Empirical Essays on Migration and Remittances in Pakistan

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ABSTRACT

In this dissertation, we develop four essays to analyse several aspects of migration for Pakistan on the basis of household level panel and cross-sectional data from 1986 to 2007. The aspects analysed are decision to migrate domestically and internationally, financing of migration, decision to send remittances and spill-over effects on remittances. These essays are presented in Chapters four through seven. Other chapters include a general introduction, literature review and concluding remarks and policy discussions.

Chapter four (essay one) studies the determinants of the two locational migrations (internal-and-international migration) using discrete choice models. The study begins by investigating migration as a whole and then looks at the more disaggregate choice. On the snapshot of migration as a whole we detect an intriguing size-composition effect on the household's probability of migration: the larger the household, the greater the probability of migration. On the other hand, the more dependants a household has (in terms of the number of children and young females), the less likely it is to have migrant member. This relation is by and large true for both types of migration – internal or international. We also find that the probability of migration is inversely related to the pre-migration initial (as observed at the beginning of the study period) landholding of the household. For a one-acre decrease in landholding will results in 11% increase in international migration relative to never migration, and comparatively it shows a 1.3% increase in internal migration. So it is most likely that households have depleted their landholding to raise finances for their migration.

Using the same dataset (of chapter four) in chapter five (essay two), we study the determinants of receiving remittances by constructing a Box-Cox double hurdle model for households. The first

hurdle deals with the decision to receive remittance, and conditional on participation, the hurdle deals with the amount or level of remittances. The first stage regression does reveal household characteristics such as household head age, number of children aged less than 11 years, and the district level fixed effects to be important for remittances, be it for internal or international migration. From these factors, it may be concluded that household level characteristics and regional factors are the important determinants for the probability of remittances. The second hurdle deals with the determinants of remittance amounts, conditional on being a remitter. The household head education and age appear to affect the level of remittances, unlike the participation results. Comparing the impact across the participation and the level of remittances received by the household, we find that both members travelling within and outside of the country are the important determinant for both hurdles. We find that there exists opposing effect of probability to receive remittances and the level of remittances at the district level.

Chapter six (essay three) studies the determinants of internal- and –international remittances by introducing the random- and –fixed effects by employing a multilevel econometric methodology to study the spread of remittances at different levels of spatial aggregation. Few studies use multilevel analyses on remittance data, but to the best of our knowledge, there is none for in the context of a developing country such as Pakistan. We use data from Pakistan Household Integrated Economic Survey of 2001-02, employing household-,village-, district-, province- and regional-level variables to understand how heterogeneities at these different levels impact on the probability of receiving (or sending) remittances, relative to other households in the same village or district. Our findings suggest that the determinants of internal remittances are different from those of international remittances. We find greater variation in the odds of receiving remittances (both internal and international) among households from same villages within the same district than those located in different villages within same district. Also with regional fixed effects, the correlation is refined and thus it becomes smaller.

In chapter seven (essay four), we empirically study the possible multiplier effect (spill over) triggered by remittances by using the Pakistan Household Integrated Economic Survey of 2007-08. While the existing studies provide a compelling empirical evidence of remittance income is more likely to be saved and invested in land, housing, and human capital, but it is unclear to what extent it contribute to the origin community. The existing literature is unable to answer the question whether remittances causes multiplier or spill-over effect. If they do exists, then to what extent? Motivated by the concern that the remittance can generate multiplier effects in origin communities. We investigate the role of household interdependencies of the remittances by exploiting a novel method of identification based on the comparison of the variance of household behaviour at the different level of aggregation within and between a different districts of Pakistan (Graham, 2008). This method allows for identification of two problems that arise due to self-selection and unobservable heterogeneity. We quantify the social multiplier of remittances to be 1.12, suggesting sizable spill-over between eighty one districts in Pakistan. Our result suggests that social multiplier in terms of remittances has contributed to the development of rural household of Pakistan.

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LIST OF ACRONYMS

AJK	Azad Jammu and Kashmir
ARL	Attock Refinery Limited
ARTEP	Asian Regional Team for Employment Promotion
BEOE	Bureau of Emigration and Overseas Employment
BPPEP	British Petroleum Pakistan Exploration and Production Inc.
EU	European Union
FATA	Federally Administered Tribal Areas
FBS	Pakistan Bureau of Statistics
FDI	Foreign Direct Investment
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HDR	Human Development Report
HIES	Household Integrated Economic Survey
IC	Intra class correlation
IFPRI	International Food Policy Research Institute
IFAD	International Fund for Agricultural Development
ILO	International Labour Organization's
IOM	International Organization for Migration
KNOMAD	Global Knowledge Partnership on Migration and Development
KPK	Khyber Pakhtunkhwa

KSA	Kindom of Saudi Arabia
LFS	Labour Force Survey
MDGs	Millennium Development Goals
MOIA	Ministry of Overseas Indian Affair
MOP	Ministry of Overseas Pakistanis
MPI	Migration Policy Institute
NELM	New Economic of Labour Migration
NWFP	Noth-West Frontier Province
ODA	Official Development Assistance
OLS	Ordinary Least Square
OR	Odd ratios
PES	Pakistan Economic Survey
PKR	Pakistan Rupee
POEA	Philippine Overseas Employment Agency
PPS	Probability Proportional to Size
PMU	Project Management Unit
PSLM	Pakistan Social and Living Standard Measurement Survey
PSUs	Primary Sampling Units
SAR	South Asian Region
SBP	State Bank of Pakistan
SSUs	Secondary Sampling Units
STAR	Student Teacher Achievement Ratio

UAE	United Arab Emirates
UK	United Kingdom
UN	United Nations
UNDP	United Nation Development Programme
USA	United States of America
WBG	World Bank Group Engagement
WU	Western Union
ZTBL	Zarai Tarqiati Bank Limited

Dedicated to

my parents,

wife

and

our children

For their endless love, support and encouragement.

CHAPTER ONE

INTRODUCTION

We begin with a discussion of the motivation of the dissertation building up to an overview of the following chapters exploring some important issues of migration and remittances in the context of Pakistan. Push and pull factors have long been the instigators of migration. The push factors are such as poverty, injustice, armed conflict, whereas the pull factors are better jobs and higher incomes at the destination places. These factors have led to, in international contexts, economically vibrant diaspora in different parts of the world. The origins of the diaspora are spread across the developing world, the South Asian diaspora being one of the largest ones. These migrant communities are known to be catalyst of important changes in their home countries. Likewise in the national contexts, migration benefits the source communities, well beyond individual households.

The significance of this research emanates from the fact that, according to the World Bank[1], there were 232 million international migrants (or 3.2 percent of world population) in 2013, an increase of 57 million (from 175 million) since 2000. The total stock of international migration from Pakistan has increased from 3.97 million in 2004 to around 7 million in 2013, an annual net increase of about 0.34 million workers. The remittances received in developing countries by international migrant stood at $404 billion in 2013, and the figure is expected rise to $516 billion

[1] Ratha et al., (2014), Migration and Development Brief 22

per annum by 2016. The share of remittances to the South Asia Region (SAR) stood at $111 billion in 2013. International migrant remittances to Pakistan reached to the $15 billion in 2013. Remittances in Pakistan continue to support the balance of payments, and were 284 percent of international reserves in 2013. In addition, share of remittances to the Pakistan Gross Domestic Product (GDP) stood at the 6 percent in 2012. The remittance shares are much larger than Foreign Direct Investment (FDI) and Official Development Assistance (ODA) in Pakistan. According to World Bank, the surges in remittances in developing countries are due to reduced remittance costs, exchange rate movement, and improved employment conditions in the destination countries.

One of the main paradigms of migration analysis is the neo-classical theory, which assumes that individuals make the migration decision, and they do so in accordance with rational cost-benefit calculation (Borjas; 1989, Borjas and Bronars, 1990). A modification of this approach, known as the New Economics of Labour Migration (NELM) due to Stark and Bloom (1985), Stark and Levhari (1982) and Stark and Taylor (1989, 1991) models migration not as an outcome of an individual's decision to migrate but that of the household the individual belongs to. Thus, in this approach household member collectively act not only to maximize their expected income but also to minimize risks and to overcome the constraints associated with a variety of market failures (such as capital and insurance market that are imperfect, inaccessible, or non-existent). Given these sorts of market failures, which are common in developing countries, people migrate not only to reap a higher benefit but also to manage risk and gain access to capital. Unlike individuals, households are in a better position to diversify their allocation of labour to control risks to their economic wellbeing. So, migration is viewed as a household response to income risks, since remittances serve as income insurance for households in the country of origin (De Haas, 2005).

Migration may result from an individual strategy to boost income or a household strategy to diversify risk. Migration may be assisted by the presence of other migrants in the community who provides the relevant information about a network. The underlying mechanisms that explain migration may differ depending on whether households or individuals are considered (Garip, 2014). Our research is in the perspective of the NELM, and in this thesis migration and remittances are considered as household decisions.

The increase in international migration has attracted the attention of many researchers (sociologists and economists), who study the impact of migration and remittances flows in origin communities (micro data), or their impact on receiving countries (macro-level data) in the past two decades (DiMaggio and Garip; 2012). The centrality of remittances for households in the process of migration has been extensively studied in the context of migration-development nexus, as well as being important discourse around poverty-alleviation and development (Adams and Cuecuecha; 2010). In several countries remittances have the potential to act as a top source of investment capital, support governments and local economic development during economic crises (Cohen, 2011).

Remittances are not only important to the balance of payments of a country, but also because they provide a risk diversification opportunity to many households, by insuring income and consumption smoothing against domestic market failures. The remittances received by many migrant-sending households are proved to be poverty reducing and to improve livelihood for many beneficiaries through direct and indirect effects (De Haas, 2005). Remittances usually go directly to poor households by avoiding pockets of corrupt government officials (Kapur, 2003). This research tries to understand the complex link between migration and remittances; in particular, the socio-spatial perspective, uneven geographical development and multiplier effects have rarely been framed in terms of a systemic analysis. This thesis is an attempt to relate internal and international migration, in particular, it aims to unravel how both types of migration link with

pre- and –post migration wealth and socio-spatial relations through remittances. Hence, on the one hand, this thesis examines the determinants of internal-and –international migration from rural Pakistan; on the other, it explores the role of remittances at district level, with particular, with reference to their contribution within- and –between districts.

The specific focus of this thesis is differential migration, remittances, and development patterns in rural Pakistan from 1986 to 2007. In this period, migration and remittances turned out to be an integral part of Pakistan's economy and provided a livelihood for many households. Pakistan provides an interesting case for unravelling the social change and community development that occurs due to the sheer size of migrant remittances.

Chapters four and five, chapter six and chapter seven use three different data sets. Chapters four and five are based a panel dataset collected by the International Food Policy Research Institute (IFPRI) on four selected districts: Faisalabad and Attock in Punjab, Badin in Sindh, and Dir in North-West Frontier Province (NWFP[2]) which were chosen using the district ranking methodology of Pasha and Hassan (1982) from 1986-91. Chapters six and seven are based on two different cross sectional household survey data (Household Integrated Economic Survey) covering the whole country for 2001-02 and 2006-07.

In chapter four, we create two sub-samples. The one consist of all sampled households, with or without out-migrants, and in the latter case regardless of the destination of the migration. In the second sample, households are categorized into three groups; (i) households with no migration; (ii) households with internal migration; and (iii) households with international migration. We begin our analysis by first studying migration as a whole. Thus, in the first regression, the

[2] Formally known as the North-West Frontier Province (NWFP); Khyber Pakhtunkhwa is one of the four provinces that comprises Pakistan. In April 2010, the constitution of Pakistan was amended and the former NWFP renamed to Khyber Pakhtunkhwa (KPK). This thesis identifies the province as NWFP because the first data (1986-91) was collected under this name and also for consistency throughout the thesis.

dependent variable, out-migration, is set to one if the household has reported out-migration, and zero otherwise. In the second regression, the discrete outcome variable represents different forms of migration, where regressors vary across the aforementioned alternatives. We use data for both households and individuals and also use fixed effects at the district level.

Using the same dataset of Chapter 4 we study the determinants of receiving remittances by constructing a Box-Cox double hurdle model for households in the chapter 5. Even though, there is extensive research on the issue of migration and remittances, only limited work is focused on this aspect in Pakistan, which comes in the world top ten remittances receiving countries. We fill this gap in the literature by analysing the determinants of remittances, employing the Box-Cox double hurdle model using the panel data described above. In particular, the return on migration whether internal or international is given by the level of remittances, if one wishes to model remittances, they have to be aware of the large number of zeroes in the data. The motivation behind using the Box-Cox double hurdle model in remittance's study is that there is a large cluster of zero-s denoting households receiving no remittances. The double hurdle approach proposed by Cragg (1971), overcomes these and other econometric problems that arise when the dependent variable takes a value of zero in a logarithmic regression, which is the case with non-remitters in our model. The data panel contains information on 973 households for five years to approach our research question from the receiving household's perspective.

It has the limitation that it does not distinguish between internal and international remittances. In the data set, remittances information is listed under a variable labelled `remittances` instead of the two separate variables --internal and international remittances. By using supporting information on the migration status – internal or international—we could distinguish between the sources of remittances, but we have chosen not to do so due to the possibility of measurement error and other data complications that might arise. In light of this, our paper treats remittances –internal or international—uniformly as additional inflow of income for households. Our aim is to analyse the

factors that play an important role in determining the probability, and the amount of remittances received by the households from the migrants who are currently abroad.

