbean region? In literature different studies have investigated the relationship between remittance by workers and financial development in developing countries and other regions of the developing countries (Aggarwal, Demirgüç-Kunt, & Pería, 2011; Chowdhury, 2011; Oke, Uadiale, & Okpala, 2011). But according to best knowledge of author no study has been conducted to investigate the impact of worker remittances on financial development in South Asia. For exploring the relationship of financial development and worker remittances, one should know exactly what financial development is and how it affects the worker remittances.

Financial development can be defined as “the factors, policies, and institutions that lead to effective financial intermediation and markets, as well as deep and broad access to capital and financial services” (World Economic Forum, 2011). Financial development of a country is normally defined through features like extent, complexity, access, productivity, and also by financial system stability. This system contains market, intermediate parties, classifications of assets, regulations by the government bodies and institutions. If this

process goes smoothly in long run, then it definitely improves the living standards, well-being and prosperity of its stakeholders.

There are numerous different factors which contribute towards the financial development of a country. Financial development is very essential component of economy as it boosts economic growth. Many scholars argued that financial development has a strong and positive impact on economic growth (Giuliano & Ruiz-Arranz, 2009; Hassan, Sanchez, & Yu, 2011; Murinde, 2012; Thumrongvit & Kim, 2007; Zhang, Wang, & Wang, 2012). But now it is important to identify how to measure exactly the financial development of a country? Scholars claimed that Financial development is measure normally by looking at the size and level of financial intermediaries in a country (Aggarwal et al., 2011; Oke et al., 2011). Researcher recognizes financial development is also measure through financial development index.

As researcher financial development and remittances are discussed in detail. Both of them are very useful for a country in terms of its economic growth but also related with each other. For instance researcher examine with the increase in remittances, the banking sector which is integral part of financial sector developed significantly. The remittance recipient families are also getting lot of financial services and the families of skilled and well established unskilled emigrants invest their savings in banks and in new business. The remittance recipient countries families can earn huge profits and financial sector of country is also boost. So these arguments convince lot of researchers and scholars to explore relationship among worker remittances and financial development in developing countries.

Few studies have worked on Latin America and Caribbean region in this regard. So this study finds out this gap and explores the impact of worker remittances on financial development in Latin America and Caribbean region. The main issue or problem in this study is to explore association between remittances and financial development in Latin America and Caribbean regions. As the inflows of remittances in these regions are increasing very significant from last 2 decades, it is very important to check the either this increasing volume of remittances can promote financial development in this region. The main purpose of the present study is investigating the impact worker remittances on financial development in Latin America and Caribbean region.

This study will be very handy for the both regions and developing countries as this study helps the remittances recipient countries to properly channelizing these ever increasing inflows in the financial development of their countries. The policy makers of recipient country and researchers can take assistance in making their decision regarding effective use of remittances which leads to financial and economic development. State bank of recipient country can take help to formulize effective system which attract overseas workers to send remittances through their formal channel which boost the financial system of their country. The impact of remittances on financial development investigated in three different

views in last two decades. In first case impact of all developing countries and in second case impact of unexplored South Asian region investigate. While in third case impact of Latin America and Caribbean region investigated, as this region is affected due to prevailing financial crisis in America.

REVIEW OF LITERATURE

The impact of worker remittances on financial development is very rarely studied, as few studies investigated the contribution of worker remittances in promoting the financial development of an economy or country (Oke et al., 2011). Major works on remittances in literature concentrate on other dimensions like economic growth, poverty, income inequality, education and health (Adams & Page, 2005; Anyanwu & Erhijakpor, 2010; Gapen, Barajas, Chami, Montiel, & Fullenkamp, 2009; Hanson & Woodruff, 2003; Yang, 2006). But the intention of this study is to investigate the relationship between worker remittances and financial development.

All these theories claims that the remittances are either consumed or invested in business can ultimate leads to financial development in the recipient countries. The relationship among financial development and remittances is look much clear now. The available literature is limited, few studies have directly studied the linkage among financial development and remittances mostly claimed positive relationship. The overview of all these studies portrays in table 1.

