

**Impact of Remittances on Financial Inclusion
An Empirical Study on Pakistan**



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CERTIFICATE

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Dedication

This work is dedicated to my beloved and sweet parents and siblings and my husband for their unconditional support during my studies.

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Abstract

Financial inclusion is considered as wide-ranging provision of financial/banking services at an affordable rate to every section of population including poor and small enterprises. The present study examines the impact of remittances on financial inclusion both in long run and short run in case of Pakistan. For this study, financial inclusion is measured through an Index of Financial Inclusion (IFI) by following Sarma (2012) methodology. The study explored the financial inclusion (IFI) and the factors which may have impact on this index during the time period of 1980-2017. For the present study, we employed Autoregressive Distributed Lag (ARDL) to analyze the data set. The result analysis for this study revealed that in both long run and short run, remittances have a positive significant impact on financial inclusion in Pakistan. Thus the study supports the hypothesis that remittances contribute in financial inclusion for Pakistan. Total population raise the financial inclusion by demanding more financial services. However, this study found out that literacy rate does not contribute in raising financial inclusion since it fails to capture financial literacy of the people. Furthermore, this study finds out that, GDP per capita has an insignificant impact on financial inclusion and Age dependency is negatively correlates with financial inclusion.

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List of Abbreviations

3SLS	Three-Stage Least Squares
A2S	Access to Finance
ADF	Augmented Dicky Fuller
AIC	Akaike information criterion
ARDL	Auto Regressive Distributive Lag Model
ATMs	Automated Teller Machines
BRICS	Brazil Russia India China and South Africa
FDI	Foreign Direct Investment
FPE	Final prediction error
GLSS6	Ghana Living Standards Survey
GMM	Generalized Method of Moments
HIES	Household Income Economic Survey
HQ	Hannan-Quinn information criterion
IFI	Index of Financial Inclusion
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development

PSLM	Pakistan Standard Of Living Survey
RGDP	Real GDP per capita
SBP	State Bank of Pakistan
SC	Schwarz information criterion
SDGs	Sustainable Development Goals
SSA	Sub-Saharan Africa
UECM	Unrestricted Error Correction model
VAR	Vector Auto-Regressive
WDI	World Development Indicator

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Chapter 1

1. Introduction

Remittances are defined as the money transferred by people working overseas to their households in the home countries (Adams et al. 2008). The World Bank (2014) states that remittances are the second largest source of foreign income for the developing countries. Remittances are increasing every year, according to the World Bank and reached the highest in 2017. Remittances to low- and middle-income countries was \$466 billion for the year 2017, the highest ever. It represented an increase of 8.5 percent over the remittances recorded in 2016, which were \$429 billion (Migration and Development Brief 29, 2018). Interestingly, three countries from South Asia are among the 10 largest remittance receiving countries. These three countries are Pakistan, India, and Bangladesh (Migration and Development Brief 29, 2018). The value of remittances has increased considerably over the years in Pakistan. In 2013, the value of the remittances was \$13.92 billion. In 2018, the value of the remittances stood at \$20 billion (Migration and Development Brief 29, 2018).

There is no doubt that remittances are an important source of foreign income for developing countries. Remittances by foreign workers have played a major role in the development and growth of their home countries. There is a positive relationship between the remittances and economic growth of a country (Ruiz-Arranz and Giuliano 2005; Saddique and Selvanathan 2012). Many researchers, policymakers, and economists argue that remittances are the most effective at reducing poverty. They help the poor segments of the society the most. The reason is that the money is directly transferred to the families, which they can effectively utilize for their needs. There is no red tape involved or any other hurdles. On the other hand, the foreign direct investment

(FDI) and Official Development Assistance (ODA) do not find their way to the poor segments of the society. ODA funds are marred by too many bureaucratic and administrative hurdles. The result is that these funds hardly find their way to the intended audience (Ratha and Mahopatra, 2007).

Shifting focus towards the macro level, remittances play another major role. They are critical in stabilizing the capital account of their home country i.e., the country to which the foreign workers send the remittances. The reason is that unlike other capital flows, remittances do not create future liabilities. Moreover, they are more stable and countercyclical. The same is depicted in the research conducted by Fritz et al. (2008).

On the other hand, financial inclusion is an important emerging topic and is considered to be a salient driver of economic development. The State Bank of Pakistan defines financial inclusion as, “access to formal financial services including savings, credit, insurance and payments vis-à-vis formal financial intermediaries, at an affordable cost” (“Financial inclusion program, State Bank of Pakistan”, n.d.).

Various researchers have regarded financial inclusion as the only means of ending poverty or at least reducing it to a lesser extent (Park & Rogelio, 2015; Pattillo, & Wagh, 2009). From a developing country’s point of view, financial inclusion is also critical for ensuring growth and development (Kelkar, V. (2010); Sharma, D. (2016); Giuliano and Ruiz-Arranz (2009). In simpler terms, financial inclusion can be defined as accessibility and usage of the formal financial system by all members of the economy i.e., the society. Usually, the poor or marginalized segments of the society do not have access to the formal financial system in a country. Although it may seem harmless, low levels of financial inclusion bring with it a host of socio-economic problems. For example, lower level of financial inclusion is related to high crime rate, high levels of

unemployment, and decline in investments. Not just these, lack of financial inclusion is responsible for various other socio-economic problems as well.

There exists a high likelihood that remittances improve financial inclusion by providing affordable financial services within the formal financial system to those who would otherwise be excluded. In this respect, promoting financial inclusion can have significant positive benefits for households. There is no specific theory about remittances effecting financial inclusion but there are multiple channels through which remittances could potentially affect financial inclusion.

There are two reasons to support this viewpoint. First is that the households which receive remittances might be tempted towards different savings instruments. It is especially true when the amount of the remittance is greater than their needs. Thus, to save the extra amount left, they might opt for a savings instrument. Secondly, research shows that the households which receive remittances are 11 percent more likely to open a bank account (Anzoategui et al., 2014). Moreover, households that receive remittances are more likely to obtain financial loans, all of which would lead to financial inclusion. Toxopeus and Lensink (2007) also studies that foreign remittances have a positive impact on economic growth of the home country as well as financial inclusion. Their findings confirmed that remittances have a positive impact on the financial inclusion. With regards to economic growth of the home country, remittances enhance the per capita growth by means of financial inclusion.

Among the South Asian countries, Pakistan occupies a remarkably high position concerning the migration statistics. It is also supported by the figures released in the 2015-2016 report of the Household Income Economic Survey (HIES). The report states that the remittances account for 5.75% of average household income in Pakistan. On the other hand, the Pakistan

Bureau of Statistics mentioned that the unemployment rate in Pakistan stood at 5.90% in 2016 (“Pakistan Bureau of Statistics,” n.d.). Upon analysis, it shows that the unemployment rate is also responsible for migration in Pakistan. Moreover, financial inclusion is also considerably lower in Pakistan. Statistics from 2018 reveal that only 21.3% adults in Pakistan have access to formal financial services. While in India, the financial inclusion rate for adults is 79.9% (Little Data Book on Financial Inclusion, 2018). Keeping in mind the advantages of financial inclusion and huge disparities with other countries, the State Bank of Pakistan (SBP) in 2015 launched the National Financial Inclusion Strategy (NFIS) in May 2015. The ultimate aim of this strategy is to increase the rate of financial inclusion among Pakistani adults to 50% by 2020.

Various studies have highlighted the importance of financial inclusion to individuals as well as households. The only thing that must be ensured is the effective distribution of remittances so that maximum benefits can be reaped (Sarma 2008). Improvement in access to formal financial services will also improve in reducing income disparity as stated by Beck and Demirguc-Kunt (2008) and Honohan (2004). Moreover, it is also an effective means of poverty reduction (Chibba 2009). While the above scholars have highlighted the positive impact of remittances on financial inclusion, various researchers are quick to point out the negative impacts as well. Guliano and Ruiz-Arranz (2009) believes that remittances reduce the financial constraints of the household. When their monetary needs are being met, they are less likely to need loans from financial institutions, thereby, limiting their chances of seeking formal financial services. Hence, remittances reduced financial inclusion.