Then in Chapter 6, we use data from Pakistan Household Integrated Economic Survey of 2001-02, employing household-village- district- province- and regional-level variables to understand how heterogeneities at these different levels impact the probability of receiving (or sending) remittances, relative to other households in the same village or district. In this study we employ a multilevel econometric methodology to study the spread of remittances at different levels of spatial aggregation. Few studies use multilevel analyses on remittance data, but to the best of our knowledge, there is none for in context of developing country such as Pakistan. The data set consists of 14,831 households (level-one) nested within 1,050 villages (level-two) which are further nested in 147 districts (level-three) into two region (rural versus urban) and four provinces. Many studies have analysed the impact of remittances on recipient countries but study of remittances at various level of spatial aggregation has received limited attention that affect individuals, families, communities, and indeed whole country. From each regression (internal-and –international remittances), we obtain the correlation coefficients for two randomly selected households from the same village and same district (denoted $\rho_{(village,district)}$) in terms of the probability of receiving remittances (internal or international) and the correlation coefficients for two randomly selected households residing in two different villages within the same district (denoted $\rho_{(district)}$).

The research on migration or remittances may suffer from methodological concern that remittances are in general not randomly allocated across households, so any observed relation between household outcome in term of remittances or migration may reflect the influence of unobserved factors. The households that have more members working abroad will receive larger remittances or the households that recently experienced a natural calamities might send members abroad to make up lost income (Yang, 2008). The household level unexplained heterogeneity should be accounted for in the empirical analysis of remittances.

Research on the migration or remittances suggests that community differential structure and social networks impact remittances outcomes. These finding provide evidence that supports the Hierarchical Models and suggest that there are critical mechanisms that produce varying outcomes, which yet to be systematically explored (Garip and Western, 2009). In hierarchical models, households are nested in social contexts—like village in district—whose effect are thought to shape household outcomes. Researchers rarely study model investigate aggregate patterns of variation by including fixed and random effects. We present an analysis of Pakistani remittances data, in which households are nested in villages and villages in districts. Through the unexplained heterogeneity, we calculated an inter- and intra-village correlation to study how remittances are distributed between two randomly selected households from same village within same district than between two different villages from same district.

A similar dataset from 2007-08 is studied in Chapter 7, where our attention shifts to studying peer effect in migration. In this chapter, we go beyond the existing literature to investigate multiplier effects triggered by remittances in rural households by using the data set of Household Integrated Economic Survey of 2007-08. Our unique data in context of Pakistan allows us to compare the magnitude of multiplier effects across different districts in rural areas (81 districts), while taking into account of household-level characteristics along with prior measure of asset holding. It thus provides an opportunity to investigate whether the multiplier effects uncovered in existing literature are confined to the specific households or districts receiving remittances. At the same time, our comparison of the magnitude of multiplier effects across different districts of Pakistan provides new evidence on what drives these multiplier effects. It is believed that remittances, like many other economic activities, have social interaction, which often is labelled as neighbourhood or multiplier effects. In this paper, we use the term ‘multiplier effects’. However, despite the economic importance of multiplier effects, empirical evidence for such effects for the remittances is yet to be understood in fullest. The handful number of studies on the labour market provides

evidence of multiplier effects in the workplace due to the knowledge spill over (Cornelissen, et al. 2013). Still it is unclear to what extent these findings can be extended to remittances.

The rest of the chapter is organised as follows. The next seven sections of the chapter present an overview of each of the six chapters and in particular highlight how each chapter contributes to the existing body of knowledge. Finally, Section 1.7 outlines the structure of the remainder of the thesis.

1.1 Chapter Two

Chapter two provides relevant (aggregate) background information on migration patterns from Pakistan to overseas (and internally) (for instance, where people migrate to), as well as a breakdown of total remittances coming into Pakistan from various regions. It provides information on which parts of Pakistan from – city or province, migration takes place significantly. Chapter two also presents the motivation to perform this study in the context of Pakistan and highlights the importance of migration and remittances as a steadily growing external source of capital for the economy. Over the last decade, the sheer increase in migration and remittances attracted attention of not only many researchers but also international agencies like World Bank Group Engagement (WBG), such as the Global Knowledge Partnership on Migration and Development (KNOMAD), which play important roles in collecting data, generating and synthesizing knowledge on migration and remittances issues for sending and receiving countries. Similarly, Bureau of Emigration and Overseas Employment (BEOE) collects data on migration, whereas, the State Bank of Pakistan (SBP) compiles data for remittances in Pakistan. The data for chapter two analyses is mostly drawn from the BEOE, SBP, and various issues of the Pakistan Economic Survey (PES).

The aggregate data on remittances (all current transfer in cash or in kind made or received by resident households to or non-resident households as defined by IMF) come from balance of payments data provided by each country central bank to the International Monetary Fund (IMF). The central banks rely on money transfer operators (private banks, Western Union) and other institution (Post offices) to provide reports on the transaction they process. However, there is an evidence of miss reporting in some instances.

1.2 Chapter Three

Chapter three presents an overview of the literature related to the four essays contained in this thesis. In particular, it outlines the important advancement in the existing body of knowledge on migration and remittances based on why a member of household chooses to migrate and then choose to send remittances. For this reasons, a comprehensive understanding of the migration (remittances) theories and empirical literature is necessary to uncover underlying reasons behinds it. The past literature provides an opportunity to link it with new findings. The areas of migration and remittances are so tightly intertwined with each other. This overlapping concept distinct depending on the different nature of research questions set for each chapter in the following discussion. This study not only tries to understand that how well these remittances are distributed between villages and districts but also try to identify their multiplier effects at the district level.

1.3 Chapter four

The thesis begins by investigating how the initial wealth and loan (wealth and loan prior to migration) of internal-and-international migration households relative to never migrant households explains the divergent migration outcome observed in the four districts from 1986 to 1991. The household initial wealth is commonly conceptualized as resources of assistance households need in absence of well-functioning credit market in rural Pakistan to cover the costs and risks of migrating. Several studies, provide evidence that access to initial wealth increases the

individuals' likelihood of migration (Mines and Massey; 1985 and Rozelle et al., 1999). The empirical finding also suggest that initial wealth can work in different ways for different households (Haddinott; 1994, Massey et al., 1990, Zhang and Song; 2003), yet these ideas lack unanimity among researcher. In our data set, the migration variable may be predetermined. This means the unobserved variable may be correlated with both past migration status and the current wealth of household. If so, then our estimated impact of wealth on migration could reflect influences of these unobserved variables. In this case, it is difficult to determine whether wealth induces migration or the reverse. In our analysis, we addressed this concern by including a measure of migration-wealth interaction in the year 0, as an explanatory variable in the estimation. At the beginning household members face two decisions - to migrate (regardless of destination) or stay at home. If a household member decides to migrate in year 0, then we generate post-migration initial wealth variables by interacting initial wealth and migration dummy. Similarly, pre-migration initial wealth variables are generated by interacting initial wealth by one minus migration dummy.

We use the logit model for dichotomous migration choice at first place and then we use the multinomial logit model for three discrete distinct choices; never migrant households, internal migrant households, and international migrant households. Distinguishing among these choices is important because each choice can influence individual migration behaviour in different ways, which is confirmed by our results. The motivation behind studying the internal-and-international migration is described by Czaika (2012; 125) as:

"*The links between internal and international migration have recently begun to attract attention at the international policy level, especially in response to concerns by developed countries over migrant flows. Important questions are whether today's internal migrants are tomorrow's international migrants; whether international migration and internal migration are substitutes for each other; and whether internal and international migrants share the same profile. Needless*

to say, the answers depend very much on the local context and thus can only be arrived at through location-specific case studies".

Our primary focus is the question of whether internal-and-international migrants' household share the similar set of determinants in Pakistan. The studies by Czaika, M. (2012), King and Skeldon (2010), Skeldon (2006), Ghatak, et al. (1996), and Massey et al. (1993) provides a range of possible determinants of internal and international migration. We find a common set of determinants for both internal and international migration, but also some differences related to initial wealth that household owns prior to migrating whether internally or internationally to afford some higher costs for migration to different destinations.

The results provide evidence that a household's human capital and specific assets are key determinants for alternative locational migration behaviour. On the snapshot of migration as a whole we detect an intriguing size-composition effect on the household's probability of migration: the larger the household, the greater the probability of migration. On the other hand, the more dependants in a particular household (in terms of the number of children and young females), the less likely it is to have migrant member. This relation is true for both types of migration – internal or international. We also find that the probability of migration is inversely related to the pre-migration initial landholding of the household (as observed at the beginning of the study period). A one-acre decrease in landholding will result in an 11% increase in international migration (relative to never migration), and comparatively it shows a 1.3% increase in internal migration. However, the probability of both types of migration – internal or international is also negatively related to the pre-migration money borrowed from informal sources. It follows that households are unlikely to raise finances from the informal sector. This seems to suggest that poor families are more likely to migrate either within the country or overseas. But this is somewhat questionable, because migration is costly, even within the country. If the poorer sections of society were migrating, we would expect to see a positive relationship between loans taken and the probability of migration. Instead we see that the probability of

migration is unrelated to loans taken. It is more likely that households deplete their landholding to raise finances for their migration.

1.4 Chapter five

The finding of the fifth chapter attests to the vital importance of the migrant remittances in shaping household members' migration choices in the Pakistani setting. Prior work in the literature in other settings finds that the remittances over time can also initiate a process of further migration in receiving household through which migration flows become self-sustaining.

The presence of a household member in destination countries could result in building social network (as interpersonal ties linking kin, friends, and community members in their places of origin and destination) and creating close relationship or ties to institution and organisation that help kin, friends, and community members to migrate, get jobs, or adjust to society in the destination countries. In short such networks link potential migrants in origin areas with others—often-family members—in destination areas (Garip, 2008). Extensive empirical evidence documents that past migration becomes a primary engine for future migration flows (Garip and Western; 2009). Using the same dataset of Chapter 4 we study the determinants of receiving remittances by constructing a Box-Cox double hurdle model for households. The first hurdle deals with the decision to receive remittance. An implicit assumption is that the decision to migrate as well as sending remittances is taken at the household. There are some migrant households, who decide not to receive remittances until the migrant permanently returns home, and there are households who would instruct their migrant members to remit regularly. The first stage regression, does reveal household characteristics such as household head age, number of children age less than 11 years, and the district level fixed effects to be of important for remittances, be it for internal or international migration. From these factors, it may be concluded

that household level characteristics, and regional factors are the important determinants for the probability of remittances.

The second hurdle deals with the determinants of remittance amounts, conditional on being a remitter. It is interesting to note that household head education and age appear to affect the level of remittances, unlike the participation results. Comparing the impact across the participation and the level of remittances received by the household, we find that both members traveling within and outside of the country are the important determinant for both hurdles. This result confirms that households that have sent migrants, are improving their welfare by receiving greater welfare, but that depends on the households remittances and its capacity to send multiple member. Moreover, presence of male and the money loaned to other households positively affects only the level of remittances, but for participation, it was not statistically significant. This suggests that remittances also serve as an insurance mechanism for other household in rural Pakistan. We find that there exists opposing effect of probability to receive remittances and the level of remittances at the district level.

1.5 Chapter six

Though multilevel modelling in the area of migration and remittances is not new, it is not very common, possibly due to data limitations (DiMaggio and Garip; 2012). It is important to take into account several levels of analysis while studying the behaviour of migration and remittances. The use of a multilevel model enables us to consider community features such as economic structures and society as a group in the analysis. Few studies use multilevel analyses on remittance data, but to the best of our knowledge, there is none available in the context of Pakistan. In this chapter we are able to specify as many as five levels of a hierarchy of random effects—at household, village, district, region, and province levels, however of these five levels only three have unobserved random heterogeneity. The clustering of observations within layers of different context creates

data more challenging for analysis. The random effects have important implications for substantive conclusions for calculating inter-and-intra village correlation. In our analysis, three level hierarchical models provide a convenient framework for studying internal and international remittances outcome with fixed and random effects. We are also interested to focus on how the remittances (internal versus international) within villages and between villages is associated with a household's likelihood of receiving remittances. It is reasonable to expect that household to receive remittances become more likely if they live in a village in which many others have migrated. According to Garip and Western (2009), this phenomenon is called the cumulative causation of migration. Our findings suggest that the determinants of internal remittances are different from those of international remittances. The effects of household characteristics tend to vary between internal and international remittances, and that too get further modified when we introduce regional fixed effects. We find that presence of the female member in the household determines only internal remittances. However, land holding is positively related to the international remittances. The household size is more robust determinant of the international remittances rather than internal remittances. We also study the village and district level unobservable heterogeneities. For this purpose we calculate the odds ratio of two randomly selected households' prospects of receiving internal and international remittances, in two cases – in one, two households are located in the same village within the same district, and in the other, they are located in two different villages within the same district. We find greater variation in the odds of receiving remittances (both internal and international) among households from same villages within the same district than those located in different villages within same district. Also with regional fixed effects, the correlation is refined and thus it becomes smaller. Results of IC and OR support the notion that migrants remit less to households that are from different villages than the same village may be due to the networking, which is theorized to be associated with access to information within or outside the country regarding employment opportunities.