Table 1: Financial Development and Worker Remittance

Study	Objective	Sample	Methodology	Sign	Findings
Aggarwal , Demirgüç-Kunt, and Pería (2006)	Impact of worker remittances on financial development in developing countries.	Panel data of 99 countries over the period 1975–2003.	Fixed effects estimations, Generalized Methods of Moments (GMM) dynamic system	+	The remittances have positive and significant impact on financial development (Bank deposit and credit to GDP).
Gupta, Pattillo, and Wagh (2009)	This paper targets to measure impact of remittance flows on financial development and poverty in Sub-	An unbalanced panel of 44 countries and six time period compose of five	Applied both random, and fixed effects panel regressions	+	The worker remittances have a positive impact on poverty, and

	Saharan Africa.	year averages from 1975 to 2004.			help foster financial development in sub-Saharan Africa.
Acosta, Baerg, and Mandelman (2010)	Scrutinized the impact of remittance and financial sector development on real exchange rate.	Panel data for 109 developing and transition countries for 1990–2003.	Generalized method of moments (GMM) estimator	-	Remittances boost exchange rate in upward direction but this effect was lesser in well-organized financial sector.
Aggarwal et al. (2011)	Do worker remittances promote financial development in developing countries?	Authors used panel data consisted of 109 countries over the period 1975–2007.	Fixed effects estimations, GMM dynamic system	+	Positive, significant, and robust link between remittances and financial development in developing countries.
Kumar (2011)	Explored the role of trade openness, overseas development aid (ODA), remittance inflows and financial development.	Annual data from 1980 to 2010	ARDL approach, Error Correction Model and OLS regression model	-	No linkage exit in long run while inverse relationship was present in short run among financial development and worker remittances
Oke et al. (2011)	Examined the connection between remittances and financial development in Nigeria.	Nigeria's annual data from 1977 to 2009.	Applied ordinary least square estimation (OLSE) technique and the Generalized Method of Moments (GMM) estimator.	+	Conclude that remittances positively and significantly influence financial development in Nigeria.

Brown, Carmignani, and Fayad (2011)	The relationship between remittances and financial development investigated on macro as well as on micro level.	Panel of 138 countries from 1970-2005. The final dataset of households 3,899 from Azerbaijan and 3,995 from Kyrgyzstan.	Fixed effects model and Probit Model	-	An inverse link exist remittances and financial development
Esteves and Khoudour-Castéras (2011)	This paper addresses the question whether the substantial financial flows received by emigration countries in the four decades running upto World War I contributed to local financial development in peripheral Europe.	Panel of 8 countries from 1870-1913.	Fixed Effects Model	+	The positive influence of emigrants' remittances on domestic financial development.
Chowdhury (2011)	Analyzed the effects of remittances on the development of the financial sector of Bangladesh.	Annual data from 1971 to 2008 of Bangladesh.	Cointegration analysis and Vector Error Correction Model	+	Remittances have a significant positive effect on financial development. However, financial sector's development is neutral in its effect on the inflow of remittances.
Fayissa and Nsiah (2012)	Investigates the long -run relationship between remittances and financial services development.	Panel of 44 countries (25 African and 19 American) from 1985-2007	Newly developed panel fully modified OLS (PFMOLS)	+	Financial development, has positive and significant effect on remittances in both regions.

Table 1 presents empirical studies which explore the relationship between financial development and worker remittances. The first study on this topic was conducted in 2006 in which the impact of worker remittances on financial development in developing countries was explored (Aggarwal et al., 2006). Authors investigated the relationship between worker remittances and financial development through a panel data of 99 developing countries for the period of 1975-2003. They employed panel data techniques fixed effects estimations and dynamic Generalized Methods of Moments (GMM) system in order to explore this relationship. They found that there is direct and significant association between worker remittances and financial development in the recipient developing countries after controlling for the reverse causality and measurement errors effects.

After this in 2009 a new study was conducting to examine the impact worker remittances on financial development and poverty elimination in Sub-Saharan Africa. Gupta et al. (2009) aimed to investigate linkage among financial development and remittances while at the same time analyzed the role of financial development in eliminating poverty. They used a panel of 44 countries of Sab-Saharan Africa with six years period averages from 1975-2004. They applied “three stage least square” and panel data models fixed effects and random effects models of regression. They concluded that remittances promote financial development and eliminate poverty after adjusting controlling variables.

The relationship among financial development, exchange rate and worker remittances was analyzed first time in 2010. Acosta et al. (2010) scrutinized the impact of financial development and worker remittances on real exchange rate. They used 109 developing countries over the period of 1990 to 2003. They applied Generalized Method of Moments (GMM) estimator to analyze above said linkage. They included different control variable and robust option to get reliable results. They found that remittances boost exchange rate in upward direction but this effect was lesser in well-organized financial sector as compared to poorly organized financial system of developing countries.

The most relevant and direct study explored the questions do worker remittances enhanced financial development in developing countries of the world (Aggarwal et al., 2011). They used a panel data of 109 developing countries from 1975-2007 and employed the fixed effects estimations and dynamic Generalized Methods of Moments (GMM) system in order to explore this relationship. They found that there is direct and significant association between worker remittances and financial development in the recipient developing countries after controlling for the reverse causality and measurement errors effects.