Levine (2003) states that development of the formal financial services, specifically the banks, lead to increased economic growth. Also, a lot of previous researches indicate that remittances may enhance economic growth as a result of greater financial inclusion. However,

there are fewer empirical researches that examine the relation between remittances and financial inclusion. This serves as a motivation for this study. Hence, this study is focused on examining the relation between foreign remittances and financial inclusion (formal financial services or specifically the banks) for Pakistan.

1.1. Significance of Study

The studies of Anzoategui et al. (2014) & Toxopeus and Lensink (2007) conclude that for developing countries such as Pakistan, economic growth can be ensured by improving the financial inclusion across all segments of the society. It is due to this reason, developing countries have started to take steps to improve the financial inclusion situation in their countries. Pakistan is also one of them. Under the 2025 vision of the SBP, financial inclusion is a major focus of it the SBP's policies. This is an important step taken by SPB since Pakistan is ranked among the nations that are least financially included, which is why we want to conduct this research to assert the remittances effect on financial inclusion in the case of Pakistan.

1.2. Objectives of the Study

The objectives of this study are as follow:

- Calculate Pakistan's index of financial inclusion.
- Assess the short and long-term effects that foreign remittances can have on the financial inclusion in Pakistan.

1.3. Research Gap

As discussed above, financial inclusion is one of the least searched areas in Pakistan. Moreover, the impact of foreign remittances on the financial inclusion in Pakistan is even less

researched. Therefore, this study aims to bridge the existing gap of literature on the research topic. Nevertheless, it is pertinent to mention that a previous study by Salman (2015) has been carried out on this research topic. In that study, population density and literacy were taken as the controlled variables and the methodology for the research was adopted from Sarma (2008). However, the study did not take into account all the dimensions of the financial inclusion index. The research did not consider the dimension of “Banking Penetration” (accessibility of banking services). Therefore, this is the first study that had constructed an index of financial inclusion by following an updated index of Sarma (2012) and for this index, all the dimensions had been utilized that was as introduced by Sarma (2012).

1.4.Hypothesis

H₀: Remittances does not help in improving financial inclusion for Pakistan.

H₁: Remittances does helps in improving financial inclusion for Pakistan.

1.5. Organization of the Study

The structure of the study is summarised as below:

Chapter 2 is the Literature Review and discusses previous researches on the research topic. It will examine the relationship between foreign remittances and financial inclusion, while also shedding light on the Index of Financial Inclusion. Chapter 3 describes the theoretical and econometrical model that is used in this study. Moreover, it also describes the variables used in this research. Chapter 4 focuses on the methodological framework of this research. Chapter 5 and chapter 6 are based on empirical findings and conclusion and recommendations.

Chapter 2

2. Literature Review

This chapter discusses the existing literature available on foreign remittances and its relationship with financial inclusion of a country. The literature concerns with different aspects of remittances and financial inclusion. The first part discusses financial inclusion and several ways of measuring it. The second part of the literature review discusses foreign remittances and how they are measured. In the third part, the literature is focused on analysing the relationship between remittances and financial inclusion.

2.1. Financial Inclusion

In the simplest terms, financial inclusion means provision of formal financial services to everyone. Mohammed et al. (2017) defines it as “Financial inclusion is making basic formal financial services available, affordable and readily useable by all members of an economy, especially by the poor (low-income individuals)”. In contrast, financial exclusion is defined as the inability of the people to access the financial system (Carbo et al., 2005). Likewise, Leyshon and Thrift (1995) also define financial exclusion as the inability of certain people in a population to access the financial system.

Financial inclusion is critical to developing countries for various reasons. Financial inclusion helps in the reduction of poverty, increase economic growth, and social development. It is also associated in the realization of the Sustainable Development Goals (SDGs). Kellar (2010)

argues that financial inclusion helps in promoting agricultural growth. Due to financial inclusion, the debt of a farmer decreased by promoting microfinancing, which also helps to advance farming.

In addition, Sharma (2016) assessed the relationship between the various dimensions of financial inclusion and India's economic growth. Using the data from 2004-13, the researcher applied Vector Auto-Regressive (VAR) model. Apart from this, the researcher also applied the Granger causality test. The study revealed important findings. The study on the basis of the data concluded that various dimensions of financial inclusion and the economic growth have shown a positive relationship. The three dimensions of financial inclusion which had a very positive relationship with economic growth were banking penetration, availability of banking services, and usage of banking services in terms of deposits. The results of the granger causality analysis show that there exists unidirectional causality between number of deposit/loan accounts and economic growth. On the other hand, there is a bidirectional causality between growth and banking penetration.

Furthermore, Akudugu (2013) conducted a study in Western Africa to analyse the determinants of financial inclusion. Instead of relying on two or three determinants, the researcher used a variety of determinants to assess the level of financial inclusion in Africa. These determinants include: poverty, access to financial institutions, literacy level availability of financial services in the area, the age of the individuals, their gender, whether someone in the family has a bank account or not, the level of trust that people have in financial institutions, and the lack of documentation. For this study, the researcher used the system of Generalized Method of Moments (GMM). In the light of the data obtained and its analysis, the study resulted in important findings. One of the most important conclusions of the research is that the gender of the individuals, their education level, age, and whether someone previously has a bank account have

a positive relationship with financial inclusion in Western Africa, particularly Ghana. It is not the only interesting conclusion from this research. The research reveals that poverty, availability of financial services in the area, level of trust that individuals have in the institution, and the lack of documentation have a negative relationship with financial inclusion. In the light of these findings, the researcher has advocated that the governments of Western African countries should take concrete steps that will promote financial inclusion, keeping in mind the positive determinants. Moreover, the government must also take initiatives to reduce determinants that have a negative relationship with financial inclusion.

Similarly, Fungacova and Weill (2014) conducted a study to compare Chinese statistics of financial inclusion with BRICS (Brazil Russia India China and South Africa) countries. To measure the financial inclusion as dependent variable, the researchers used those variable that were introduced by Demirgüç-Kunt and Klapper (2013). Some of those measures include formal saving, how many people have ownership of a banking account, and the rate of formal credit usage by the population. The income of the population, their gender and age were taken as explanatory variable. The findings of the research reveal that China has the highest levels of financial inclusion among BRICS countries when it comes to deposit and saving accounts. However, Chinese people abstain from becoming a part of the financial system in the country due to lack of trust and excessive banking charges. Moreover, when people are in need of loans, they prefer to rely on their personal connections and family rather than seek financial services. It is for this reason that use of credit is the lowest in China among BRICS. Moreover, the research revealed that individuals who have male gender, high literacy rate, along with high levels of income are more likely to be a part of the formal financial system.

Moreover, Joseph and Varghese (2014) conducted a study to determine that what role banks played in the promotion of financial inclusion in India. The study revealed that banks are playing a major role in the promotion of financial inclusion in India, thus leading to high economic and social development. Unlike before, banks are now more visible in rural areas, opening more branches than before. Moreover, the increase in the use of debit and credit cards, and growth in ATMs also shows an increase in financial inclusion.

On the other hand, a study by Iqbal and Sami (2017) had some contradictory findings. Their study was based on a data taken from 2007 to 2014 and they had used multiple regression method for the analysis of the data. The number of bank branches, growth in ATMs, and credit deposit ratio were taken as determinants for financial inclusion. The findings of the research showed that there is a positive relationship between the number of bank branches and credit deposit ratio with the GDP of Indian economy. However, there is an insignificant relationship between the number of ATMs and the GDP of India. Hence, both the papers conclude that there exists a positive relationship between financial inclusion and economic growth of a country.

2.2.Measurement of Financial inclusion

There is no doubt that financial inclusion is a complicated and multi-layered concept. There are different approaches and different ways of measuring it. Hence, there is a need to come with a theory or model that carefully incorporates all the aspects of financial inclusion. Although many models have been suggested, but they have their limitations. However, the Index of Financial Inclusion (IFI) is widely regarded as the most authentic and reliable model of measuring financial inclusion. Moreover, no matter how many aspects are added to it, the results will be more comprehensive (Sarma, 2008). IFI allows effective monitoring of a country's level of financial

inclusion. Another advantage is that it allows for cross comparison of different countries as well. The comparison is made on the progress that countries have made towards ensuring financial inclusion.