1.6 Chapter seven

The overall impact of remittances on economic activities for the origin communities is still unclear. Whether it induces more investment or consumption and its impact on migration decisions of other community members is positive or negative are still open questions. But some sort of communication and social interaction between migrant and non-migrant households at origin communities exists. The coexistence of migrant versus non-migrant households produces "peer pressures". This kind of interaction in economic literature is also called "knowledge spillover" or "social network" (Cornelissen, et al. 2013). In sociology this kind of social network is labelled the cost reducing factor of migration. Most of the empirical studies have estimated the social multiplier in a diverse area such as schooling performance, financial decision and criminal behaviour, but no study has gone beyond the conventional wisdom to study the remittances as an outcome variable to estimate the spillover or multiplier effects. In this chapter, we empirically study the possible multiplier effect (spillover) triggered by remittances by using the Pakistan Household Integrated Economic Survey of 2007-08. We investigate the role of household interdependencies of the remittances by exploiting a novel method of identification based on the comparison of the variance of household behaviour at the different level of aggregation within a different district of Pakistan (Graham, 2008). This method allows for identification of two problems that arise due to self-selection and unobservable heterogeneity. We quantify the social multiplier of remittances to be 1.12, suggesting sizable spill-over. Our result suggests that social multiplier in terms of remittances has contributed to the development of rural household of Pakistan.

1.7 Structure of the thesis

The remainder of the thesis is structure as follow. The chapter 2 which examines the historical overview of migration and remittances in Pakistan. Chapter 3 presents the literature review of four chapters covered in this thesis. Chapter 4 presents the substantial chapter of determinants of internal- and –international migration from rural Pakistan, while chapter 5 presents the determinants of remittances using Box-Cox double hurdle model. In chapter 6 we employ a multilevel econometric methodology to study the spread of remittances at different levels of spatial aggregation. Similarly, in this chapter 7, we go beyond the existing literature to investigate multiplier effects triggered by remittances in 81 rural districts of Pakistan. Finally, chapter 8 outlines the key findings and implications of the four chapters and the potential areas of future research.

CHAPTER TWO

Historical Overview of Migration and Remittances in Pakistan

2.1 Introduction

This chapter presents my motivation to perform this study in the context of Pakistan and highlights the importance of migration and remittances for reshaping the lives of many destitute households. Pakistan is among the top ten remittance recipient countries in the world. The total stock of international migration from Pakistan has increased from 3.97 million in 2004 to around 7 million in 2013, an annual net increase of about 0.34 million workers [3]. There represents over a ten-fold increase in official remittances from around $1 billion in 2001 to approximately $15 billion in 2013. According to some estimates, the actual remittances flow to Pakistan could be around more than $20 billion, if the remittances channelled through the informal sector are included. According to the 2009 United Nation Development Programme (UNDP) on Human Development Report, globally the number of those who moved within their countries was nearly four times larger (740 million) than the 3% of the world population who moved internationally (214 million). Associated with migration are remittances, which may be called "unrequited transfers" unlike other financial flows such as debt, or equity flows (Kapur, 2003), and provides a safety net to the poor.

This chapter aims to provide an overview of issues relating to migration and remittances. We focus on the international migration from Pakistan and domestic migration within Pakistan, but

[3] Amjad, et al. (2012) study analyses the country-wise stock of overseas Pakistanis together with the historical annual amount of remittances received in Pakistan from 2001-2012. However, it is a descriptive study with some insightful discussion related to informal sector involvement in the transfer of money. This study finds that the total remittances flow to Pakistan could have been around $20 billion instead of the $12 billion officially declared.

not on the migration into Pakistan such as the refugee influx from Afghanistan. The data is mostly drawn from the Bureau of Emigration and Overseas Employment (BEOE), which is a branch of the Ministry of Labour and Overseas Pakistanis with the main objective of promotion and regulation of labour migration to other countries. The BEOE reports gross flows of migration only and they do not take into account return migrants. The figure of migration should not be confused with the net migration rate in Pakistan. Other sources include the World Bank, the State Bank of Pakistan (SBP), and various issues of the Pakistan Economic Survey (PES).

2.2 Internal migration

It is more difficult to estimate the exact share of internal migrants in any country due to it nature and different patterns such as urban to urban migration, rural to urban migration, rural to rural migration, displacement due to projects, migration from arid areas, migration of share-tenants, pastoralists and seasonal migrants. Urban areas account for more than 60 percent of all domestic migration in Pakistan. Half of the total lifetime internal migration (greater than ten years) are inter-district migrations (intra-province), and about a quarter are due to inter-province migration (Karim and Nasar; 2003). Availability of basic public amenities in urban areas (Mann, 2003) and individual human capital endowment (Akram, et al., 2001) along with higher wages in urban areas (Guzdar; 2003) are positively linked with internal migration. The following strand of literature particularly focuses on the provinces of Pakistan to highlight inter-district (intra-province) and inter-province migration by using the 1998 census data. In the Noth-West Frontier Province (NWFP), 69 percent of internal migration is inter-district (intra-province), while 15 percent is inter-province (Khatak; 2004).

The districts of Karachi, Lahore and Rawalpindi account for more than 33 percent of the total internal migration in Pakistan, according to the 1998 population Census. The Karachi district

alone embraces around 13 percent of all immigrants, suggesting a strong regional influence for urban immigration. Thus, it suggests that the urban cities of Punjab and Sindh are the main destination for internal migrants, however, migration patterns in Punjab are from rural or other urban areas of Punjab. The migration pattern in Sindh, especially in Karachi is mostly from other provinces such as NWFP, Punjab and Balochistan. There is very little emigration from Sindh to other provinces. This pattern of migration from rural to urban areas, especially migration from NWFP to Punjab and Sindh does conform to a basic poverty-migration linkage. It seems that there is a historical link between migration from arid areas of NWFP and Punjab to irrigated regions of Sindh and southern Punjab.

2.3 International migration

Mohammad (1999) describes the four distinct migration movements from Pakistan during these decades. The first movement consisted of unskilled and semi-skilled labour to Britain in the 1950s. The second movement is that of migration of qualified professionals (the so-called "brain drain") to Britain, the USA, Canada and the Middle East (contract migration to the Middle East with a condition to return to Pakistan) in 1960s and 1970s. The third movement of migration continued to the aforementioned countries with less intensity, which may be due to more restrictive border controls, since the mid-1980s. The fourth and current wave of migration is to the USA, Canada and Australia for permanent settlement resulting from the immigration policies of these countries. On the other hand, internal migration from rural to urban areas is an on-going process due to multiple factors such as education (post graduate and professional level), better infrastructure, employment opportunities, higher fertility, returned international migrants preferring to reside in urban areas and reduction in psychological and social costs.

The first flow of international migration started to the United Kingdom primarily from the districts of Mirpur, Faisalabad, Attock, Rawalpindi, Jhelum, Gujrat and Peshawar in the 1950s. However, from 1965 we witnessed an increase in international migration to the US due to relaxed immigration policies and introduction of the quotas system. It was followed by a migration to Middle East in 1970s due to the exploration of oil. The Middle East currently has the highest concentration of overseas Pakistanis in residence. Almost 2 million Pakistanis migrated to the Gulf region in early 1980s, initially to work as construction labourers but subsequently their demand switched to other sectors such as trade, transport, social infrastructure and security services. This trend was followed by student migration from well-off families to Western Europe and North America in the late 1980s[4].

The historical international migration from Pakistan can be broadly divided into two strands of literature, migration to the Middle East and to developed countries.

2.3.1 International migration to Middle East

The coastal region of Balochistan was once a part of the Sultanate of Oman before 1958, when it was merged into Pakistan. Before 1970s, this long established cultural and political connection resulted in a first wave of migration, specifically from these regions to Oman. This was followed by a second wave of migration induced by a Middle East oil boom in the 1970s, which attracted immense unskilled labour from the majority of rural areas. The migration from these areas brought material and economic prosperity. However, by the early 1980s, the Middle East started

[4] Guzdar (2003) descriptive study provides an overview of issues relating to migration and poverty in Pakistan. Migration is approached from the perspective of vulnerability, rights and political sustainability. This study tried to answer three complex and interrelated questions. Firstly, what are the main forms of migration that are significant from the point of view of poverty and public policy? Secondly, how have researchers, activists, and policy-makers dealt with these forms of migration? And, finally, what are the keys issues for future research, activism and policy for the main types of migration?

reaping the benefits of the oil led economic boom in the majority of Middle East countries. Due to the labour and skills shortage in the Middle East region the door opened for migration from many Asian countries, which dramatically changed the traditional patterns of migration from unskilled labour to semi-skilled and skilled, especially from Pakistan. The migration was not solely confined to Saudi Arabia, Kuwait and the United Arab Emirates, but it quickly dispersed to other countries comprising Qatar, Bahrain, Oman, Iraq and Iran.

The inconsistent economic policies directly linked with political instability and nationalization of industries in Pakistan not only encouraged labour migration but also flight of capital to the Middle East. Due to it expanding nature of industrial, commercial and financial activities, the Middle East economies developed in regional commercial hubs. This period was followed by a trend of reduced economic activities in the region due to the 1991 Gulf War, which resulted in repatriation of many migrants, particularly from Kuwait. This unrest in the Gulf region transformed the demand of labour from unskilled to more skilled and educated not only from the traditional region of (NWFP), Punjab and Azad Jammu and Kashmir (AJK) but also from other regions of Pakistan. After 2000s, Pakistani diaspora have gain access to the labour market of Malaysia, South Korea, Thailand, and Hong Kong.

It may be concluded that Middle East and Pakistan's cooperation in trade, investment and labour market access not only transformed the lives of many households in Pakistan but also at a macro level helped to improve country imbalances ranging from strengthening of the foreign exchange reserve to improving the budget and trade deficit.

2.3.2 International migration to developed countries

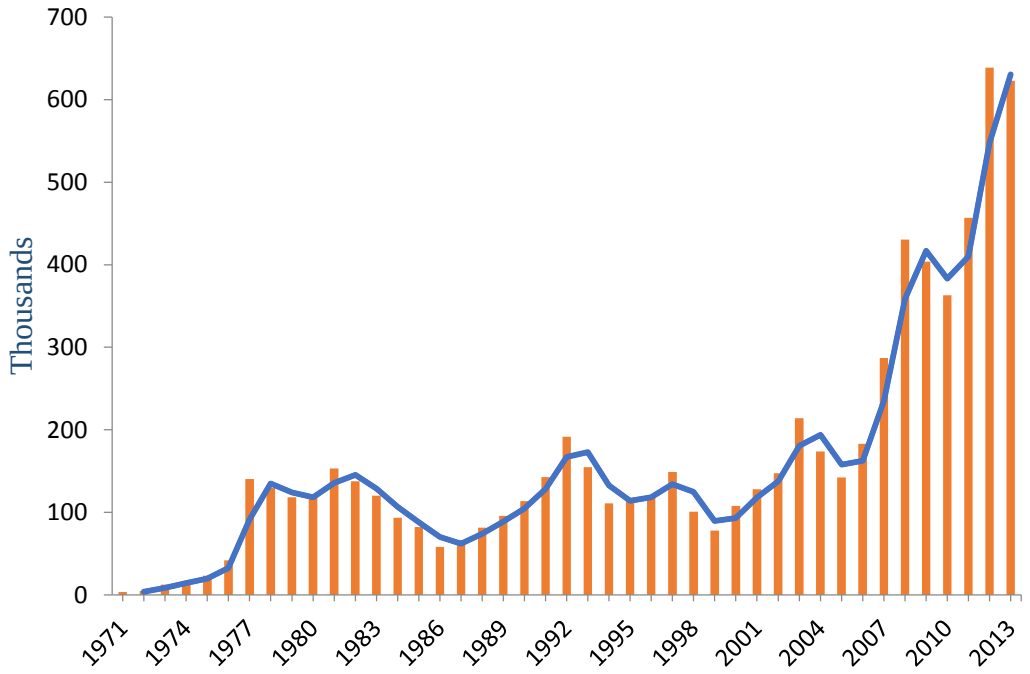
The share of Pakistani origin international migrants in developed countries stand at around 2 to 3 million (Burki, 2011). There is a historical link between Azad Jammu and Kasmir (AJK) and migration to the United Kingdom (UK). During the colonial period, many males from AJK were employed in maritime activities and resulted in the first wave of migration to UK. However, the second wave of youth migration started in the 1950s and 1960s to the UK, due to the displacement of the many people as a result of the water storage project in this area. The UK government being an international guarantor for the irrigation project granted migrant status to a large number of people as a compensation package (Guzdar, 2003). This was followed by a settlement of the migrant families and dependants in the UK. In comparison, the migration to North America were proceeded by more professional and educated men, particularly in the field of medicine, which later resulted in the settlement of migrant families and dependents in North America in the 1970s. In the 1980s, due to martial law many people migrated to Western Europe and North America to avoid social and political suppression in Pakistan. However, during the late 1980s and early 1990s many students went to the European Union (EU), North America and the UK for studies which was later followed by a similar pattern of settlement of families and dependents. Similarly, the 1990s witnessed a migration not only to East Asian countries such as Japan and South Korea but developed countries as well (on visitor visas and then overstaying illegally).

Figure 2.1 shows a histrorical trend of international migration in Pakistan (1971-2013). Pakistani Diasopra is comprised of around more than 7 million, which is around 4 percent of the country's population. The Bureau of Emigration and Overseas Employment (BEOE) was established in October 1971 under the direction of the Government of Pakistan. It is responsible for managing a substantial share of workers pursuing formal employment abroad. BEOE registered that around 3,534 migrants moved abroad for employment in the year 1971 with increasing to around 140,445 in 1977. However, this decade (1971-1980) witnesses the highest average annual growth rate of international migration to around 57.5 percent. This migration resulted due to the

separation of East Pakistan (Bangladesh), political unrest and nationalisation of industries. Yet again, this is followed by increasing trend in migration from 1987 to 1992. The 1980s observes the lowest average annual migration rate to around 1.64 percent with a substantial decrease in the annual rate from 57.5 percent. The next decade in 1990s repots annual migration rate to 2.74, greater than the last decade.