After this another study analyzed the role of trade openness and foreign aid in promoting financial development while examining the association between financial development and worker remittances. Kumar (2011) explored the linkage among financial development and

economic growth in Pakistan by adopting bonds mechanism while at the same time examine the role of trade open and foreign aid in promoting financial development. Researcher collected annual data of Pakistan for the period of 1980 to 2010. They applied time series models including Auto Regressive Distributed Lagged(ARDL) approach, Error Correction Model and OLS regression model. Researcher found that there was no linkage exist among financial development and worker remittances in long run while inverse relationship was present in short run.

A different valuable study that directly investigate the impact of worker remittance on financial development in Nigeria (Oke et al., 2011). Authors used the annual data of Nigeria from 1977-2009. They incorporated the ordinary least square estimation (OLSE) technique and the Generalized Method of Moments (GMM) estimator. They controlled for the different variables that has significant impact on financial development in order to obtain robust results. They found that remittances directly and significantly impact financial development in Nigeria, except in GMM worker remittances was insignificant where authors taken proxy of financial developed as e ratio of credit to private sector to GDP.

After this a very important study was conducting on both macro as well as micro level to explore link between financial development and remittances. Brown et al. (2011) have analyzed first time on both perceptive micro as well as macro level in literature. On macro level researchers collected a panel data of 138 countries of world for the period of 1970 to 2005 and incorporated fixed effects model of panel data and Probit model in exploring financial development and remittances. While on the other hand at micro level they collected data from household from two countries, final dataset contained 3,899 households from Azerbaijan and 3,995 households from Kyrgyzstan. They found that there was inverse relationship among Remittances and financial development. Probit model tested among worker remittances and household's probability holding bank account in sampled two countries. They found inverse impact of remittance from both perspectives households as well as community in Azerbaijan while found direct relationship of remittances with both sources households and community in Kyrgyzstan but its impact was weaker.

The next study was focused on emigration in era when mass emigration was occurring in the history. Esteves and Khoudour-Castéras (2011) explored the linkage among inflows (remittances and capital flows) of funds and financial development during mass emigration in Europe. They collected the data of 8 economies for the period of 1870 to 1913. They applied fixed effects model of panel data in order to analyze the relationship among inflows of funds and financial development. They found that there was direct relationship exist among remittances and financial development after controlling for other variables. They claimed that contribution of worker remittances was very handy as compared to other inflows in boosting the financial sector.

After this another valuable study was conducting with different statistical time series tests. This study examined relationship between worker remittances and financial development in Bangladesh. Chowdhury (2011) used annual time series data from 1971-2008 of Bangladesh. Researcher applied unit root tests for analyzing data stationary among the variables of the study before applying the models. After testing unit root, they applied Cointegration tests and Vector Error Correction model to explore the long and short run relationship between worker remittances and financial development. Researcher found that worker remittances also have a positive and significant impact on of all three possible proxies of financial development. While on the other hand financial development has neutral effects on remittances.

A most recent study that explored the direct linkage among financial development and worker remittance produce similar result with newly developed panel data unit root tests and panel Cointegration tests. Fayissa and Nsiah (2012) implemented first time newly developed panel unit root tests as well as panel Cointegration tests while examining direct linkage among financial development and remittances in Africa and America. Researchers utilized final panel of 44 economies which was a combination of 25 African and 19 American economies over the period of 1985 to 2007. They applied “newly developed panel fully modified OLS” (PFMOLS), “Autoregressive Distributed Lag Model” (ARDL) model and newly developed panel unit roots and Cointegration tests for analyzing long run relationship among remittances and financial development. They found that there was direct relationship exist among worker remittances and financial development. They claimed that these results are in accordance with previous studies but these results are more robust and authenticated as most recently developed methodology was adopted here.

So, these are the studies that have directly explore the impact of worker remittances on financial developed. Although these studies are limited in numbers but capable enough to meet the objectives of this study. These studies set a ground that increased inflows of remittances can boost financial sector development of the remittance recipient countries.