Moreover, to measure index of financial inclusion, Sarma (2008) used three dimensions or aspects of financial inclusion, namely - banking penetration, availability and usage of banking services. The value of the index lies between 0 and 1. The closer it is to 1, it means that the level of inclusion is better. On the other hand, the closer it is to 0, the lower the level of financial inclusion will be. The study collected data from 55 countries using the banking penetration dimensions. For the usage and availability of banking services, the data was taken from 100 countries from 2004 onwards. Taking into consideration the values of the IFI, the analysis showed that Spain has the highest levels of financial inclusion. Most OECD (Organisation for Economic Co-operation and Development) countries had medium to high values on the IFI. Interestingly, Singapore and Malaysia both ranked higher on the IFI than Norway, an OECD country.

Sarma and Pais (2011) conducted a study on 49 countries to determine the relationship between financial inclusion and human development. The study concluded that there exists a positive relationship between financial inclusion and human development. Nevertheless, there exists few exceptions. To assess the financial inclusion, the study used the following dimensions: socio-economic factors, physical infrastructure, and banking sectors. The researchers used regression for the analysis of the data and concluded that there exists a positive relationship between socio-economic factors, physical infrastructure sectors and financial inclusion. The only exception is that in banking sector, the non-performing assets of the banking sector, the capital asset ratio, along with the foreign ownership of banking have a negative relationship with the financial inclusion in a country.

Although highly regarded, Sarma and Pais (2011) failed to incorporate other aspects of financial inclusion into their index. For example, they failed to include ease and cost of financial services into their research. Gupte et al. (2012) using the same dimensions as of Sarma and Pais added the ease and cost of financial services into their research. The objectives of the study were to assess how much financial inclusion had expanded in India from 2008-2009. Their study concluded that the IFI index had increased from 0.346 to 0.352. They attribute this growth due to the increase in the presence of banks across the country.

Furthermore, using the same methodology as that of Sarma (2008), a study was conducted to formulate an IFI for Turkey. The findings of the study revealed that there is a positive relationship between financial inclusion and level of income (Yorulmaz, 2013). Hence, the countries which have higher levels of income will also have higher levels of financial inclusion.

In addition, Pineyro (2013) conducted a study in Mexico to assess the level of financial inclusion in the country. The author utilized data from 32 Mexican states and municipalities. Principle component analysis was then done on the gathered data. The study concluded that there exists a positive relationship between literacy level and financial inclusion. Moreover, there is a negative relationship between poverty and financial inclusion.

Goel and Sharma (2017) extending on the research conducted by Sarma (2008) decided to include saving and insurance parameters into the dimension for financial inclusion. Moreover, they took the data from 2004-2015. It should be noted that India attained the greatest level of financial inclusion during 2014-2015, and as a result, India's government can achieve inclusive growth, decrease poverty, encourage research and innovation, etc.

In addition to above discussion on IFI, Ambarkhane et al. (2016) included additional dimensions of financial inclusion into their study, such as, supply, demand and infrastructure factors, pension, financial literacy, remittances, insurances and drag factors (i.e. factors that are negatively related to financial inclusion) as well. They applied their index on 21 Indian states. The findings of their research suggested that there exists a negative relationship between financial inclusion and poverty.

Park and Rogelio (2015) researched 37 Asian economies. The aim of the study was to explore the relationship between financial inclusion, income inequality and poverty. The researchers wanted to explore the claim whether financial inclusion can lower poverty and income inequality in Asia, more specifically in the developing countries of Asia. Their research concluded that financial inclusion did reduce income equality and poverty in developing countries. Moreover, their analysis suggested that financial inclusion in the Asian economies is strongly influenced by per capita income, rule of law and demographic factors.

2.3.Linkages between Remittances and Financial Inclusion

1. Positive Effects

Toxopeus and Lensink (2007) analysed the role of foreign remittances on financial inclusion. The authors then explored the impact of financial inclusion on the economic growth of a country. The study was based on cross country analysis. For this study, the researchers used single equation estimates to assess what impact does foreign remittances have on financial inclusion. On the other hand, they used 3SLS (Three-Stage Least Squares) estimation to determine what impact does foreign remittances have on economic growth through improvement in the financial inclusion of the country. The results of the study confirmed that remittances have a positive relationship with the economic growth of a country. Moreover, as remittances improve

financial inclusion, they also increase the per capita economic growth. One of the drawbacks or criticism of this study is that it only takes into consideration the banked population when measuring financial inclusion. It does not take into account other dimensions of economic growth such as access to banking services.

Furthermore, Anzoategui et al. (2014) conducted their own study to assess the relationship between foreign remittances and financial inclusion. The researchers considered the use of deposit account and access to credit services as a measure for financial inclusion. Their study was based on El Salvador. For their study, they used primary data. The data was collected through a household survey conducted through FUSADES. The data was collected from the years 1996, 1998, 2000 and 2002. To analyse the relationship between financial inclusion and remittances, the researchers used regression analysis. The findings from the research revealed various noteworthy things. One of the first is that foreign remittances increased the likelihood of a household to opt for a deposit account. However, there is no strong reason to believe that foreign remittances have an effect on the credit available from the financial institutions.

A more recent study conducted on foreign remittances is by Machasio (2018). In this study, the researcher tried to analyse the relationship between foreign remittances and financial inclusion. The researcher aimed to analyse the relationship between the two through the use of an index. The purpose of the index is to measure the level of financial inclusion. Moreover, the index was developed for 61 developing countries. To analyse the data, the study utilized two methods - fixed effects estimations as well as GMM IV estimation method of panel data econometric analysis. The findings of the research reveal that there is a strong positive relationship between foreign remittances and financial inclusion, as the act of sending and receiving foreign remittances increase the use of formal financial services by the sender and the receiver respectively. As far as

the study is concerned, it revealed that the financial inclusion improved by 2.49% due to foreign remittances. Therefore, there is no doubt that foreign remittances play a positive role in socioeconomic development of a country.

Along with this study, another recent study which highlights the positive relationship between foreign remittances and financial inclusion is by Mbilla et. al (2018). The authors studied the relationship of the two by taking a sample from Ghana. The total sample is of 16772 households. The data was taken from the sixth round of Ghana Living Standards Survey (GLSS6). To analyse the data obtained from the GLSS6, the researchers used binary logistic regression. The study revealed two interesting phenomena. One is that local or internal remittances (the flow of remittances within Ghana) had a strong positive relationship with financial inclusion. The receivers of the internal remittances were more likely to request a loan, open a bank account or seek grants from financial services. On the other hand, external or foreign remittances (remittances sent or received from abroad) only increased the likelihood of opening a bank account. There is no positive relationship between obtaining loans and foreign remittances.

Likewise, Nyanhete (2017) also conducted a study to analyse the relationship between remittances and financial inclusion. The study was carried out on the service EcoCash Diaspora which is offered by Econet Wireless Zimbabwe. Through this service, immigrants are able to send remittances to their households in Zimbabwe. The study concluded that that the international mobile remittances service promoted financial inclusion.

2. Negative Effects

As mentioned earlier, researchers have also highlighted various negative aspects as well. Efobi and Osabuohiena (2014), conducted a research in Nigeria to assess the relationship between

remittances and financial inclusion. The findings of the research are interesting in that it showed a negative relationship between the two instead of a positive or no relationship at all. The reason behind the negative is that instead of converting the foreign currencies through a bank, which charge higher fees, so Nigerians opt out of opening a bank account. Rather, they rely on black market sellers that provide them with higher rates for currency exchange than the ones offered by the bank. Hence, Nigerians which receive remittances are less likely to opt for the usage formal financial services.