Many Pakistani migrants had to unexpectedly return home with the outbreak of the Gulf war in 1990s and consequent decreased economic activities in the Middle East, as is evident from Figure 2.1, which has been a traditionally major destination for Pakistan's international migrants. The aftermath of 9/11 and the global recession of 2008 launched a backlash on the immigrants and witnessed tougher immigration policies in the developed countries, but these factors did not curb migration from Pakistan.

Figure 2.1 Emigration from Pakistan (1971-2013); Source: BEOE



The increasing trend of migration is related to multiple factors. Firstly, the Pakistani diaspora is concentrated in countries like Saudi Arabia, UAE, and Gulf Cooperation Council (GCC)

countries (including Bahrain, Kuwait, Qatar and Oman) which have less hostile immigration controls. Secondly, internal security issues in Pakistan (suicide attacks, target killing, radicalisation, and sectarianism) encouraged (religious) minorities to migrate to countries that are considered safe, secure and also economically promising. According to the Ministry of Overseas Pakistanis, almost 2.7 million Pakistani migrated in last five years. The average annual migration growth rate in three years (2011-2013) increases to 21% from 16% in 2000s.

Figure 2.2 Skill-wise Emigration from Pakistan (1971-2013); Source: BEOE

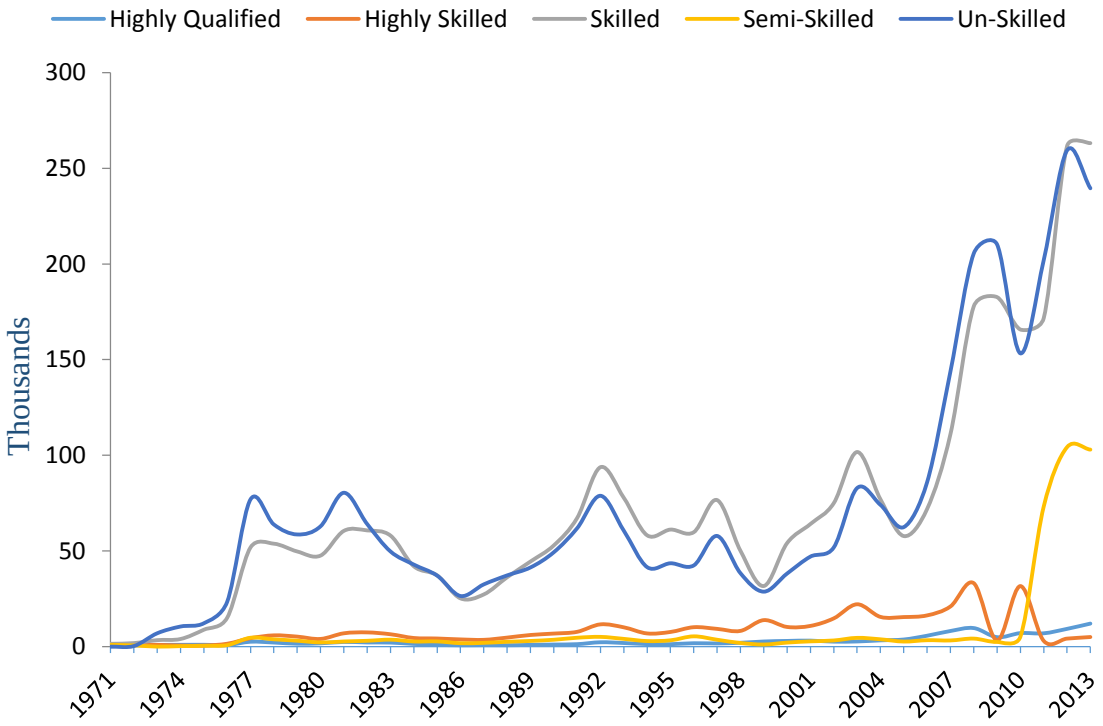


Figure 2.2 shows the skills classification of Pakistani migrant workers, are divided into five main categories comprising of highly qualified, highly skilled, skilled, semi-skilled, and un-skilled[5].

[5] The highly qualified category of emigration from Pakistan includes Doctor, Engineer, Accountant, and Manager. Additionally, highly skilled category comprises of Nurse (M&F), Foreman/Supervisor, Technician, Operator, Surveyor, Carpenter, Computer Programmer/Analyst, Designer, Pharmacist, Rigger, Draftsman, Photographer, and Artist.

The migration of the Pakistani professional (highly-qualified) such as doctors, IT experts and scientists to foreign countries shows an increasing trend during recent decades. However, highly qualified, highly skilled, semi-skilled migration has a comparatively small share than skilled and un-skilled. The historical share of highly qualified migration stands at around 2 percent, while the share of highly skilled and semi-skilled migration is around 5 and 6 percent of the total stock of migrants respectively. Interestingly, the largest share is represented by the skilled and un-skilled migration which stands at around 43 and 44 percent, respectively of the total stock of migration from 1971 to 2013.

The decade wise share of each category of migration highlights the changing pattern of the migration. The share of highly qualified, semi-skilled, and high skilled is around 5, 6, and 8 percent respectively, although the highest shares are represented by the skilled and un-skilled at around 37 and 44 percent respectively in 1970s. However, there was a decreasing trend, particularly of skilled and un-skilled migration in the first half of the 1980s that are recovered in second half of the 1980s. In the 1980s, the share of highly qualified, semi-skilled, and highly skilled were around 1, 3, and 6 percent respectively, witnesses a substantial decrease in the share of each category. Whereas, the skilled migration is around 45 percent (with an increase of 8 percent than 1970s) and shares of the un-skilled migration are almost stable at around 45 percent. However, the 1990s shows a quite stable share of each category in the out-migration but with a decreasing trend in the major categories, such as skilled and un-skilled. The share of highly qualified increases from 1 percent to 2 percent, semi-skilled same at 3 percent, and high skilled increases from 6 to 8 percent, while share of skilled migration increases from 45 to 49 percent, and un-skilled migration decreases from 45 to 38 percent in 1980s to 1990s. Similarly, the share

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Similarly, skilled category contains Welder, Secretary/Stenographer, Storekeeper, Clerk/Typist, Mason, Carpenter, Electrician, Plumber, Steel fixer, Painter, Mechanic, Cable jointer, Driver, Tailor, Fitter, Denter, Goldsmith, Blacksmith, and Salesman.
However, semi-skilled category includes Cook and Waiter/Bearer.
Finally, un-skilled category comprises of Agriculturalist, Labourer, and Farmer.

of highly qualified, semi-skilled, and high skilled are around 2, 2, and 8 percent respectively, although again, the highest shares are represented by the skilled and un-skilled around 44 and 44 percent respectively in 2000s.

Figure 2.3 Country-wise Emigration (high) from Pakistan (1971-2013); Source: BEOE

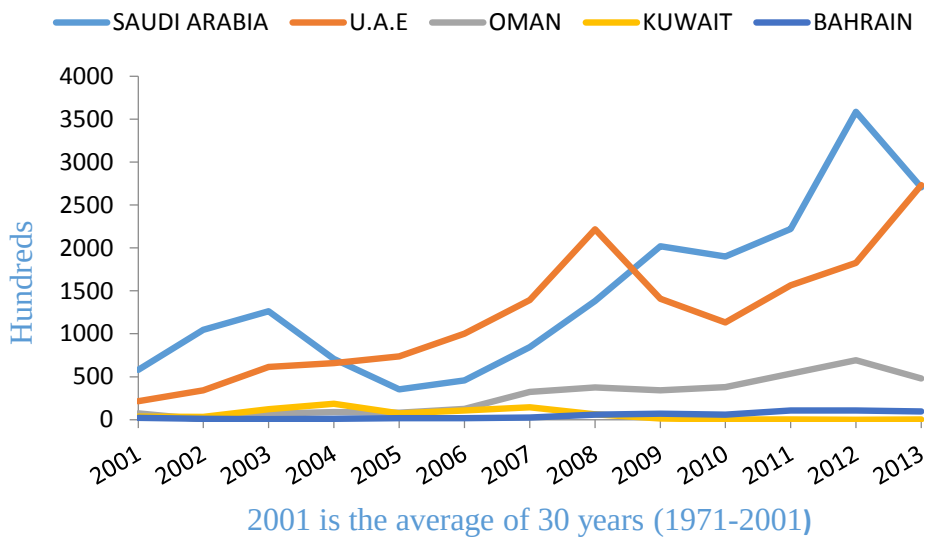


Figure 2.4 Country-wise Emigration (low) from Pakistan (1971-2013); Source: BEOE

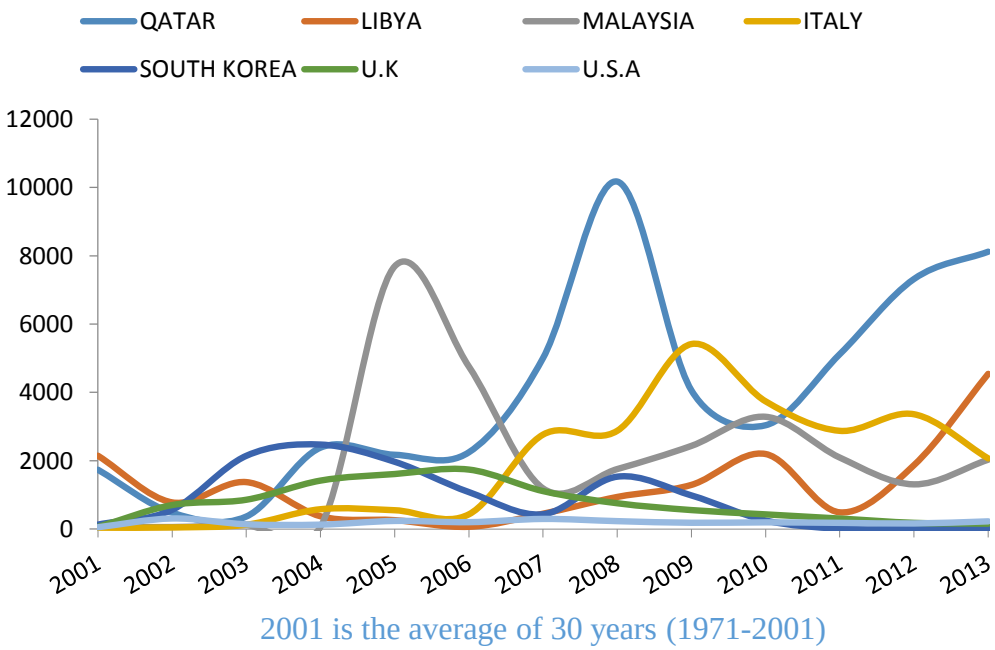


Figure 2.3 and 2.4 shows the emigration from Pakistan broken down by high and low destination country for the years 2001 to 2013. The intercept is the average out-migration for the the 30 years from 1971 to 2001. Kindom of Saudi Arabia (KSA), the United Arab Emirates (UAE), and Oman are the largest destination countries for Pakistani migrants followed by Bahrain and Kuwait. Post 2001, there is an increasing trend for migration until 2008 (the era of global economic crisis). This shows a fall in migration to the UAE, but migration to Saudi Arabia and Oman remains relatively stable. Worker migration to the UAE has declined from 2008 to 2010, which hosts almost half of all Pakistani migrants. The drop in migration to the UAE is offset by an increase in migration to Saudi Arabia. Labour migration to the European Union, including the UK, tripled from 2007 to 2009 (monthly average of 400-600 workers). During that time labour migration to the United States is comparatively smaller than other main destinations such as Saudi Arabia and UAE.

Figure 2.5 shows the percentage share of total stock of Pakistani migrants in the main destination countries of the world (1971-2013). The Gulf Cooperation Council (GCC[6]) constitutes around more than 90 percent of the Pakistani Diaspora. Saudi Arabia stands as the largest source for Pakistani Diaspora that consists of around 52 percent, whereas, with the United Arab Emirates sharing 32 percent of the Pakistani immigrants. Likewise, Oman, Kuwait, and Bahrain constitute around 8, 3, and 2 percent of Pakistani immigrants, respectively.

Overall, it is apparent that the migration to GCC countries had a strong positive impact not only at a household level in rural areas irrespective of it productive versus unproductive uses of remittances, but also on the macro-economic indicators, such as GDP growth rates and foreign exchange earnings as a result of an increase in employment opportunities.