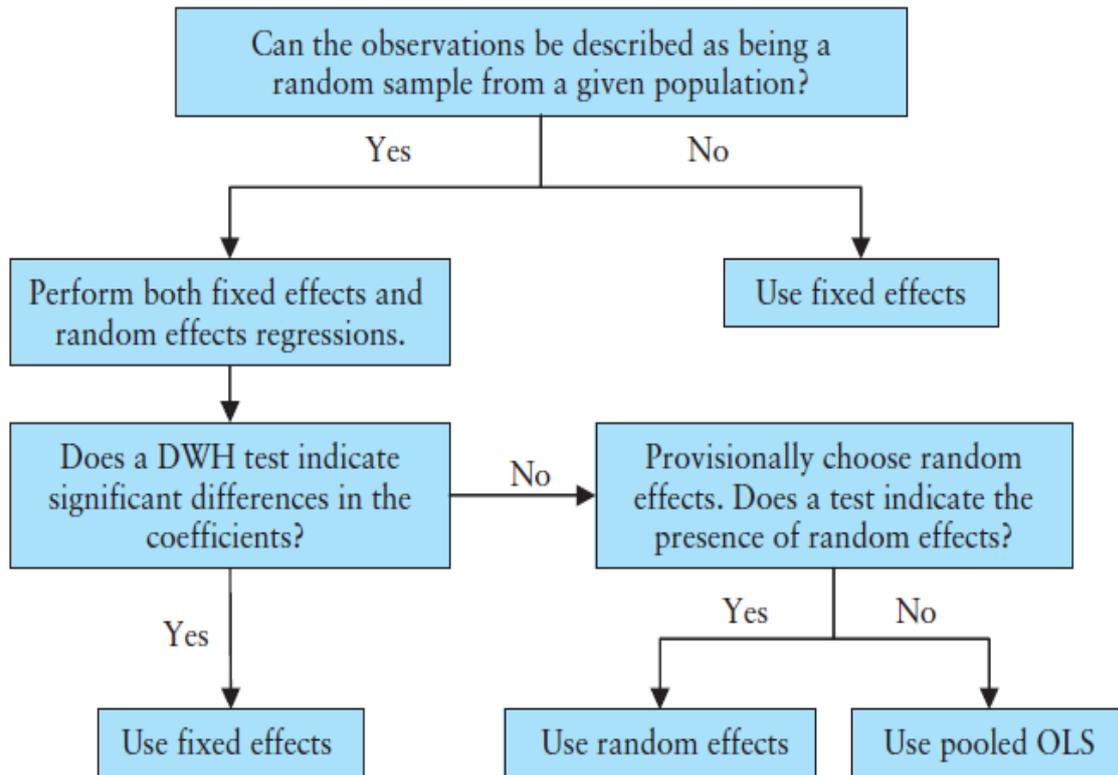
RESEARCH METHODOLOGY

In this session, researcher briefs about data, nature of data and its sources in order to explore the relationship among financial development and remittances. The appropriate methodology with respect to nature of data is described in detail and its decision criteria. After this final models of study and variables used are discussed. So, this session will include the entire procedure and methods through which the research objective can be achieved. STATA software will use for the analysis of econometrics models results of this study. Panel data of 29 countries of Latin America and Caribbean region is select for the time period of 1991 to 2010 on the basis of data availability. The data is collected from the publication of World Bank known as World Development Indicators and from official website of State Bank's of the respect countries.

As current study employing the panel data which take contains same cross-sectional units (countries) over a same time period(Wooldridge, 2009). So, panel data is a blend of both times series and cross-section data. In econometrics there is lot of techniques for conducting analysis with panel data but the two most important and widely used techniques are fixed effects model and random affects model. In literature different authors provided different justifications for adopting these techniques. The most appropriate usage of fixed effects model and random effects model in case of random sample is provided in figure 3.

Figure 3 portrays the whole procedure for effectively decide a most appropriate panel data model either fixed effects or random effects or use pooled OLS in case when we draw a random sample. Dougherty (2007)recommended a criteria for choosing a regression model in panel data, if authors choose random sample from population then they should must utilized both panel data approaches fixed effects model and random effects model. After applying the both panel data approaches authors must run Hausman's specification test, if this test provides significant result than you should reject the following null hypothesis, "difference in coefficients not systematic" and chose most appropriate model is fixed effects model and stop. If the result of the Hausman's specification test gives an insignificant result then authors it is more appropriate to use random effects model instead of fixed effects model and also go towards further testing. While when authors select random effects model then they must apply further appropriate test like Breusch Pagan Lagrange multiplier test. If this test produces significant results then authors reject the following null hypothesis "no random effects" and most appropriate model is random effects model. On the other hand if this test fails to give the significant results than most appropriate model for analysis is pooled Ordinary Least Square (OLS) regression.