In addition, Shrestha and Joshi (2017) also conducted a study in which they highlighted the negative relationship. In this study, the authors aimed to assess the relationship between remittances and financial inclusion. The authors based their study on Nepal, using micro-level data. The micro-level data was not taken through primary data collection methods. Instead, the data was taken from a large household survey conducted previously. To measure financial inclusion, the researchers have used two alternative dummy variables. These variables include: 1) whether the recipients have access to a formal financial institution i.e., whether they have a deposit account at a bank or any other formal financial institution; 2) whether the household has received a loan from any financial institution which is a part of the formal financial system. The researchers then utilized the probit model to analyse the relationship remittances and financial inclusion. The findings of the analysis using the probit model revealed that there is a negative relationship between remittances and financial inclusion. The study concluded that households receiving remittances are less likely to have deposit accounts at a formal financial institution and less likely to seek loans. To be more specific, the researchers concluded that households which receive foreign remittances are 3.49 percentage points less likely to use financial services. Financial services include a wide variety of things including having a deposit account at a formal financial

institution. Likewise, households are 9.17 percentage points less likely to opt for a loan. There were several reasons behind the negative relation but the main reason is that people use money that they earned from remittances for personal expenses rather than investing it in a bank. Thus, they don't need deposit account or loans. The findings keep into account all the control variables. However, the district fixed-effects variable is not accounted for.

Similarly, Gautam (2019) also conducted a study to investigate the relationship between foreign remittances and financial inclusion. The author used data of financial inclusion from the World Bank Global Findex Database. The research is based on the data of 107 remittance receiving countries. The author on the basis of the obtained data reveals that instead of having a positive impact, remittances have a significant negative impact. Contrary to the findings from earlier case studies, the results show that remittance inflows have a significant negative impact on financial inclusion by reducing the demand for deposit accounts from formal financial institutions. However, the findings of the study are consistent with the earlier findings that remittances do not have a significant and robust impact on the demand for credit instruments from formal institutions.

2.4. Remittances and Financial development

Another strand of literature strongly linked to our studies is literature on the connection between remittances and financial development, as financial development also involves "Access" as its dimension. Different studies evaluate the connection between remittances and financial sector development. Ojapinwa1 & Bashorun (2014) conducted a study on the efficacy of financial development and remittances in 22 Sub-Saharan African (SSA) countries for year 1996-2010. Financial development measured as credit extended to the private industry, inflation, worker remittances, FDI (Foreign Direct Investment), globalization, magnitude of economic growth and

previous level of financial development were the factors used for this study. GMM (Generalized Method of Moment) model was the research method. The study assessment indicates that the relationship between remittances and economic growth is direct and substantial. It also implies that remittances intermediated by the official financial industry assemble the savings, create demand for other financial services, and if remittances are effectively assigned and used by the financial industry then financial development can be boosted. Financial development and remittances are thus complementary.

Similarly, information was gathered from 45 Sub Saharan African (SSA) countries to explore the connection between financial development and remittances for the time period of 1970-2013. Empirical analysis shows that financial development is substantial and directly associated with remittances (William, 2016).

Likewise, Agarwal et al. (2010), as a proxy variable for financial development, evaluated the connection between remittances measured as equilibrium of payments and shares of deposits and credits to GDP. The data was gathered for the period 1975-2007 for 109 nations. The study assessment indicates that the financial development and remittances are strongly co related.

Correspondingly, due to the rise in the flow of remittances, families discover the advantages of financial services and prefer to store their money in bank accounts as well as the increase in the share of credits owing to the rise in total loanable funds in the economy (Gupta et al., 2009).

Similarly, there was a bidirectional causality between remittances and financial development with regard to countries in Latin and Caribbean (LAC) and the result was more important for countries with huge remittance flows. For this research, the sample information was

from 1970 to 2013. Furthermore, the data analysis indicates that the remittances ' effect on savings and deposit accounts was more as compared to the credit share (Fromentin, 2015).

Demirguç-Kunt et al. (2011) use Mexico's municipal level information to explore the effect of remittances on the scope and depth of the banking sector. Results indicate that remittances have a important statistical and economic effect on municipal financial inclusion. Further results show that remittances have a strong beneficial effect on per capita accounts, branches per capita, and GDP deposit ratio. Therefore, the results indicate that the effect on credit of remittances is sometimes positive, but less robust than others.

Surprisingly, Efobi et al. (2014) discovered a adverse relationship in opening a bank account for Nigeria between remittances and household choices. The researcher explains that banks charge greater conversion prices of different currencies. Therefore, Nigerians generally prefer to keep foreign exchange earnings in exchange for selling them at a greater price on the black market than to store their profits on a bank account.

2.5.Conclusion

The above review of literature surmises different dimension of IFI and its relation with growth, poverty, income inequality, financial development and remittances. However only a small number of studies had been done on remittances impact on financial inclusion such as Nyanhete (2017), Machasio (2018) and Mbilla et al. (2018). Thus, to analyse the correlation between FI and remittances with reference to Pakistan.

Chapter 3

3. Theoretical Framework

The rapid growing labor mobility in international market has positively affected the economies of several countries due to which remittance has become a very important part of those economies. The world is looking for the policies and guidelines to improve the flow of remittance into their economy due to its growing importance in the world market. This is the primary reason which allows remittance to have good and a large share in the foreign policies and inflows of the big or small economies of the world. Therefore, the increasing attention given remittance inflow into economy may expose economies to increase economic activities which in turn will lead the country on the path of economic development.

The available literature provides us with the understanding that remittance will not only improve and increase the economic activities but will also help in increasing household income as well. The increase in household income will help in reducing poverty and will improve the living standards of the poor of the country. The poor can enjoy the freedom to have meal for 3 times a day. According to a study by Cordova and Olmedo human capital, saving and investment can be increased with the help of remittance (Cordova and Olmedo, 2006).

The more an individual is educated the more he will be aware of the benefits of savings, investment and depositing in saving accounts (Zins and Weill, 2016) and he will ultimately invest more which will secure not only his future but also help in boosting up the economy. Improved and increased financial inclusion is another benefit of having a stable, efficient and effective remittance system which will impact the society positively. The living standard and society will improve at large. Below are some of the channels and ways through which remittance affect

financial inclusions. For Hirsch and Anzoategui transfer of payments have positive impact on the economic system of the country (Hirsch, 2017 & Anzoategui et al. 2014).

The continuous interaction of the financial institutions and the receiver provides benefits to both and its one of the channels which operates the remittance system. The process of transfer of money from a person living in abroad send back the money to his family members, back home, demands to have a deposit or saving account at both ends and hence promotes remittance system.

The remittance itself is a very large amount which demands to place it at safe and protected place where it could not be stolen by any unauthorized person. Therefore, the owner or sender or receiver of the remittance amount is advised to have a saving or deposit account in a bank as banks are the safe and protected place to secure your money in.

The international banking institutions act as an intermediary between the migrant and the recipient of the remittance. This transaction of remittance through banks provide banks several opportunities to understand the financial capabilities and stability level of the both the parties, sender and receiver. In this way the bank can offer loans to the party in need. Hence improving the credibility of loan in the market.

With the help of above mention channels of remittances, people feel to be the part of the financial system as the channels provide them with the access to explore and experience the other financial products available able for them to use for their benefit as fitted. Thus, financial inclusion of the society is a goal which countries are looking at and trying approaches to achieve that goal as this not only improves the macro level financial and economic situation but also improves at micro level. Pakistan one such country trying to achieve that goal but unfortunately it's among the least financially included countries. If the relationship between remittance and financial inclusion

experience a positively growing then it may lead the country (Pakistan) to improve its status in terms of financial inclusion.

3.1. Data Sources

In order to conduct this study time series data on yearly basis has been used. The data of period 1980 till 2017 has been used to find out the strength and nature of relationship and relevance between foreign remittance and financial inclusions. The data from State Bank of Pakistan (SBP) has been taken to be used as indicator of financial inclusion. Literacy rate data is also used which has been taken from Pakistan Economic Survey while World Development Indicator (WDI) has also been consulted for the purpose of using the data for all other indicators of the study.