[6] Countries includes; Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates

Figure 2.5 Country-wise share of total stock of Pakistan's Emigrants (1971-2013); Source: BEOE

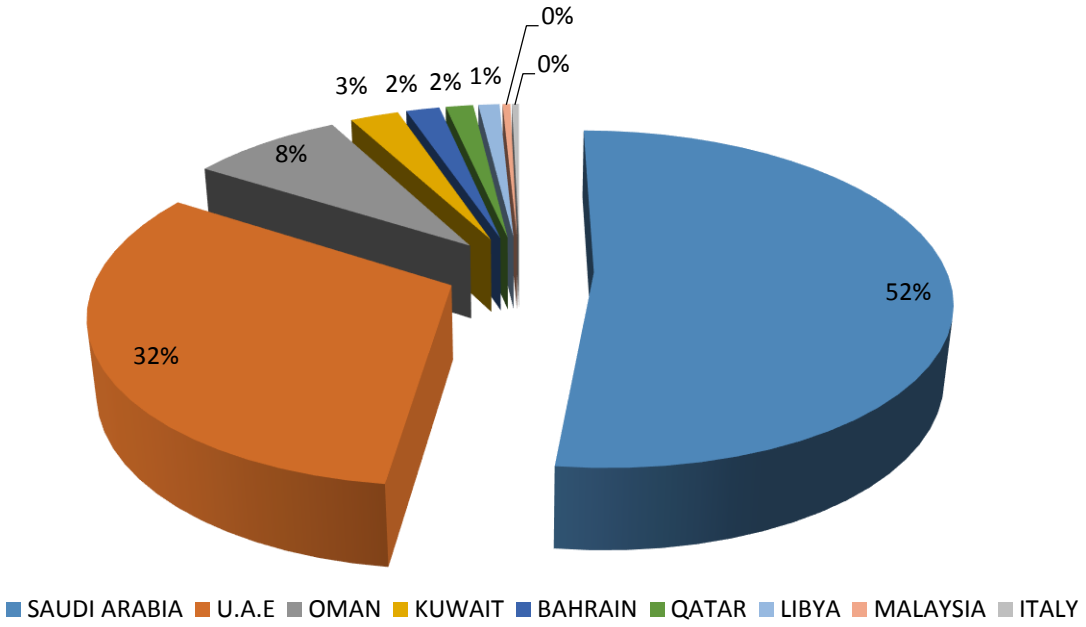


Figure 2.6 shows the emigration trends originating from four provinces of Pakistan, namely Punjab, Sindh, NWFP and Balochistan. It is quite evident that migration is not evenly distributed across the provinces of Pakistan. The provinces of Punjab and NWFP has comparatively higher incidences of migration than Sindh and Balochistan. The contribution of each province Punjab, NWFP, Sindh and Balochistan stands at 59, 10, 29 and 2 percent, respectively in the total migration from 1981-2013. We also do not find any striking difference by looking at the decade-wise share of each province in migration; the trends are quite upward sloping with a minimal fluctuation for each province. This picture is changing somewhat in recent years, particularly, from Sindh and Balochistan. The unskilled and semi-skilled international migration to the Middle East mostly comes from upper Punjab, and NWFP regions (particularly from rain-fed) associated with low agricultural productivity. However, patterns of migration are quite different for central Punjab and the city of Karachi, where more skilled labour usually migrated internationally. Likewise, the poorer area of the country, particularly, lower Punjab, Balochistan, and rural Sindh account for relatively less migration.

Figure 2.6 Province Wise Emigration from Pakistan (1981-2013); Source: BEOE

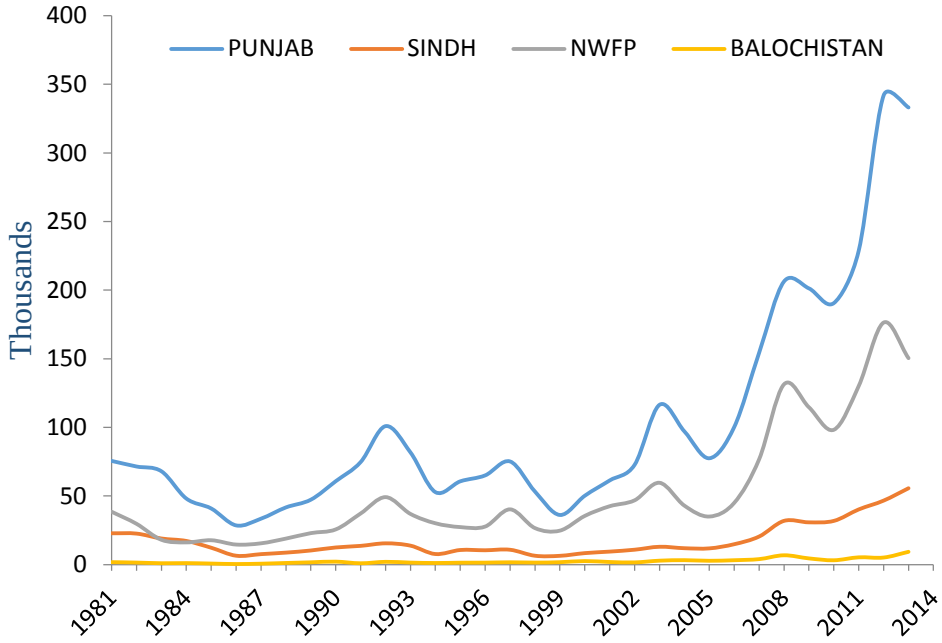
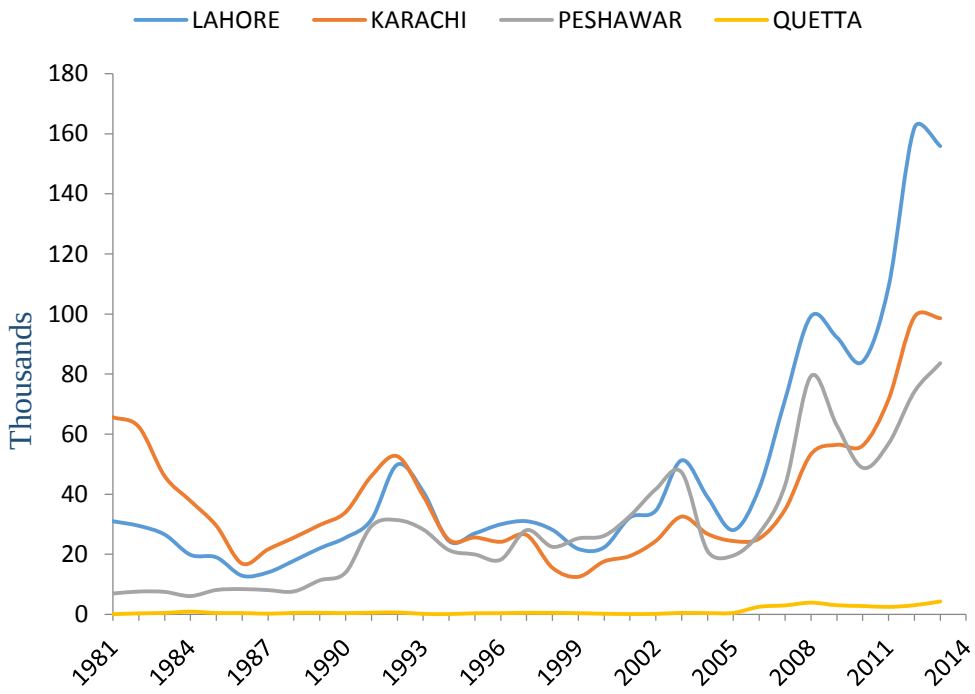


Figure 2.7 represents the emigration from the four provincial capital cities of Pakistan from 1981 to 2013. In terms of population, Punjab is the largest province of Pakistan, and Balochistan has the lowest population density. Lahore is the provincial capital of Punjab, Karachi (Sindh), Peshawar (NWFP) and Quetta (Balochistan). The international migration trends for all cities except Quetta show a quite similar pattern, but with different migration magnitudes. In 1981, the share of total migration from Lahore, Karachi, Peshawar and Quetta is around 29, 63, 7, and 0.09 percent respectively, so Karachi and Lahore city shares more than 90 percent of the international migration from the four provincial capital cities. Similarly, the share of migration from Lahore, Karachi, Peshawar, and Quetta is around 45, 29, 24.5, and 1.50 percent respectively in 2013. Lahore's share in international migration is increased from 29 to 45 percent (an increase of 16 percent) from 1981 to 2013, Karachi's share reduces from 63 to 29 percent (a decrease of 34 percent) and Peshawar's share is increased from 7 to 24.5 percent (an increase of 17.5 percent) from 1981 to 2013. In more than 30 years, Quetta's share is around 1.5 percent.

Figure 2.7 Provincial Capital City-wise Emigration from Pakistan (1981-2013); Source: BEOE



2.4 Remittances overview

In economics term, migration has payoff in terms of remittances. Remittances are the money that migrants earn in a foreign country and then send back to their households, described as 'Mother's milk for poor nations' and 'a free lunch' (Kapur and McHale 2003). Remittances are an important and growing source of foreign exchange for Asia, as 5 of the top 10 emigration countries are in Asia (India, China, Pakistan, Bangladesh, and the Philippines). Not surprisingly, the top emigration countries are also among the top remittances-receiving countries (Migration and Remittances Factbook (2011): World Bank, Washington, DC).

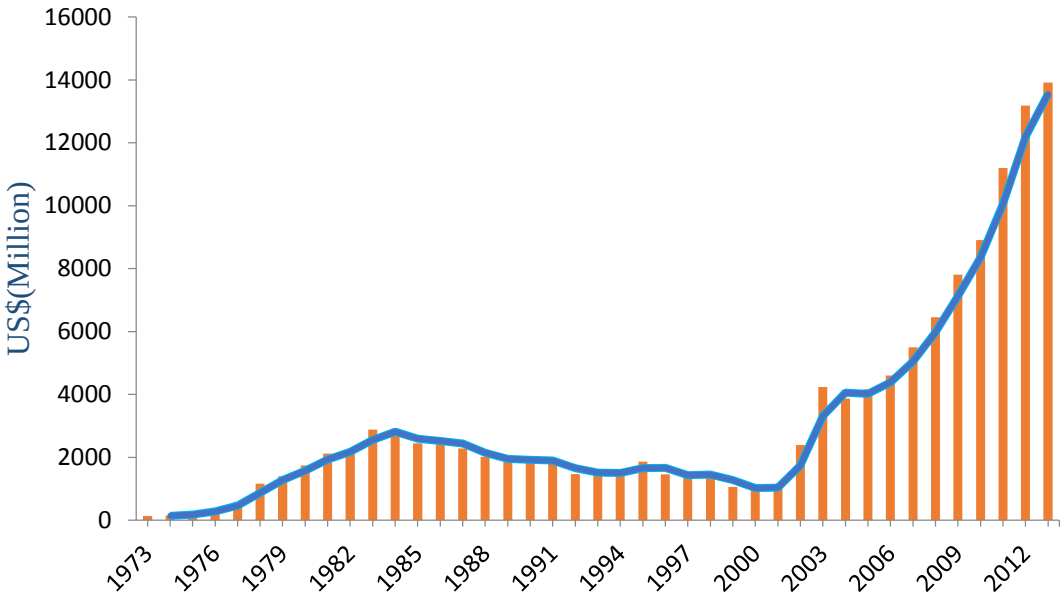
The flow of remittances from developed to developing countries remained significant during the recession in 2008. Officially recorded remittances to developing countries reached up to $325 billion in 2010 (in the aftermath of the global financial crisis). The remittance flows to South Asia and East Asia increased at a pace of 8.2% and 7.4% respectively in 2010. Worldwide flows of remittances grow at rates of 7 to 8% annually during 2011-13 and reached to $404 billion by

2014 in developing countries (World Bank Blog). The top recipients of remittances among developing countries were India ($58 billion), followed by China ($57 billion), Mexico ($24 billion), the Philippines ($23 billion), and Pakistan ($12 billion) in 2011. Other large recipients in US dollar terms include Bangladesh, Nigeria, Vietnam, Egypt and Lebanon. It follows all top remittances receiving countries are lower-middle-income countries (World Bank Migration and Development Brief 17). In 2009, 45% of remittance inflows to Pakistan came from Asia, 32% from Europe and 22% from North America. Similarly, 73% of Pakistan's migrants are hosted by Asia, 17% by Europe and 9% by North America (Human Development Report (HDR), 2009).

The labour migration to different parts of the world has contributed to worker remittances in Pakistan, which have increased significantly in the last decade and were equal to around $14 billion in 2013. Due to it philanthropic nature, remittances became relevant not only in the household economies of migrant families but also contributed to the wider community and the national economy. Figure 2.8 shows the trend of total remittances received in Pakistan (in USD million, from 1973-2013). There is a noticeable increasing trend of remittances after 2001, which may be due to the 9/11 attack that resulted in a crush on informal money transfers such as Hundi and Hawala (shift of remittances from informal to formal channels) with the Financial Action Task Force (FATF) and developing international standards on anti-money laundering (AML) and combating the financing of terrorism (CFT). This resulted in better records keeping of financial transaction with identity. Other underlying reasons may be a change in the skills composition of migrants; an increase in international migration from Pakistan and improved technology and infrastructure for money transfers (Western Union; WU) coupled with reductions in the cost of sending remittances (more competition between money operators). The establishment of Financial Action Task Force (FATF) and developing international standards on anti-money laundering (AML) and combating the financing of terrorism (CFT) proved a blessing in disguise for Pakistan. Many Pakistanis with savings in offshore accounts repatriated their funds in fear of

a US-led investigation into terrorist financing. Where remittances increased from around $ 1 billion in 2000 and exceeded to $ 15 billion in 2014 (Kapur, 2003).