Figure 3.1: Decision making criteria for the selection of Model



Source: Adapted from; Dougherty (2007)

Along with recommended criteria for selecting an appropriate model authors have utilized both panel data approaches fixed effects model and random effects model then run Hausman's specification test to choose one most appropriate model from two models. Fixed effects model is simply a model in which slope coefficients are constant while intercept varies across the cross-sectional unit in a panel. On the other hand random effects model is a model which treat cross-sectional unit as well as variation within cross-sectional unit in the model. The proposed fixed effects and random effects models for this study are as follows:

$$FDi_{it}^1 = \beta_0 + \beta_1 WR_{it} + \beta_2 GDP_{it} + \beta_3 INF_{it} + \beta_4 FID_{it} + \beta_5 TO_{it} + u_{it}$$

$$FDi_{it}^2 = \beta_0 + \beta_1 WR_{it} + \beta_2 GDP_{it} + \beta_3 INF_{it} + \beta_4 FID_{it} + \beta_5 TO_{it} + u_{it} + e_{it}$$

Where;

FINDiit= Financial development (1. Domestic credit to banking sector as percentage of GDP, 2. Domestic credit to private sector as percentage of GDP and 3. Money and Quasi money M2 as percentage of GDP) of country i at time t

WR_{it} = Worker remittances (Work remittances inflows as a percentage of GDP)country i at time t

GPD_{it} = GDP per capita i at time t

INF_{it} = Inflation (Annual percentage change in the GDP deflator) country i at t

FDI_{it}	=	Foreign Direct Investment as Percentage of GDP of country i at time t
TO_{it}	=	Trade openness (ratio of import, and exports to GDP) of country i at time t
β_{0i}	=	y-intercept of country i
u_{it}	=	Error Term of country i at time t or between country error
e_{it}	=	Within country error

Financial development in the study is represented via three different proxies. The first indicator is domestic credit providing by banking sector of country in terms of percentage of GDP while second indicator is bank credit in terms of percentage of GDP. Scholars claimed these two indicators are ordinary measures that show the financial depth of a country (Aggarwal et al., 2011; King & Levine, 1993). The third indicator is ration of M2 (money as well as quasi money) to GDP in terms of percentage. Oke et al. (2011) emphasized that this indicator measure the size as well of financial intermediaries in a country. The independent variable remittance is represented as ratio of worker remittances to GDP in terms of percentage. This variable consists of two components remittance transfers and compensation of workers. The remittance transfers meant that transfer of funds by overseas workers to their home countries who are residing there from more than 1 year. Whereas compensation of workers meant that income earned by overseas workers in host country and sent to their home country.

In this study, four control variables inflation, growth, foreign direct investment and trade openness is included. The purpose of their inclusion is to show the exact impact of remittances on financial development and literature emphasized that these variables have greater influence on financial development. Here variable inflation is measured through annual customer prices in terms of percentage and adopted from (Giuliano & Ruiz-Arranz, 2009; Nyamongo, Misati, Kipyegon, & Ndirangu, 2012). The growth variable is represents the size of country and measured via yearly GDP growth of a country in terms of percentage and adopted from (Aggarwal et al., 2011; Fayissa & Nsiah, 2012). Foreign direct investment variable is measure via ratio of net inflows of foreign direct investment to GDP in terms of percentage and adopted from (Aggarwal et al., 2011; Chowdhury, 2011). The last control variable trade openness is measured via ratio of trade to GDP in terms of percentage and adopted from (Chowdhury, 2011; Oke et al., 2011).

Empirical Results and Discussion:

The descriptive statistics, correlation matrix and regression models are explained in this session. The mutlicollinearity is checked through correlation matrix while in order to control heteroskedasticity robust option in utilized in panel techniques.

Table 2: Descriptive Statistics of Latin America and Caribbean Countries

Variables	Observations	Mean	Std. Dev.	Min	Max
FD1 _{it}	579	53.98802	33.05411	4.70155	269.5833
FD2 _{it}	579	38.94228	22.0468	6.569775	134.1136
FD3 _{it}	579	47.83763	23.7889	7.465533	130.6514
WR _{it}	551	4.759978	5.228484	.0000289	28.69292
INF _{it}	540	23.16752	132.1402	-1.213135	2075.887
FDI _{it}	579	4.976359	5.701503	-16.58887	39.80923
GDP _{it}	578	3.448765	3.868966	-11.95063	18.28661
TO _{it}	561	80.92688	42.63118	13.75305	280.361