3.2. Variable Construction and Definition

This study will illustrate how the researcher constructed the variables which are dependent and independent of our research study. Some variables used in this research are controlled variable and these are adopted from the research study analysed by Machasio (2018). Due to unavailability of data, the variables used in this research are limited in number as compared to the number of variables used by Machasio. Financial inclusion index is dependent while remittance is independent variable in this study and control variables are literacy rate, real GDP per capita, age dependency ratio and total population.

3.2.1. Index of Financial Inclusion

The index of financial inclusion (IFI) is used to measure the level of inclusiveness of financial institutions of the country. The IFI capture information about different aspect of financial inclusions, hence giving us multidimensional view of the prospect that is calculated in one single binary number. One of the benefit of IFI is that it helps in comparison of various economies at

particular time point. The results of the financial inclusion index can be utilized to know and monitor the progress and changes in policy initiatives at a given period of a time. The studies that have been carried out in the past on remittances and financial inclusions have dropped out certain factors of financial inclusion due to different reasons. One such study is carried out by Anzoategui et al. (2014). For this study, three dummy variables had been taken as a proxy for financial inclusion. These variables are namely; deposit accounts, loan applications and loan received. In this study, all of the three variables has been used separately which makes it to ignore or omit one of the three variables leading to omitting an important aspect of financial inclusion. On the other hand, the study carried out by Toxopeus and Lensink, (2007) measure the said nexus in a different way. They used bank accounts of formal financial institution with predicted share of households. On the other hand, a dimensional approach has been applied by Sarma (2012). For this study, the dimensional approach used by Sarma follows of UNDP's ((United Nations Development Programme) approach to measure the indexes such as Human Development Index. Therefore, for the present study, we will formulate an index of financial inclusion by adopting Sarma (2012) methodology.

3.2.1.1. Dimensions of Index of Financial Inclusion (IFI)

On the basis of Sarma (2012) study, three basic dimensions will be used for constructing an IFI. The three dimensions which will be used in this study are namely; banking penetration, usage of the banking system and availability of the banking services. These dimensions provide valuable evidence on the nature of inclusiveness of a financial system. The limitation for using these variables will be that if these dimensions are used separately the results might be misled due to incompleteness of the required results. The reason is that the individual dimension is unable to sufficiently extract and capture the extent of financial inclusion. The values between 0 and 1 will

be taken for the projected or given IFI, where 0 is equals to lowest value and 1 means complete or highest value of financial inclusion.

i. Banking penetration (dimension 1):

Accounts are known as a significant measure of financial inclusion because all official financial transactions are essentially carried out through accounts. The primary reason why account ownership is chosen as one of the key component factors of the financial inclusion dimension is that it offers an avenue for both payments and savings, which are likely to be more strongly linked to family choices than credit as described by Allen et al. (2016). In this situation, accounts provide a measure of banking penetration as a significant financial inclusion dimension. it is preferable that as many customers as possible should have an inclusive financial system, i.e. an inclusive financial system should penetrate extensively among its users. The size of the "banked" population is a measure of the system's banking penetration, i.e. the number of people with a bank account. In this situation, the banking penetration dimension is the total number of commercial bank accounts.

ii. Availability of banking services (dimension 2):

Availability implies that banks provide financial services to their clients. Banking services in an inclusive financial system should be easier to access for its customers. The total quantity of bank branches and the total quantity of ATMs can indicate the availability of services. ATMs play a significant role in today's banking system in many countries. In addition to offering clients with their bank account information and enabling money and check (traditional teller services) to be deposited and withdrawn, ATMs also conduct other tasks in some cases, such as offering bill payment services, credit card associated services. The significance of ATMs is therefore undeniable in offering enhanced access to banking services. The spread of the ATM network varies

from bank to bank and country to country and the role of a branch of the bank remains as well. Both are therefore included in this dimension. Furthermore, considering the step towards electronic banking in many countries, this dimension should also include information on the accessibility of electronic / internet-based banking facilities. However, due to the absence of complete information on online banking, we cannot use these indicators in quantifying the accessibility dimension of electronic banking for Pakistan. We use data on the total number of branches and total the number of ATMs in this index to assess the accessibility dimension. For banking branches and ATMs, two distinct indexes are calculated. A weighted average of these two indexes, using 2/3rd weight for the bank branch index and 1/3rd weight for the ATM index, is then regarded as the availability dimension index.¹

iii. Usage (dimension 3):

As stated by Kempson et al. (2004), this dimension is driven by the concept of "underbanked" or "marginally banked" individuals. They have observed that *“in some apparently very highly-banked countries, a number of people with bank account are nonetheless making very little use of the services on offer”*. These people are called "under-banked" or "marginally banked." These under banked persons, despite having access to official financial services, are unable to use financial services for multiple reasons such as remoteness of banking outlets, unaffordable circumstances connected to financial services or merely because of adverse experiences with the service provider. These factors negatively represent an economic system's inclusiveness. Thus, having a bank account alone is not sufficient for an inclusive financial system; it is also essential that the banking services be used appropriately. Accounts can be used in several ways, for example, we use accounts for credit, remittances, deposits, payments, transfers etc.

¹ The weight here given to availability dimension is based on Sarma (2012) study.

However, in the case of Pakistan, information on payments, remittances, and transfers is not available. Therefore, by integrating the utilization aspect in this index, we consider two fundamental banking system services – credit and deposit, and in this situation: volume of deposits and credits as a percentage of GDP.

- **Calculation of Dimensions**

The dimension index d_i is calculated by the following formula for the i th dimension.

$$d_i = \frac{A_i - m_i}{M_i - m_i} \quad (1)$$

Formula (1) indicates that 0 has been allocated to all 1. Higher the d_i value, greater the value of financial inclusion of the country. Thus, considering the three above dimensions: penetration, accessibility and use. we can describe these measurements by a point (p, a, u) in the Cartesian three-dimensional space, where p , a and u denote the dimensional indexes for Pakistan calculated using formula (1). In the Cartesian space of three dimensions, point $O(0,0,0)$ indicates the worst level of financial inclusion and point $W(1,1,1)$ indicates the best or ideal level of financial inclusion.

- **Weights Assigned to All Dimensions**

For the dimension indexes, it is quite challenging task to allocate suitable weights. For a financial inclusive system, the mention three dimensions in the index, all held equal importance, but due to non-availability of complete information on these dimensions, we are left with no option, other than to assign less weight to these dimensions in the present index. For example, the availability dimension is no longer limited to the access of banks or ATMs anymore. The rise of internet and mobile banking make physical presence of the banks or ATMs obsolete. However, for

Pakistan, the data is limited on internet and mobile banking, so assign weight of 0.5 for the index of availability. Moreover, the different means through which customers use bank accounts is also not available such as payments, transfer of money and remittances. Considering these aspects, the following weights have been assigned: 1 for the index of banking penetration, 0.5 for the index of availability and 0.5 for the index of usage².

Because of these weights, we can represent Pakistan by a point (pp, ap, up) in the three-dimensional space, such as $0 \leq pp \leq 1$, $0 \leq ap \leq 0.5$, $0 \leq up \leq 0.5$, where pk, ak and uk are Pakistan's computed dimensional indexes using formula 1 The point (0,0,0) will show the worst scenario in the three-dimensional space (full economic exclusion) and the point (1,0.5,0.5) will indicate the highest or ideal scenario in the current context (full financial inclusion). The IFI_p for Pakistan in formula (2) is evaluated by the simple average of normalized Euclidean point range (pk, ak, uk) from point (0,0,0) and its normalized inverse Euclidean distance from the optimal point (1, 0.5, 0.5). The standardization is performed to ensure that the IFI_p value is between 0 and 1, the inverse distance is regarded so that the greater IFIP value corresponds to the greater financial inclusion. Algebraically;

$$IFI_p = \frac{1}{2} \left[\left(\frac{\sqrt{P_p^2 + a_p^2 + u_p^2}}{\sqrt{1.5}} \right) + \left(1 - \sqrt{\frac{(1-P_p)^2 + (0.5-a_p)^2 + (0.5-u_p)^2}{1.5}} \right) \right] \quad (2)$$

3.2.2. Remittances

Foreign remittances are measured as the proportion of GDP remittances. Foreign remittances are considered as the independent variable in this study. It is anticipated that remittances (rem) will have a beneficial effect on financial inclusion by offering more financial services by

² Weights given to the dimension is based on Sarma (2012) study.

improving capital accessibility. Remittances affect economic integration because the receiver has to use one account to obtain the cash, and this enhanced capital has enabled the banks to boost their economic services. This is already being used by (Toxopeus and Lensink, 2007 & Anzoategui et al. 2013) and it has been discovered that remittances have a beneficial effect on economic inclusion.