Figure 2.8 Total Remittances Received in Pakistan (1973-2013); Source: Various Pakistan Economic Survey

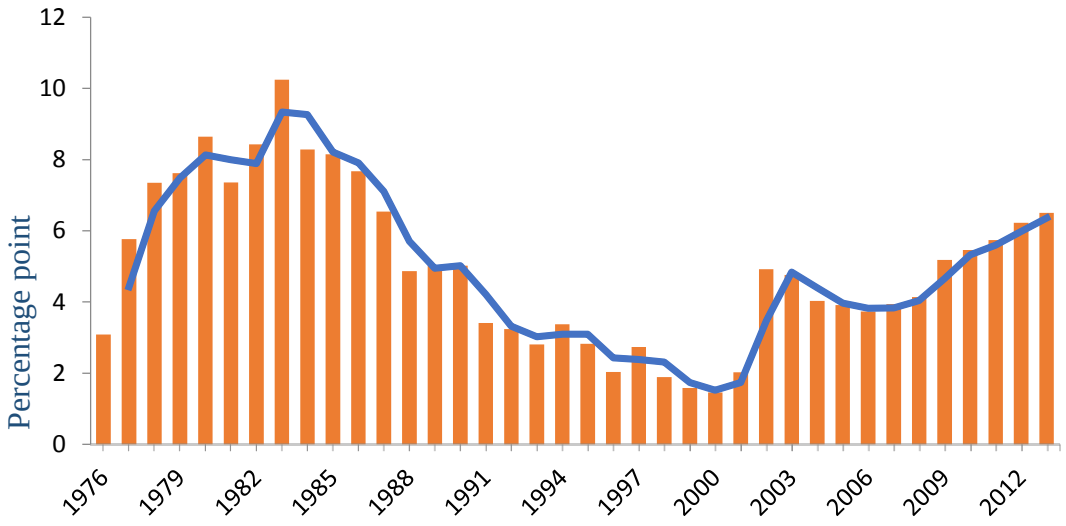


Ultimately, the average annual percentage growth rate of remittances may help to understand its importance for each decade for Pakistan. The second half of the 1970s (1973-1980) recorded an average annual growth of remittances of around 47 percent, which is a substantial contribution to the foreign exchange of the country. The 1980s witnesses a drastic reduction in the average annual growth rate of remittances to around 2 percent. The 1990s is registered a negative average annual growth rate of around -5.5 percent which is characterized by macroeconomic instability in the country and the 1991 Gulf War. The first decade of the millennium proves to be a financial blessing for Pakistan, where the average annual growth rate of remittances is second highest around 29 percent. The average annual percentage growth rate is around 16 percent in the last three years (2011-2013). As such, remittances are emerged as a stable source of capital that requires no fees or servicing costs unlike other sources of capital that carry a cost for the receiving country, be it interest payments for loans or profit repatriation for investment. Its

importance for many receiving households will be clear from the passage of Kapur and McHale (2003; 50), "Within the development community, remittances strike the right cognitive chords. They fit in with a communitarian, 'third way' approach -neither inefficient socialism nor savage capitalism- and exemplify the principal of self-help. Immigrants, rather than governments, thus become the biggest provider of foreign aid".

Clemens and Mackenzie (2014) argue that the surge in remittances is due to measurement errors, but not due to changes in real financial flows. Secondly, if these increases were correctly measured, cross-country panel regression may have too little power to detect the effect of remittances on growth. Third, the greater driver of increase in remittances is increase in migration. This study argues that 79% of the growth in remittances received by developing countries over the last two decades reflects changes in measurement, with only 21% representing changes that can be due to the growth in the migrant stock. Migration and remittances clearly have first-order effects on welfare of families, poverty and community development through technology transfer, FDI, and trade.

Figure 2.9 Remittances % of GDP (1976-2013); Source: World Bank



The real GDP growth rate provides an understanding of the rate at which the economy is growing. The historical trends in GDP growth rate have varied markedly and remained unsustainable in Pakistan. In the 1970s, the annual average growth rate in real GDP is around 5.2 percent, while it is enjoyed higher annual average growth rates of around 6.4 percent across sectors when compared with other developing countries in the region in the 1980s. The average annual growth rate remained positive but more volatile in the early to mid-1990s, and the economy has undergone a noticeable slowdown and stagnation since the mid-1990s with a growth rate of around 4.5 percent in the 1990s. Yet again it fells to around 3.5 percent in first half of the 2000s.

However, remittances as a percentage of GDP specify the contribution of remittances in the overall income of the country which is the most significant source of foreign exchange earnings for Pakistan. Figure 2.9 specifies the contribution of remittances in overall GDP of Pakistan. The significance of remittances to the share of GDP is quite apparent in the figure, especially in the 1970s and 1980s. As a proportion of GDP, average annual remittances elapses from 6.5 percent in the 1970s to 7.2 percent in the 1980s. Even in some years, annual remittances contribution surpasses more than 10 percent of the GDP. Since the 1990s, average annual remittances records a declining trend to 2.3 percent of GDP. Key drivers contributing to the decline in worker remittances may be the decline in oil prices, the slowing down of economic activities particularly in the Gulf region, increased competition with other labour exporting countries and the freezing of foreign-currency accounts. Average annual remittances steadily increases in the years 2000-10 to around 4.2 percent of GDP. The average annual remittances are again second highest in the last three years (2011-13) at 6.5 percent over the last two decades. Remittance receipts to Pakistan were about 4.2% of GDP in 2008 with the surge in remittances to Pakistan mainly coming from host countries in Gulf. Remittances from Saudi Arabia, UAE and GCC countries tripled from 2005-06 to 2008-09, but remittances from USA, UK and Europe are only increased moderately.

The remittances are important not only for the receiving household but also have grown to be an important source of foreign exchange earnings for many developing countries. In almost all South Asian countries, remittances relative to GDP and exports have grown significantly over the last few decades. At a macro-level, the indirect effect of remittances on the exchange rate results in an appreciation of currency, which may make exports less competitive in the international market. The remittance receiving countries may experience a 'Dutch disease' problem with the allocation of labour moves away from the tradable sector to the non-tradable sector due to real exchange appreciation and loss of international competitiveness. An implication of remittances at a household-level suggests that it is smooth consumption through an increase in disposable income. Regardless of the 'Dutch disease' problem the remittances have helped to build up international reserves and have provided a cushion against external shocks during the global economic crisis in low-income countries.

Figure 2.10 Remittances as % of Total Export (1973-2002); Source: (Guzdar, 2003)

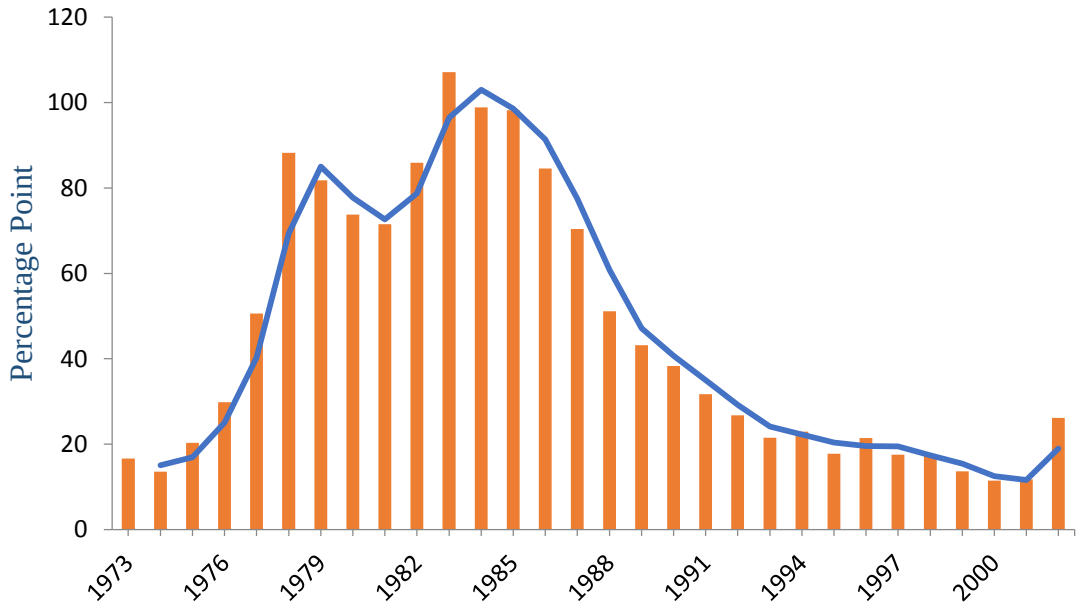
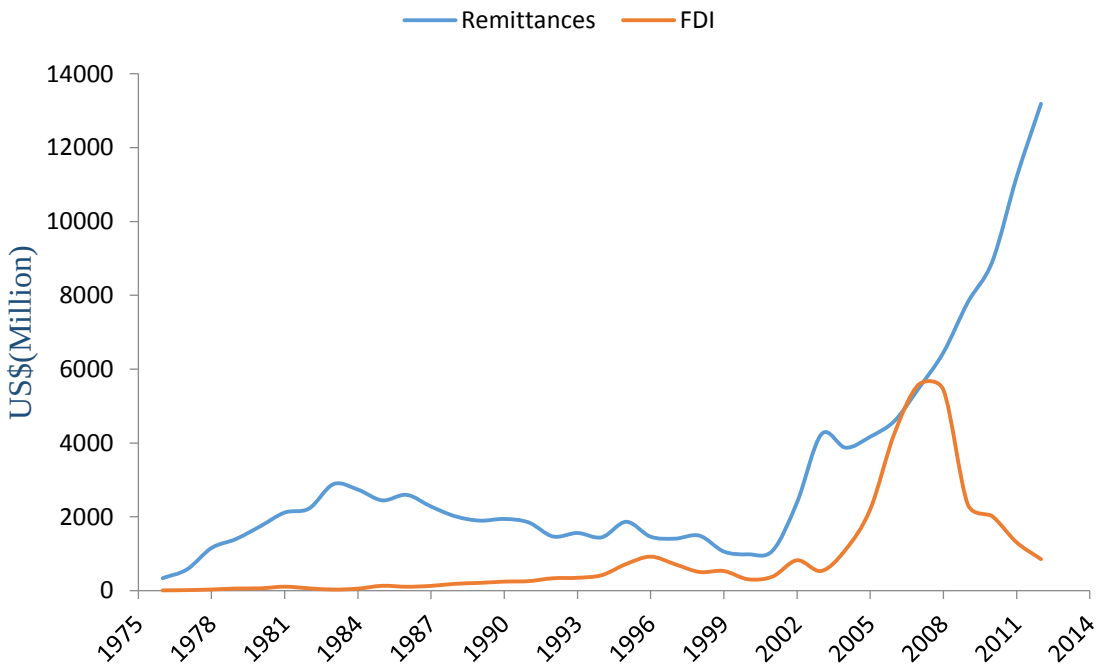


Figure 2.10 represents the share of remittances as a percentage of total exports from Pakistan which ranges from 11.5 percent to 107 percent of export earnings over the past three decades.

From 1983, remittances as a percent of export earnings decline until the year 2000. In 1970s, the annual average percentage share of remittances to exports is around 47 percent, while the highest annual average percentage share of remittances to the export is around 75 percent in the 1980s. However, its share remains positive but more volatile in the 1990s, and the economy has undergone a noticeable slowdown and stagnation with a share around 20 percent in the 1990s. Remittances have been an important source of foreign exchange, especially in the balance of payments for developing countries since the 1970's. In the 1980, Pakistan received remittances equal to 82% of its total exports and 38% of its total imports. Similarly in 1985, Pakistan received 97.2% of its total exports and 43.8% of its imports. In 1990, the share of remittance is 40.4% of its total exports and 26.9% of its imports. The trade deficits in many developing countries have been largely offset by remittances in 2009.

Figure 2.11 Remittances and FDI in Million US$ (1976-2012); Source: World Bank



FDI inflows are larger than remittance's receipts in developing countries. This is not the case in Pakistan; remittance receipts have been much greater than FDI since 1975, except in 2007. In fact, FDI is strongly correlated with economic growth for many countries by adding to their

capital stock. The stock of FDI in any country is determined by many factors such as law and order, infrastructure development, regional trade agreements, multilateral trade openness and host country institutions. Figure 2.11 shows the relative contribution of remittances and FDI in the Pakistan. In the case of Pakistan, the volume of remittances compensates the shortfall in FDI. However, the nature and significance of FDI and remittances is quite different for the overall contribution to the economy.

Figure 2.12 Official Remittances from Countries of Origin (1998-2012); Source: State Bank of Pakistan

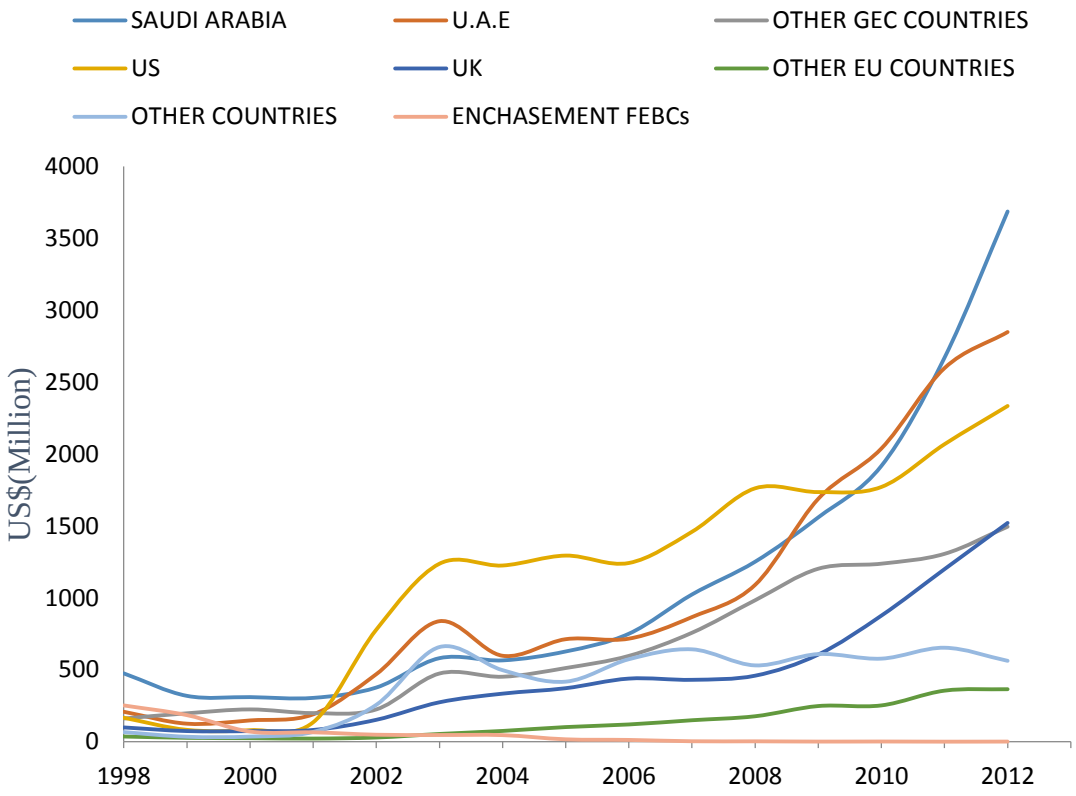


Figure 2.12 provide a breakdown of the remittances received in Pakistan by country of origin. The country-wise share of remittances suggests that Saudi Arabia, the UAE, the US, the UK and other GCC countries are the major contributors to Pakistan. However, the relative share of remittances from the US, Saudi Arabia and the UAE account for around two thirds of the total remittances. Over the period 1998 to 2012, the average share of remittances from Saudi Arabia stands at 23 percent, the US at 22 percent, the UAE at 18 percent, other GCC countries at 14

percent, and the UK at 8.5 percent. Saudi Arabia shows a steady growth in remittances from 2001 and a sharp increase after 2010, but the US emerges as the single largest source of official remittances from 2001 to 2008. The remittances from the US shows a minimal decline following the global financial recession in 2008, otherwise remittances from all other major countries were resilient to the recession.