The descriptive statistics of this region is provided in table 2 for all variables. The variable FD1_{it} has 579 observations in this panel. The average is 53.98802% with standard deviation 33.05411% which means huge dispersion in this panel from 20.93% to 87.04%. The lowest value is 4.70155% while largest is 269.5833% of this variable in this panel. The FD2_{it} has same 579 observations and mean value 38.94228% with standard deviation of 22.0468%. The variations of this variable are within the range of 16.89% to 60.99%. The smallest and largest value of this variable is 8.52735% and 134.1136% respectively. The last proxy of financial development FD3_{it} has 579 observations, 47.83763% average value and standard deviation 23.7889%. The dispersion of this variable is within the range of 24.05% to 71.63%. The lowest value is 7.465533% while highest is 130.6514% of this variable in south Asia. The independent variable worker remittance has 551 observations in this panel. The average value of remittance is 4.759978% with deviation of 5.228484% that shows dispersion of remittance among different countries and ranging from -0.47% to 9.99%. The lowest value of remittance is 0.0000289% while highest is 28.69292% in this panel. Similarly summary statistics of all controlling variables in this panel is portraying.

Variables	FD1 _{it}	FD2 _{it}	FD3 _{it}	WR _{it}	INF _{it}	FDI _{it}	GDP _{it}	TO _{it}
FD1 _{it}	1							
FD2 _{it}	0.603**	1						
FD3 _{it}	0.622**	0.799**	1					
WR _{it}	-0.013	-0.029	0.174**	1				
INF _{it}	0.155**	0.127**	-0.106*	-0.094*	1			
FDI _{it}	0.512**	0.512**	0.641**	0.073	-0.120**	1		
GDP _{it}	-0.056	-0.031	-0.092*	-0.120**	-0.006	0.077	1	
TO _{it}	0.475**	0.457**	0.561**	0.153**	-0.163**	0.445**	0.088*	1

Table 3: Correlation Matrix of Latin America and Caribbean Countries

Notes: Correlation with **, * is significant at 1% and 5% level of significance respectively.

The correlation among the variables is presented in table 3. Likewise in case of developing countries, there is an inverse relationship among financial development and remittances according to first two indicators of financial development ($FD1_{it}$ and $FD2_{it}$). But in case of $FD3_{it}$ the relationship among financial development and remittances is positive and according to theory. In order to detect multicollinearity in this panel before running panel data techniques, researcher examine the relationship of independent variables. The cut point is that the relationship between two independent variables is not more than 0.6 and significant. But the highest and significant relationship among independent variables here is 0.445 between trade openness and foreign direct investment. So, there is no chance of multicollinearity in models of this panel as the correlation between two independent variables is not more than 0.6 and now researcher can run panel data models by using these variables.

Table 4: Regression Models of Latin America and Caribbean Countries

Variable	Model 1 $FD1_{it}$		Model 2 $FD2_{it}$		Model 2 $FD3_{it}$	
	FE	RE	FE	RE	FE	RE
WR_{it}	0.6274 (1.24)	0.3867 (0.91)	0.7613** (3.59)	0.5558** (2.67)	1.4194** (6.65)	1.1873** (5.45)
INF_{it}	0.0275** (6.80)	0.0285** (7.13)	0.0297** (8.07)	0.0300** (8.08)	-0.0089** (-3.15)	-0.0084** (-3.02)
FDI_{it}	0.8000** (3.42)	0.9942** (3.88)	0.5649* (2.38)	0.6894** (2.39)	0.5340** (3.53)	0.7089** (3.91)
GDP_{it}	-0.6611** (-3.21)	-0.7752** (-3.75)	-0.4001* (-2.57)	-0.4615** (-2.85)	-0.2792* (-2.73)	-0.3736** (-3.31)
TO_{it}	0.0745 (-0.66)	0.0329 (0.34)	-0.0491 (-0.56)	0.0167 (0.26)	-0.0766 (-1.06)	0.0088 (0.15)
Constant	51.647** (6.80)	45.389** (5.66)	46.949** (5.84)	32.916** (4.64)	45.581** (8.83)	40.372** (5.86)
Observations	504	504	504	504	504	504
Overall R^2	0.1032	0.3722	0.2422	0.2525	0.0574	0.2880
Between R^2	0.0393	0.5074	0.0005	0.1842	0.0057	0.2143
Within R^2	0.1646	0.1534	0.0516	0.2336	0.2614	0.2438
F statistics	17.66**	122.85**	18.90**	106.2***	13.28**	67.05**
Hausman test (χ^2)	25.52**		56.96**		87.33**	

Notes: The t or z values are given in parenthesis and Correlation with **, * is significant at 1% and 5% level of significance respectively.

Likewise in above two cases, fixed effects and random effects models in case of Latin America and Caribbean countries are present in table 4. Three different models are run by

using three indicators of financial development. In model 1, researcher use $FD1_{it}$ financial development indicator and this indicator again has positive relationship with remittances in both techniques but not significant in both fixed effects and random effects. Three controlling variables FDI_{it} , growth and inflation are significant in both techniques while only one control variable trade openness is not significant in both techniques.