3.2.3. Real GDP per capita

Household income level measured by real GDP per capita. GDP per capita is a mid-year population split gross domestic product. Real Gross Domestic Product (RGDP) is the currency value of all finished goods and services generated within the boundaries of a country over a certain period of time, adjusted for inflation. Machasio (2018) results revealed that GDP per capita has a beneficial effect on financial inclusion due to the reality that a household's earnings could have a direct effect on financial inclusion.

3.2.4. Literacy rate

The literacy rate is another dimension which is taken into account. Literacy rate is defined as the individuals which are age 14 and above and they can read and write a short and simple statement on their everyday life (World Bank). The reason that literacy rate is considered is that literate households are more likely to use formal finance services than illiterate households (Akudugu, 2013). High literacy rate is indicative of higher level of financial inclusion. Hence, it is the reason that literacy rate is included as a proxy for financial literacy in our regression.

3.2.5. Population

Total population includes the entire population regardless of their legal status. Consultative Group to Assist the Poor's report which is published after the 2012 Global Findex

report concludes that higher density countries have higher levels of financial inclusion. In other words, a larger population means that there will be higher levels of financial inclusion. The reason is that a higher population is indicative of a larger market size.

3.2.6. Age dependency ratio

Another control variable that we have set in this study is the age dependency ratio. It depicts the ratio of the dependents. Dependents are generally defined as individuals less than 15 years of age and older than 64 years. These dependents are expressed as a ratio to the working-age population. The working age population is defined as individuals between 15-64 years of age. According to the prevailing data, this is shown as the proportion of dependents per 100 working-age population. The higher age dependency ratio should result in the reduction of financial inclusion. The reason is that a large portion of the population is either too young or old which impedes their access to financial services as they do not earn income.

3.3. Specification of Model for Impact of Remittances on Financial Inclusion

Financial inclusion is based on Machasio (2018) as a function of migrant remittances. However, In our analysis, we include only those variables whose data is accessible for Pakistan between 1980 and 2017.

$$IFI = \beta_0 + \beta_1 Rem + \beta_2 RGDP + \beta_3 Pop + \beta_4 Age + \beta_5 Lit + \varepsilon_t$$

Where

- IFI = Index of Financial Inclusion
- Rem = Remittances
- RGDP = Real GDP per capita

- Pop = Total population
- Age = Age dependency ratio
- Lit = Literacy rate

Chapter 4:

4. Methodological Framework

To analyze the relationship between remittances and financial inclusion, several approaches have been used. For instance, Toxopeus and Lensink (2007) had used 3SLS estimation. They used 3SLS estimation to find the effect of remittances on growth to improve financial inclusion. Anzoategui et al. (2014) used regression analysis to explain the relationship between the two. Machasio (2018) engaged the GMM IV type of panel data econometric analysis. Mbilla et al. (2018) used binary logistic regression Nyanhete (2017). While 3SLS and GMM IV are suitable for panel data analysis, binary logistic regressions are suited for dependent dummy variable. And in contrast, for this study, we will be applying the ARDL (Auto-Regressive Distributed Lag) model as the study is using time series data. Thus our dependent variable is continuous in nature, and we want to analyze the short and long run effect of remittances on financial inclusion.

Analyzing the interlinked cointegrated relationship between remittances and financial inclusion, with other variables, is the main objective of this study. The assumption behind this study is that one set of variables is stationary at level, i.e. $I(0)$ while other is stationary at first difference, i.e. $I(1)$. Nonetheless, the fundamental conventions of ARDL approach may be violated if integration order of any variable is more than 1 (Ouattara, 2004). Hence, to avoid such problematic situations, we can begin by examining the order of integration of the included variables, before estimation of ARDL model.

4.1. Unit Root Test

The results in a time series data may be spurious. So, it is important that this problem is figured out to avoid the non-stationary of these problems. To examine the stationarity of variables, Augmented Dickey-Fuller (ADF) test is applied. The ADF test is the alternate form of the standard Dickey-Fuller test. ADF test was amplified by the Dickey-Fuller equation by incorporating the lagged difference term of the dependent variable to erase the problem of autocorrelation. The ADF test has been applied with or without an intercept and a time trend to regulate the non-stationary of variables. The following is a model of ADF test:

$$\Delta Y_t = \alpha + \rho Y_{t-1} + \sum_{i=1}^k \beta_i \Delta Y_{t-i} + e_t$$

Where Y_t shows dependent variable, α represents constant term, t is the time trend, Δ is the first difference operator, ρ and β are the parameters to be estimated, k represents the optimal lag length, and e is the white noise error term. The null hypothesis $H_0 = \rho = 0$ (series is non-stationary) is tested against the alternative hypothesis $H_1 = \rho = 1$ (series is stationary) based on t-statistics. Since t-test statistic does not base on the student's t-distribution. Therefore, critical values provided by Dickey and Fuller (1979) and Mackinnon (1996) are used for analysis.

4.2. ARDL cointegration approach

Pesaran and Shin (1999) were the pioneers of ARDL (Auto-Regressive Distributed Lag) methodology. However, it was further modified by Pesaran *et al.* (2001). This methodology is more refined and hence preferred over Engle-Granger (1987) two-step methodology and Johansen (1988) and Johansen and Juselius (1990) approach to assimilation; as it has tremendous advantages as well.

It is with the help of this ARDL approach that the short and long-run effects of different variables can be figure out at the same time. With the help of the bound testing approach, it can be identified whether the independent variables are purely I(0), purely I(1) or a mixture of both. This can be done only by using the ARDL model. However, models like Johansen as well as Engle-Granger are only apprehensive with the long-run association among I (1) variables. In ARDL approach, the long-run relationship can be examined by OLS method, once the lag order of the variables is acknowledged through lag length criteria, for instance, Akaike (1969, 1973) Information Criterion (AIC), Schwartz Bayesian (1978) Information Criterion (SC) or The Hannan Quinn (1979) Criterion (HQ).

Bound test for co-integration of ARDL is given preference over all other approaches because it facilitates the researchers by giving by controlling small sample bias. Pesaran *et al.* (2001) and Pesaran and Shin (1999), find out that in small sample size, parameters of OLS estimators in short run through Unrestricted Error Correction model (UECM) are consistent and parameters in the long run are consistent as well. Through ARDL model, the problem of endogeneity i.e. where an explanatory variable is associated with the error term, can also be resolved. We have used six explanatory variables, whereby the data period ranges from 1980-2017 comprising of a small sample size of 37 observations; thus, the ARDL approach is the most suitable and ideal technique for this study.

4.3.ARDL Model bound test

For this study, bound test of ARDL approach (Pesaran et al, 2000) is used to estimate the long run association between remittances and financial inclusion. The standard of Unrestricted Error Correction Model for ARDL approach is as follows:

$$\Delta IFI_t = \alpha_0 + \sum_{i=1}^P \beta_i \Delta IFI_{t-i} + \sum_{i=1}^P \delta_i \Delta Rem_{t-i} + \sum_{i=1}^P \varepsilon_i \Delta RGDP_{t-i} + \sum_{i=1}^P \pi_i \Delta Age_{t-i} + \sum_{i=1}^P \phi_i \Delta Lit_{t-i} + \lambda_1 FinIncl_{t-1} + \lambda_2 Rem_{t-1} + \lambda_3 RGDP_{t-1} + \lambda_4 Age_{t-1} + \lambda_5 Lit_{t-1} + e_{t-1}$$

In the above equation, $\beta_i, \delta_i, \varepsilon_i, \pi_i$ and ϕ_i are short run parameters and $\lambda_1, \lambda_2, \lambda_3, \lambda_4$ and λ_5 are long run parameters. To estimate the long run association among parameters of these variables, bound test is applied. The hypothesis for cointegration as follows:

H0: $\lambda_1=\lambda_2=\lambda_3=\lambda_4=\lambda_5=0$ (No Co-integration)

H1: At least one λ is non-zero. (Cointegration exists)

The variable addition test is used to calculate the value of F- statistics and compare with F-critical values of lower and upper bound that is I(0) and I(1) at 5% level of significant include intercept and time trend. There are three possible outcomes based on F-Statistics:

(i) If $F_{stat} > F_{critical}$ of upper bound, the cointegration will exist.