In the 1970s and 1980s, the average annual share in total remittances from the US remains around 5 percent which increased to 9.7 percent in the 1990s. From the UK, the average annual share of remittances are around 12.7 percent in 1970s. Comparatively, the annual average share of remittnaces are around 47 percent from Saudi Arabia in the 1980s, around 15.6 percent from the UAE during the 1970s, and similarly around 5 percent from the Kuwait in the 1970s (Iqbal and Sattar 2010).

The overall picture from the above overview of migration and remittances sheds a light on the importance of remittances not only for the country but also for the receiving households. It can be concluded that migration and remittances have more than doubled since the last decade in Pakistan. The increase in remittances originated mostly from developed countries, especially from the US and the Gulf. However, migration to the Middle East remains important not only from the viewpoint of those who migrated (mostly migration to the Middle East comes from rural areas), but also for its primary effects on the remittance receiving households and as well secondary effects on the economy. From the perspective of microeconomics, migration to developed countries or the Middle East clearly proved to be the complex poverty reducing mechanism, through the remittance's direct or indirect effect on the receiving household and on the rural economy as whole. At a macro-level, remittances became a permanent source of foreign exchange earnings for the capital deficient country.

2.5 The study area for chapter four and five

To understand the determinants of internal and international migration covered in chapter four, it is important to examine the nature and role of the rural economy especially, the districts covered in the study. Pakistan is the sixth largest populous country in the world. It is located in South Asia with an estimated population of about 184.35 million in 2013, with an average inflation rate of 8.03 percent from 1957 to 2014. The average unemployment rate is 5.4 percent from 1985 to 2013. Punjab represents 56% of the population, while Sindh, NWFP, and Balochistan have roughly 20%, 19% and 5%, respectively (According to population census of 1998). Besides it, geopolitical importance in the region, it covers a total area of around 197 million acres. Around 27 percent of the surface area consists of cultivated land; 11 percent goes to cultivable waste, and 4.5% are under forest, adding up to the total of 42.5 percent. The remaining 57.5 percent of the surface area consists of mountains and deserts which are unsuitable for any types of farming or forestry activities.

The country historically is an agro-based economy with agriculture accounting for 21.4 percent of GDP and employing 45 percent of the labour force in 2013. Almost 64 percent of the population resides in rural areas and rely directly and indirectly on food and fibre crops, livestock, dairy, fisheries, horticulture, orchards, and forestry (Faruqee, 1999). Agriculture is the largest source of foreign exchange earnings (70 percent of the foreign exchange through exports of raw, semi-processed, and processed commodities) and meets the raw material needs of the country's major industries; namely, textiles and sugar. Similarly, manufacturing and the industrial sector contribute around 25.55 percent of GDP and employ 20.10 percent of the labour force. Economic output is now dominated by the services sector which accounts for 44.60% of GDP and employs

35.70% of the labour force[7]. During the past two decades the livestock sector has grown steadily, and it now contributes about half of the agricultural share of GDP.

The contribution of the four provinces, namely Punjab, Sindh, NWFP and Balochistan stands at 57 percent, 27.5 percent, 8 percent, and 3 percent respectively to Pakistan's GDP in 2009. The agricultural sector contributes more than half of the country's GDP in rural areas where approximately 85 percent of country's population resided in the 1950s. Rural poverty, although less visible, is more prevalent than urban poverty. Another striking feature of the rural economy is landless households that represent over 20 percent and mostly work as seasonal labourers in the agricultural sector under the authority of a big landlord and can hardly afford hand to mouth living.

Figure 2.13 The districts covered in the study; Source: Rosen (2007: 98)

Other major activities of rural households include livestock and informal business, work in industries sector, internal- and -international migration, but migration is associated with initial cost to finance travelling, accommodation, to look for work. The other characteristics include

[7] From the various issues of the Pakistan Economic Survey

worse human development indexes and deteriorating living conditions due to weather vagaries, poor access to basic needs (health, education and absence of a social net), biased behaviour of formal capital market towards small farmers, cumbersome mechanisms of loan application and so on. These are all unavoidable circumstances for rural households resulting in chronic poverty of 41 percent in 1963-64, rising to 55 percent in 1969-70, private sector led economy in the sixties (Chaudhry, et al. 2006). However, the incidence of poverty could have been worse without the 'green revolution package' (high yield variety seed, pesticides, insecticides, tube-well and tractor).

The migration to the oil-rich Gulf region took off in early 1970s. The main destinations were Saudi Arabia, Kuwait and the United Arab Emirates; other destinations include Iran, Iraq, Qatar, Bahrain and Oman. The majority of the migrants come from the rural areas (63%) and most of them were employed as construction workers (Guzdar, 2003). However, the era of the 1980s was associated with liberalization, deregulation and denationalization policies bundled with immense foreign remittances and substantial foreign assistance due to the Afghan war. This was followed by a debt crisis in the 1990s and privatization coupled with excessive government borrowings, sluggish growth, and fall in remittances in 2000s.

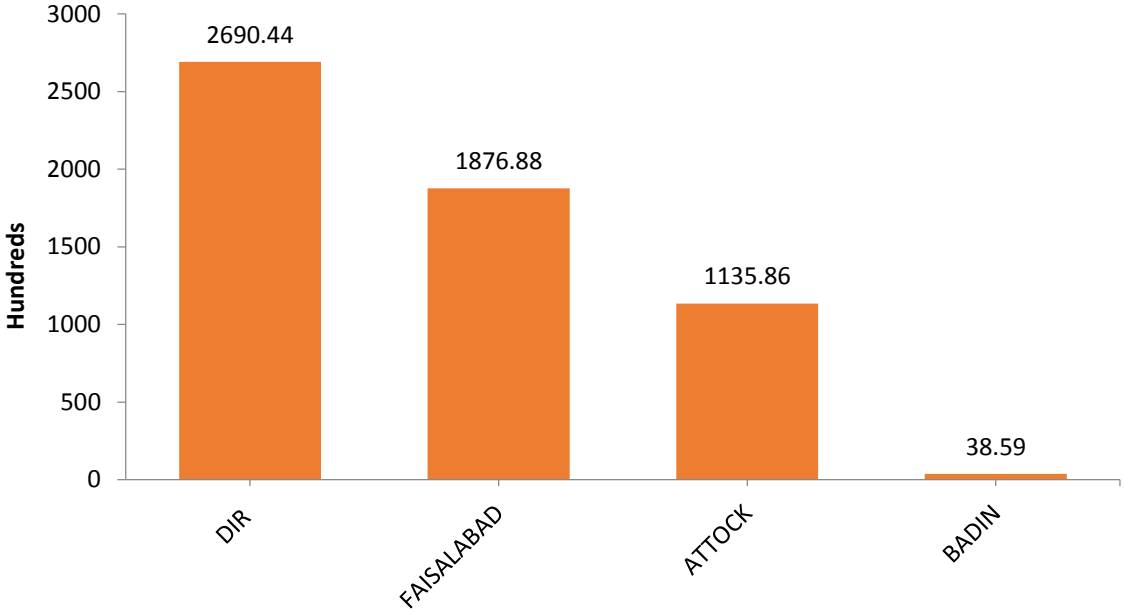
Higher concentrations of the most deprived households occur predominately in desert zones, steep hill areas, and area with endowment of natural resources[8]. The other striking common features include fewer employment opportunities (non-farm employment opportunities and only seasonal demand for labour), restricted access to social services (education and health), and non-existence of infrastructure (road networks to market, irrigation system, electricity, access to basic input, and tenure system). These are severely segregated areas with a lower population density,

[8] This includes the fourth province of Pakistan (Balochistan), which was not covered in the data collection.

less fertile land, and subsistence farming associated with low productivity and ignoble economic activity, which leads to substantial seasonal and annual variation in household income. Besides the subsistence-farming households in hill and desert areas are reliant on the livestock sector. The role of farm credit is apparently inevitable for sustainable agriculture. However, rural households have been severely restricted by the dearth of the credit market. Therefore, the household turns to informal credit sources such as; friends, relatives, landlords and commission agents for internal and international migration to minimise risks, diversify income earnings and to overcome financial constraints through remittances. These characteristics are most apparent in all surveyed districts except Faisalabad, a relatively prosperous district that makes the case study an interesting one in terms of investigating the relative deprivation argument in explaining migration. The following is the brief description of the selected districts in Pakistan.

Figure 2.14 shows total international migrants stock from the four districts Dir (NWFP), Faisalabad and Attock (Punjab), and Badin (Sindh) covered in the survey from 1981 to 2013. The stock of international migrants has more than doubled since 2003 to 2013. Over the last ten years, the international number of migrants has increased from 135,142 to 269,044 (50%) from Dir district. Similarly, the number of migrants from Faisalabad, Attock and Badin has increased from 86,517 to 187,688 (46%), 44,546 to 113,586 (40%), and 1,874 to 3,859 in 2013 (48%), respectively. The migration flows from these areas have considerable impacts not only on households, but also on their respective districts. However, it is quite difficult to estimate the true stock of internal migrants for each district. For this reason mostly studies rely on micro-studies based on survey data for internal migration.

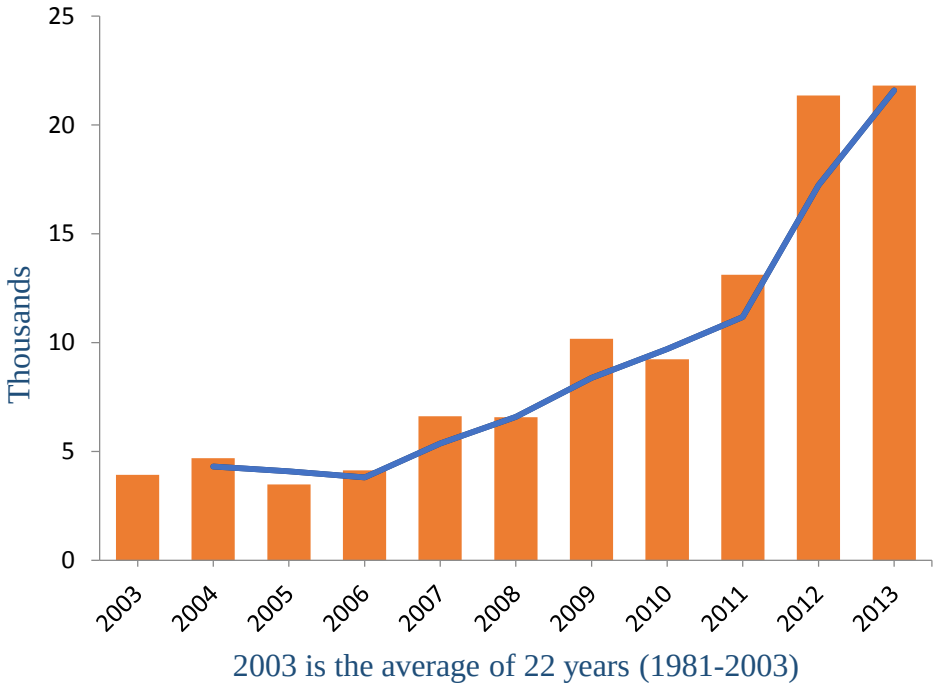
Figure 2.14 District wise total stock of migration (1981-2013); Source: BEOE



2.5.1 Faisalabad district

Punjab is the biggest province of the country in term of population and contribution of the agricultural sector in the GDP. Agriculture is the main source of livelihood and employment in rural areas. High levels of poverty in rural areas are closely linked with low growth of the agricultural sector over the past decade (Mubin, et al., 2013). Faisalabad is one of the districts in Punjab province, which was developed as a hub for agro-based industries. It is a comparatively a more prosperous district and included in the panel survey as a control. Faisalabad is the third largest city in Pakistan after Karachi and Lahore, with an estimated population of 2.6 million. For example, a large number of industries such as; wheat grinds and cotton ginning units (four flour mills, textile mills, twelve ginning and six engineering units) were localized in 1947. However, post-independence, the city was transformed with the support of the Government from basically an agro-based industrial city with its original base of power looms and textile processing to city with the largest concentration of chemical plants and manmade fibre producing mills in the country. Now, it hosts a variety of other industries, including sugar, fertilizer, chemical, engineering and steel, rubber, leather tanning, vegetable oil and paint factories.