Both techniques are good fit as F statistics 17.66 in fixed effects and wald $\chi^2_{122.85}$ in random effects are significant. The first two overall and between R^2 are larger in random effects as compared to fixed effects but within R^2 of fixed effects is higher in contrast with random effects. But Hausman's test with $\chi^2_{25.52}$ is significant and verifies that fixed effects model is preferred as compared to random effects. The second indicator of financial development $FD2_{it}$ employ in second model. In this model financial development has direct and significant relationship with remittances in both techniques. Again three controlling variables FDI_{it} , growth and inflation are significant in both techniques while only one control variable trade openness is not significant in both techniques. Both techniques are good fit as F statistics 18.92 in fixed effects and wald $\chi^2_{106.2}$ in random effects are significant. The overall, within and between R^2 are larger in random effects as compared to fixed effects in this model. But Hausman's test with $\chi^2_{87.33}$ is significant and verifies that fixed effects model is preferred as compared to random effects.

In model 3, financial development $FD3_{it}$ and likewise in above two models this indicator also has positive relationship with remittances in both techniques and significant like in model 2. Once more three controlling variables FDI_{it} , growth and inflation are significant in both techniques while only one control variable trade openness is not significant in both techniques. Both techniques are good fit as F statistics 13.28 in fixed effects and wald $\chi^2_{67.05}$ in random effects are significant. Likewise in model 1, first two overall and between R^2 are larger in random effects as compared to fixed effects but within R^2 of fixed effects is higher in contrast with random effects. But Hausman's test with $\chi^2_{87.33}$ is significant and verifies that fixed effects model is preferred as compared to random effects.

These results show that remittance has positive and significant impact on financial development in Latin America and Caribbean region. These findings are in compliance with literature, as many studies have proved positive and significant impact of remittances on financial development (Aggarwal et al., 2011; Esteves & Khoudour-Castéras, 2011; Fayissa & Nsiah, 2012; Gupta et al., 2009; Oke et al., 2011). These findings confirm that if developing countries can effectively channelize their remittance inflows then it is certain that financial sector of their countries is boosted. But effective implementation is needed to attract the families for productive channelization of remittances. It is a big challenge for the central bank of respective country to effectively utilize these ever-increasing inflows which have a significant impact on financial development.

Latin America and Caribbean region also shows positive impact of remittances in financial development but this relationship is only significant with 2nd and 3rd financial development indicators. While this relationship is insignificant with 1st indicator of financial development (banks deposits taken in percentage of GDP). The major reason for this is financial crisis of East Asian in 1997 which spread throughout this region and adversely affects banking sector and businesses in 1999 (Soederberg, 2000). As this crisis spread in Brazil and then in whole region the banking sector of this region can not recover its post crisis position as shown in graph in Appendix 2.

The other reason prevailing financial crisis in America severely affects financial sector of this region as mostly migrant of this region moves to America. So, these reasons are strong enough to justify the insignificance of this indicator. As other two indicators have positive and significant impact on financial development which indicates that remittances can even boost financial development while this region is suffering from crisis. The prevailing financial crisis in America is a major challenge for the Government of this region. As people from this region are only migrated to America if the economy of America is not recovered then it is destructive for this region in the future. But as remittance inflows show resilience in the last two decades the effective channeling of the remittances is essential for this region (Sirkeci et al., 2012).

CONCLUSION

The results found in this study are in accordance with literature that investigate the impact of remittances on financial development. The objective of this study is fulfilled successfully as the researcher found positive and significant impact of remittances on financial development. In Latin America and Caribbean countries two financial development indicators "banks credit to GDP" and "M2 to GDP" have positive and significant relationship between remittances and financial development but unfortunately "bank deposits to GDP" found insignificant. The findings of this study are beneficial for International Organization for Migration, Governments, Central Banks, Financial Analysts, Researchers and Students of developing countries for making effective decisions regarding financial development and remittances. The central banks of developing countries can take help from this study and make operational policies for effective channelization of remittances. Major limitation in the study is that recorded data of remittances is incomplete due to prevalence of informal channels in developing countries. So, contribution of remittances in promotion of financial development may be lacking as a lot of remittances are still coming through informal ways. The upcoming studies will be focused on the issue that does worldwide economic recession and financial crisis reduce or deter the flow of remittances and what should be the impact of those decreased or reduced remittances on financial development of these different regions.