(ii) If $F_{stat} < F_{critical}$ of lower bound, absence of cointegration.

(iii) If F-value lies between the two bounds, cointegration is inconclusive among the variables.

4.4. Diagnostic Tests

The stability of parameters and model plays an important role in any econometric model. If parameters are unstable they may produce inconsistent results and may mislead the policy makers to design suitable and appropriate policy. Thus to check the stability of a model, the diagnostic tests are applied. The diagnostic tests can be applied in three various ways;

autocorrelation, heteroskedasticity, and normality. Breusch-Godfrey (1978) serial association Lagrange Multiplier test with the null hypothesis, for autocorrelation, there is the absence of serial correlation within the errors within the regression model. For Heteroscedasticity test, Breusch Pagan test (Breusch and Pagan, 1979) has been applied for checking error variance. Jarque-Bera (1987) test (JB Test) has been utilized to monitor for normality of the goodness of fit of the model. The null hypothesis of JB Test is a combined hypothesis of zero skewness and zero excess kurtoses.

Chapter 4

5. Empirical Results

This chapter reveals information about examining the properties of time series by reasoning and analysis. The two important steps Data and Methodology which have been discussed in the previous chapter will be implemented in this chapter. In this chapter the estimated results are proclaimed in tabular form.

5.1. Testing of Stationarity:

The time series properties of all the variables must be examined and inquired before regression investigation. In order to test the stationarity of series of all the variables or indices i-e including Index of Financial Inclusion (IFI), Remittances (REM), Real GDP per capita (GDP), and Literacy rate (LIT_RATE), we applied Augmented Dickey-Fuller (ADF) Test. In the time series data, stationary is first step because we would like to check the changeover the time in the data set or time-varying mean or a time-varying variance or both. The estimated results of ADF results are given below in the table 1.

Table 5.1: Unit Root Test Results

Variables	Constant/ trend	t-stats at Level	t- stats at 1st difference	Order of integration
IFI	Constant and trend	-0.7302	-6.2454**	I(1)
REM	Constant and trend	-0.9036	-5.8755**	I(1)
RGDP	Constant and trend	-1.4784	-5.2530**	I(1)
TOT_POP	Constant and trend	-4.7842**		I(0)
LTI_RATE	Constant and trend	-1.26098	-5.094467**	I (1)
ADR	Constant and trend	-3.1946*		I(0)

Note: *, ** and * represents significance level at 1%, 5% and 10%.**

As mentioned in the above table, null hypothesis of unit root is accepted at level for four variables (Index of Financial Inclusion (IFI), Remittances (REM), Real GDP per capita (RGDP), and Literacy rate (LIT_RATE)) and all of these four variables is rejected at first difference of each variables and integrated of order 1 i.e. I (1). While, null hypothesis of unit root for two variables total population and literacy rate is accepted at level and both of the series is order of 0 i.e. I (0). The ARDL model has been implemented because the order of integration of all variables is either I (0) or I (1) and none of the variable is I(2). The ARDL method has been used to compose the model and then it is estimated for short-run and long-run relationship by using the Pesaran (2001) ARDL bound testing approach.

5.2. Lag Length Selection Criteria

After checking the stationarity test, to ascertain the optimal lag structure is the next step. Selection of optimal lag length structure is based on selecting a smallest value among different criterias like Akaike Information Criterion (AIC) and Schwarz Bayesian Information Criterion (SBC), Likelihood ratio test (LR). The estimated results of optimal lag structure are report in below Table 2. According to AIC, SC and LR statistical value shows the minimum value to the corresponding at lag 2, however AIC value is the smallest among all of them at 2nd lag length. Hence, our optimal lag is 2 on the basis of AIC and we use it for further analysis.

Table 5.2: Lag Length Selection Criteria Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	416.8581	NA	2.56e-18	-23.47761	-23.21098	-23.38557
1	810.0309	629.0764	3.62e-27	-43.88748	-42.02106	-43.24319
2	881.4786	89.82003*	5.79e-28	-45.91306*	-42.44686*	-44.71653

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

5.3. Bound Testing Approach

The ARDL bound test of Pesaran, Shin (1999) and Pesaran et al. (2001) has some condition which are to be prefer over the conventional methodology, 1) A mixture of I (0) and I (1) in the data. 2) Different variables have different lags structure as when enter in the model. 3) There is a single equation, which making it simple to interpret. For our model, the ordinary least square approach (OLS) has been used to estimate the ARDL cointegration equation. By implementing F-statistic, the hypothesis of absence of cointegration relationship among the variables for our model has been estimated. The obtained value of F-test is correlated with the two types of bounds (upper and lower bounds) of critical values given by Pesaran et al. (2001), after estimating the F-statistic.

Table 5.3: Results of Bound test

Model	F statistics	I (0)	I (1)	Cointegration
<i>IFI f (REM, LGDP, LLIT_RATE, LTOT_POP, ADR)</i>	6.7794	2.39	3.38	Yes

Note: critical values are given only at 5% significance level.

The inclusion of the critical value for upper and lower bounds provided by Pesaran (2001) and Narayan (2005) along with the estimated F-statistic for the bound tests has been conferred in table 3. The calculated F-statistic value is 6.7794, which is greater than both lower and upper bound critical value at 5% level of significance. Based on this hypothesis, the rejection of null

hypothesis of no cointegration can be justified, and between financial inclusion, remittances and other explanatory variables there is a long run cointegration.

5.4. Estimated Long-Run of Financial Inclusion

Table 5.4: Estimated Long Run Results, based on Akaike information criterion

(Dependent Variable = IFI)

Variables	Coefficient	t-ratio	P-value
C	-82.99367	-2.827319	0.0093
REM	9.541851	3.185971	0.0040
RGDP	-0.496866	-0.611255	0.5468
TOT_POP	10.73905	2.283975	0.0315
LIT_RATE	-3.051514	-2.269255	0.0325
ADR	4.151635	3.324725	0.0028

Table 4 presented the long-run estimated results. The estimated coefficient of Remittances has positive sign. The findings revealed that in Pakistan, raise in foreign remittance significantly increases financial inclusion. Table 4 presented the long-run estimated results. The estimated coefficient of Remittances has positive sign. The findings revealed that in Pakistan, raise in remittance significantly increases financial inclusion. The results are also further supported by our hypothesis that increase in the flow of remittances will helps in improving financial inclusion. The study findings are also similar to Anzoategui et al. (2013) and Machasio (2018), since for sending and receiving remittances migrants have to use financial services that further raise the financial inclusion.

The estimated coefficient for Real GDP per capita is insignificant. It may be occurred due to probability of financial exclusion of the significant sector of Pakistan economy i.e. agriculture, industry and services. This also means that there is a large roam for improving financial inclusion of Pakistan by providing relevant financial services to different sectors of Pakistan's economy. Our study findings are further evident by the study of Park and Mercado (2015), who suggests that greater financial inclusion significantly co-varies with higher output growth for high-income and middle-high-income economies and not for middle-low (Pakistan) and low-income economies. In low-income economies, economic growth has no significant effect on financial inclusion that might reflect less institutional quality in these economies to allow better access to finance.