REFERENCES

- Acosta, P. A., Baerg, N. R., & Mandelman, F. S. (2010). Financial development, remittances, and real exchange rate appreciation. *Economic Review*, 1-12.
- Adams, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World Development*, 33(10), 1645-1669.
- Aggarwal, R., Demirgüç-Kunt, A., & Pería, M. S. M. (2006). Do worker' Remittances Promote Financial Development? *World Bank Policy Research Paper Series, WBPR WP No. 3975, The World Bank*.
- Aggarwal, R., Demirgüç-Kunt, A., & Pería, M. S. M. (2011). Do remittances promote financial development? *Journal of Development Economics*, 96(2), 255-264.
- Anyanwu, J. C., & Erhijakpor, A. E. O. (2010). Do International Remittances Affect Poverty in Africa?*. *African Development Review*, 22(1), 51-91.
- Brown, R. P. C., Carmignani, F., & Fayad, G. (2011). Migrants' Remittances and financial Development: Macro-and Micro-level Evidence of a Perverse Relationship. *OxCarre Working Papers*.
- Chowdhury, M. B. (2011). Remittances flow and financial development in Bangladesh. *Economic Modelling*, 28(6), 2600-2608.
- Dougherty, C. (2007). *Introduction to econometrics*: Oxford University Press, USA.
- Englama, A. (2009). *The Economics of Remittances: Theories and Issues*. Paper presented at the High-Level Seminar on International Remittances for Economic Development, Banjul, The Gambia.
- Esteves, R., & Khoudour-Castéras, D. (2011). Remittances, capital flows and financial development during the mass migration period, 1870–1913. *European Review of Economic History*, 15(3), 443-474.
- Fayissa, B., & Nsiah, C. (2012). Financial Development and Remittances in Africa and the Americas: A Panel Unit-Root Tests and Panel Cointegration Analysis.
- Gapen, M. T., Barajas, A., Chami, R., Montiel, P., & Fullenkamp, C. (2009). *Do workers' remittances promote economic growth?* : International Monetary Fund.
- Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, 90(1), 144-152.

- Gupta, S., Pattillo, C. A., & Wagh, S. (2009). Effect of remittances on poverty and financial development in Sub-Saharan Africa. *World Development*, 37(1), 104-115.
- Hanson, G. H., & Woodruff, C. (2003). Emigration and educational attainment in Mexico. *Documento de Trabajo del IR/PS*. Disponible en http://irpshome.ucsd.edu/faculty/gohanson/working_papers.htm.
- Hassan, M. K., Sanchez, B., & Yu, J. S. (2011). Financial development and economic growth: New evidence from panel data. *The Quarterly Review of Economics and Finance*, 51(1), 88-104.
- IOM. (2006). IOM and Remittances: Definition, Scale and Importance of Remittances.
- King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics*, 108(3), 717-737.
- Kumar, R. R. (2011). Exploring the role of Trade, Aid, Remittances and Financial Development in Pakistan.
- Murinde, V. (2012). Financial Development and Economic Growth: Global and African Evidence. *Journal of African Economies*, 21(suppl 1), i10-i56.
- Nyamongo, E. M., Misati, R. N., Kipyegon, L., & Ndirangu, L. (2012). Remittances, financial development and economic growth in Africa. *Journal of Economics and Business*, 64(3), 240-260. doi: 10.1016/j.jeconbus.2012.01.001
- Oke, B. O., Uadiale, O. M., & Okpala, O. P. (2011). Impact of Workers' Remittances on Financial Development in Nigeria. *International Business Research*, 4(4), 218-225.
- Ratha, D. (2005). Workers' remittances: an important and stable source of external development finance.
- Sirkeci, I., Cohen, J. H., & Ratha, D. (2012). *Migration and Remittances during the Global Financial Crisis and Beyond*: World Bank Publications.
- Soederberg, S. (2000). *The financial crisis of Latin America and the new international financial architecture*. Paper presented at the The New International Financial Architecture and Latin America, Lima.
- Thumrongvit, P., & Kim, Y. (2007). Financial Development and Economic Growth.
- Wooldridge, J. M. (2009). *Introductory econometrics: A modern approach*: South-Western Pub.
- World Bank. (2011). *Migration and remittances factbook*: World Bank Publications.

World Economic Forum. (2011). *The Financial Development Report 2011*. New York, USA.: World Economic Forum.

Yang, D. (2006). International migration, remittances, and household investment: Evidence from Philippine migrants' exchange rate shocks: National Bureau of Economic Research.

Zhang, J., Wang, L., & Wang, S. (2012). Financial development and economic growth: Recent evidence from China. *Journal of Comparative Economics*.