The estimated coefficient of the population has a positive and is a statistically significant with dependent variable i.e. financial inclusion. It can be justified by the study of (Machasio 2018), whose findings of the study suggested that a raise in population increase the financial access that further strengthens the financial inclusion. Our results are also supported by another study that recommends that economies that have a huge population sizes tend to have greater access to financial services (Park & Mercado, 2015). Moreover, the direct relationship between total population and financial inclusion is also proved by Demirgüç-Kunt et al. (2011), who argued that populated area demands more financial services and banks also open more branches in the dense areas.

On financial inclusion, the literacy rate affects significantly but negatively. As the data on financial literacy was not accessible, so the literacy rate has been considered as proxy variable for financial literacy. In comparison with the illiterate people, the literate people mostly take the step to be financially included by making more use of financial services (Zins and Weill, 2016). According to Lusardi and Mitchell (2014), financial literacy is defined as the “awareness and the

knowledge of the public that is related with the financial services, management of the financial resources and the different concepts that are considered to be very important for the awareness of the general public, so that they might get the information related to the different financial terms such as the interest rates, inflation etc". In Pakistan, the literacy rate has been defined as "A person is treated as literate if he could read a newspaper or a journal and could write a simple letter in any language" (World bank). This definition of literacy arises the negative correlation between the financial inclusion and literary rate in Pakistan. This definition of literacy rate does not make citizens financial literate as they still lack the deep insight of financial procedures and products. It can be clinched from the figures of literacy rate in Pakistan that is 58% in 2015 (Economic survey of Pakistan, 2015), but financial literacy is 16% in 2015 (A2S, 2015). From above explanation, we can conclude that literacy rate doesn't fully capture financial literacy of people that's why, in this study, financial inclusion showed a negative relation with literacy.

On financial inclusion, the age dependency ratio has significant and positive effects. The ratio of group comprising of people between ages 15 to 64, which makes the working-age population is known as the age dependency ratio. To discriminate the non-working population from the working one, arranging the working age that uphold the responsibilities of the non-working population, we review the dependency ratio. When there is an increase in ratio of dependents of household, rather than saving money for the investments, the bread earner will be compelled to spend money on the household expenditures, thus cutting the savings for financial inclusion. In the present case, the financial inclusion and age dependency have opposite relations, due to the fact that only that age of person has been considered at which the person is financially stable or not, hence it become a limitation of the definition of age dependency ratio. Since in Pakistan, some children below the age of 14 are working as child labor, compromising of

approximately 12.5 million children (Child labour Survey, 2014-15) out of 189.4 million (World Bank) and people above the age of 64 are mainly pension holders. Hence, the ratio of working population has been increased in the present case as the people below the age of 14 or above the age of 65 are contributing in the household earnings with their other income sources, thus making the relation between the age dependency ratio and financial inclusion positive.

5.5. Short Run Estimations of Financial Inclusion

Table 5.5: Short Run Results of Financial Inclusion

Variables	Coefficient	t-ratio	P-value
$\Delta(\text{REM})$	2.505161	4.302191	0.0002
$\Delta(\text{REM}(-1))$	-1.444593	-2.392202	0.0249
$\Delta(\text{TOT_POP})$	189.4419	5.077996	0.0000
$\Delta(\text{TOT_POP}(-1))$	-183.6738	-5.002278	0.0000
$\Delta(\text{ADR})$	-1.618621	-2.071369	0.0492
CointEq(-1)*	-0.389916	-7.701941	0.0000

The rate at which equilibrium has been attained and the speed of adjustment has been exhibited by the coefficient of the t-1 ECM term. The speed of adjustment toward long run after short run external shock has been estimated by the coefficient of error correction term (ECT). With absolute value of t-statistic 3.51, the error correction term has been estimated negative and immensely significant statistically. The existence of cointegration between the variables has affirmed with the high significance coefficient of t-1 ECM term (Banerjee et al. 1998). The model

will converge back to its equilibrium position with 0.3803 years of speeds of adjustment, if it diverges from its long run path, as indicated by the negative value of the coefficient of t-1 ECM term, thus converging to long run equilibrium path. Thus, current remittances, first lag of remittances, current total population, first lag of total populations and current age dependence ratio are all important variables, as observed from the results, playing its vital role in error correction generated by the external shock in the index of financial inclusion vector.

The positive short run relationship between remittances has been estimated by the results. The 2.50 percent increase in financial inclusion is the result of 1 percent increase in remittance as indicated by the positive impact of remittance with the statistically significant co-efficient of remittance. However, the association between remittances and financial inclusion becomes negative and statistically significant with first lag of remittances. The total population both in the short run and in long run has a positive and significant effect on the index of financial inclusion, but with first lag of total population, the relation become negative and statically significant. Also, there is negative short run relationship between age dependence ratio with index of financial inclusion, as indicated by the results and are statistically significant.

5.6. Residual diagnosis

Table 5.6: Results of Residual diagnosis

Test Statistics	F-Stat	Probability
Heteroscedasticity test	4.00	0.54
Normality Test (Jarque Bera Test)	1.27	0.52
Serial LM test	1.47	0.47

In this above table three of most common diagnostics tests are used which are heteroscedasticity, normality Jarque Bera test and Serial LM test. After applying all these tests, we found out that in Heteroscedasticity test, the residuals data are not heteroscedastic because their probability value is greater than 5%. Second test is normality test and this test revealed that residuals are normally distributed as its probability value is greater than 5%. Last test which is serial LM test, this test probability value is greater than 5% which indicates that there is no serial correlation in residuals.

Chapter 6

6. Conclusion

Financial inclusion is the least research area in Pakistan despite gaining a huge importance from the last few years. It helps in raising economic growth and development (Kelkar, V. (2010); Sharma, D. (2016), reducing poverty (Park & Rogelio, 2015; Pattillo, & Wagh, 2009), efficient allocation of financial resources Sarma (2008). The current study has been intended to fill this gap by examining the impact of foreign remittances on financial inclusion through constructing an Index of Financial Inclusion (IFI) for Pakistan through an updated data set (1980-2017). The study followed Sarma (2012) methodology to formulate IFI. This study further explored the index of financial inclusion (IFI) and the factors which may have impact on this index.

The study employed bound test of co-integration and used autoregressive distributed lag (ARDL) to analyze the data set. The econometric analysis confirms that index of financial inclusion (IFI), Remittances (REM), Gross domestic product (GDP) and literacy rate variables are non-stationary at level while taking first difference it become stationary, whereas Population and Age Dependence ratio (ADR) become stationary at level. The Bound test of co-integration analysis reveals that and there is a long run cointegration between financial inclusion, remittances and other explanatory variables. The estimated result found that there is a positive relationship between remittance and index of financial inclusion both in the long run and short run, which supports our hypothesis that whenever there is increase occur in the remittance it will change the IFI in the increase order. The study reached on this conclusion that the factors like remittances, population and age dependency ratio effects the index of financial inclusion i.e. all of these three indices have direct relationship with dependent variable (index of financial inclusion). However, literacy rate

has a negative and significant relation with index of financial inclusion. Moreover, we also found that, there is no significant relationship between the Gross Domestic Product and index of financial inclusion as the relation is insignificant. These all results are confirmed by the different studies that discussed in detail in the chapter 4 of the study.

6.1. Policy Recommendation

- Formulate and implement effective policies that encourage migrants' workers to remit through financial institution.
- Financial resources must be made accessible to people by banking policies that make it easy for general public to get loans.
- Reduced the remittance cost and transaction fees, which promote poor migrants to remit because they do not remit due to high cost in formal ways.
- Improve financial literacy in Pakistan that will further accelerate financial inclusion.
- Efficient usage of financial services in different sectors of economy, so when there is a raise in economic growth, financial inclusion will increase as well or vice versa.
- Government may take appropriate step to curtail informal financial channels i.e. hawala, hundi etc. used by people to send remittances.
- Government may form banking accounts for every Pakistani living abroad having nominal formalities help Pakistan diaspora to send remittances easily.
- TV, radio and social media programmes may be organized wherein financial experts may explain financial products available in the market and enlighten general public about the benefit of availing banking services.

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