Figure 2.15 District Faisalabad (Punjab Province) Migration (1981-2013); Source: BEOE



Approximately, 70% of textile exports originate from Faisalabad. Lower Chenab canal is the main source of irrigation water, which meets the requirements of 80% of the cultivated land. Approximately 47 percent of the population lives in urban areas while around 53 percent reside in rural areas (According to the population census of 1998). Most of the rural households engage in farming activities with cotton and wheat as its major crops, along with fruit production and livestock rearing. The key reason for the inclusion of this comparatively prosperous district was to make it as a reference category. The nature of this reference category provided us with an opportunity to test the argument of relative deprivation[9] of the household leading to internal and international migration. Figure 2.15 provides an overview of historical migration from Faisalabad

[9] Coined by Stark and Taylor (1989, 1991); Stark and Bloom (1985) to point out the main push factor behind internal and internal migration.

province. The number of migrants shows a steady upward trend since 2003. The annual number of migrants is increased from 4,695 in 2004 to around 21,810 in 2013. The total number of international migrants stands at around 187,688 until 2013. It emerges that households in Faisalabad district are more engaged to participate in migration decisions through sending their family member to work internationally.

2.5.2 Attock district

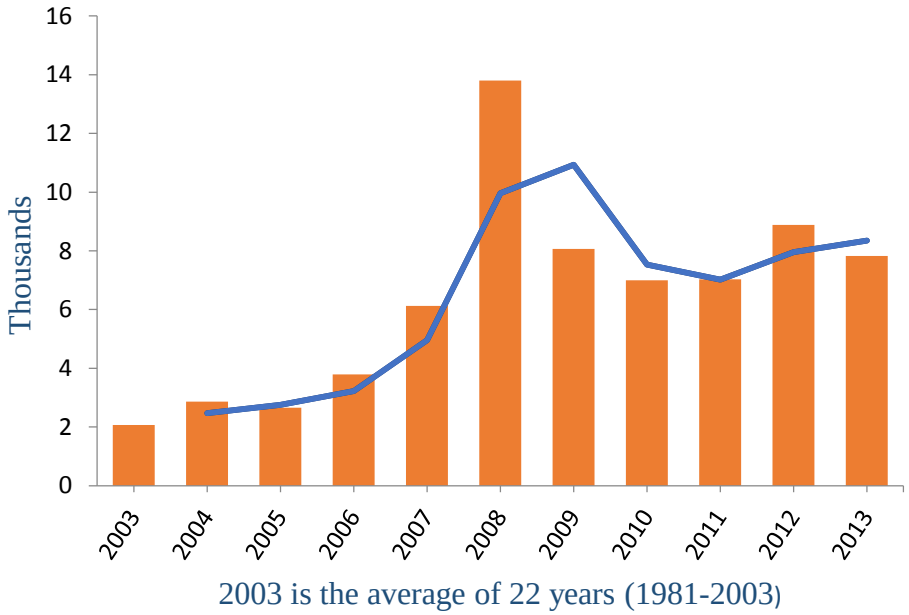
Attock district is a part of the Punjab province. It lies in the *barani* zone of the province. However, it is famous for Attock fort[10] and serves as a joining point for the Kabul River (flows east out of Afghanistan) and the Indus River (flows northeast of Kalabagh), where Kabul River ultimately falls into Indus River. Geographically, the district is mainly hills, plateaus and dissected plains. The urban area constitutes 21 percent of the district population, while the rural area has 79 percent of the population (Pakistan population census of 1998). The rural household engages in farming activities, livestock, and poultry as a basic source of income, where fodder deficiency is a serious concern. The agriculture production entirely relies on rainfall due to the nature of its *barani* land. For example, favourable weather results in a bumper crop for the households and bad weather results in crop failure that leaves household income uncertain. Household average landholding equals 9.6 acres in the district. However, only 14 percent of the households owns landholding of over 150 acres[11]. The Government of Pakistan has completed 26 mini-dams and 10 small dams to overcome the deficiency of irrigated water in order to boost agricultural productivity. The Hydro Power Station of Ghazi-Brotha is also located in the district

[10] Emperor Akbar the Great, the grandson of Babar, recognizing the strategic importance of this area in 1581 to build his famous Attock Fort

[11] Land concentration has actually declined over the period 1980 –2000. But, a small number of households still own large land-holdings. Land reforms have had little redistributive effect. Because of high prices of agricultural land, it is uncommon in rural Pakistan for tenants to buy land.

with electricity generation capacity of 1450 Mega-Watts. Attock Refinery Limited (ARL) is the pioneer in crude oil refining in the country where one-third of the country's oil is produced. The main crops of the rural household includes wheat, ground nut, maize and fruits (including citrus, guava, apricot) in addition to livestock rearing. Almost 10 percent of the total area is under forest, although it has around 52 medium, and small industrial units to engage surplus labour from rural area. Attock is accessible to large cities such as Rawalpindi and Peshawar by motorway and rail [12].

Figure 2.16 District Attock (Punjab Province) Migration (1981-2013); Source: BEOE



The following Figure 2.16 shows the international migration from the Attock district in Punjab province. The annual number of migrants increases from 2,868 in 2004 to 7,823 in 2013. However, the highest annual number of migrants around 13,798 is recorded in the year 2008. Except for the year 2008, the international migrant trend shows an increasing trend over the years in Attock district.

[12] Directorate of Industries, Punjab (Attock Pre-Investment Study – 2012)

2.5.3 Badin district

Sindh is the second largest province in the country in terms of population and agricultural area. Badin is the district in the Sindh province with a population in excess of one million population and covers 6,726 Square Km of fertile plain's land mostly irrigated from the Kotri and Sukkar barrage. Only 16 percent of the population lives in urban areas while 84 percent of the population is rural. The net cropped area is 0.66 million acres out of the total cultivable area of 2.8 million acres, mainly due to the lack of canal irrigation water and erratic rain fall (Lohano, 2009). Many of the farming households were adversely affected by the shortage of water supply leaving many in an extreme poverty trap due to the lack of an efficient network of tributaries, channels and watercourses. Rural areas in Badin are badly affected by waterlogging, salinity and lack of pure drinking water. It is a home of medium and large farming households where 57 percent of the households own on average above 25 acres of landholding. Farming is the main economic activity for many households in the district with sugarcane, rice, cotton, wheat and sunflower as the major crops whilst the rearing of cattle, fishing and agro-based industries account for the second largest source of income for households[13]. An industrial estate was established on an area of 30 acres in 1986, although it did not attract the attention of investors. The Badin has established itself as a sugarcane estate with more than seven large sugar mills, 79 rice husking mills and about 100 flour mills creating employment for the rural workforce.

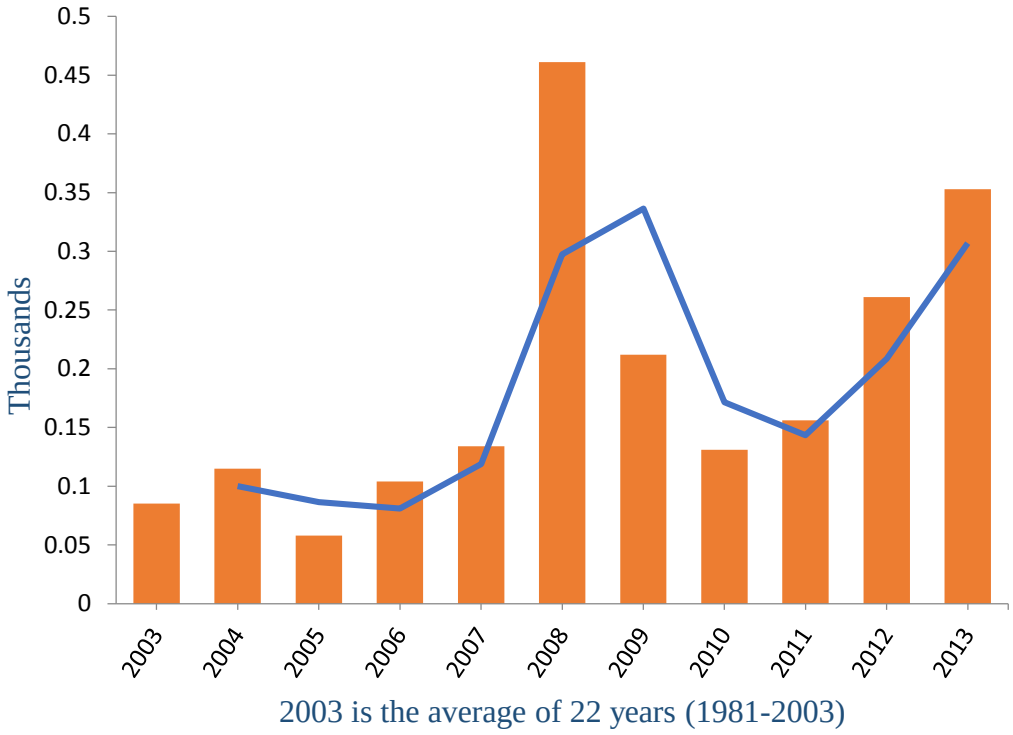
The share of livestock accounts for roughly one-third of agricultural production and it is also used for farm operations such as ploughing. Similarly, the contribution of the marine fish stands at

[13] The discussion follows from the fascinating and comprehensive report prepared by "District Government Badin"(A Framework for Sustainable Development, 'District Vision Badin' District Government Badin; Government of Sindh, Pakistan), and another prepared by "Planning & Development Department Government of Sindh"(Sindh Vision 2030: Planning & Development Department Government of Sindh, Pakistan). For more comprehensive details consult it.

about 10 percent of the total fish exports in the country. However, its share of fresh waters fisheries stands at 17.5 percent of the total production. Similarly, the district has gas and oil reservoirs. The major petroleum discovery in the district was made in 1981 through the foreign company called BP Pakistan Exploration and Production Inc. (BP), with six more oil wells and six gas discoveries recorded up to 1986. To date BP has discovered 61 oil and gas wells. The oil and gas share stands at 44 percent and 8 percent respectively, of the total production in the country. The average daily crude oil production was recorded to be 20,931 barrels, 24,002 barrels and 25,762 barrels in 1995, 1996, and 1997 respectively. The oil and gas industry created employment opportunities for the residing households, but it still is a predominantly agricultural economy.

Badin District is regularly exposed to natural calamities, which have resulted in more chronic poverty in the district. Theses natural calamities include cyclones in 1964/1965, heavy rain fall in 1964/65, heavy rainfall in 1973, floods during 1988, torrential rainfall in 1994, an earthquake in 2001 and floods in 2003. Despite its economic potential within the country, it is still the poorest district. Overall, agriculture is the largest source of employment for the household and consequently agro-based industries heavily rely on this sector. Ultimately, the fluctuation in agricultural production has an ability to upset the ecosystem not only of labour markets but also affects many households associated with it. The conditions even get considerably worse for rural households in an absence of inadequate credit facilities. This is quite apparent with only two branches of Zarai Tarqiati Bank Limited (ZTBL) in the district. A large proportion of defaulter households reside in the district due to a high incidence of natural disasters resulting in tough criteria for banks to lend. In an area where subsistence-level agriculture is prevalent, livestock rearing and poultry farming become a crucial part of economic life by supplementing household income. Lately, however, crop yields in the district have been low. This is attributed to many factors including lack of research, low availability of quality crop seed and land degradation (waterlogging and salinity) caused by inappropriate farming practices.

Figure 2.17 District Badin (Sindh Province) Migration (1981-2013); Source: BEOE



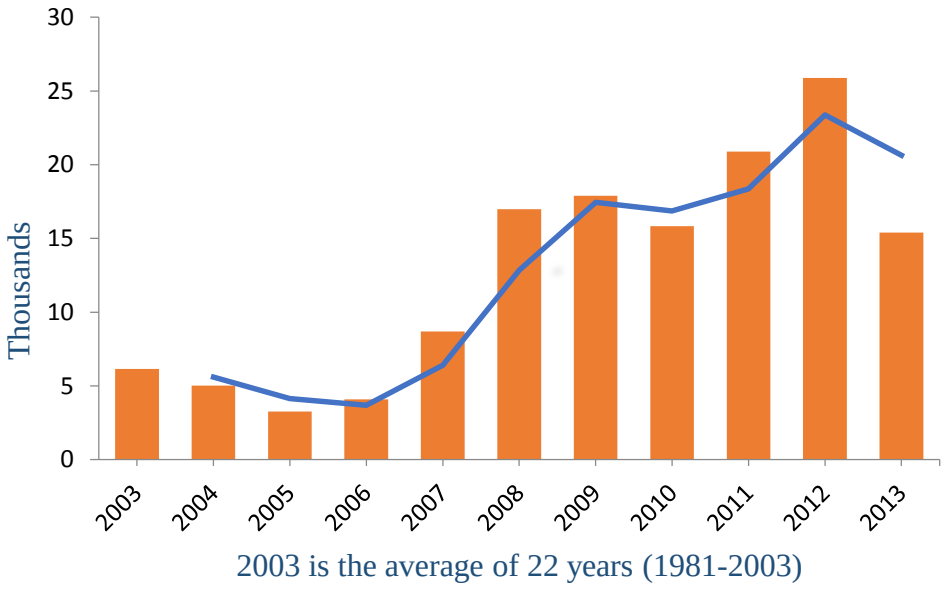
The total number of international migrants is comparatively lower than the other districts covered in the survey. Overall, annual international migration is less than a thousand. The annual number of migrants is 115 in 2004 and increases to 353 in 2013. In 2008, the annual number of migrants is around 461, which is one of the highest registered migrant counts during the last ten years.

2.5.4 Dir district

NWFP is the third largest province in the country in terms of population. The province is land-scarce (steep hill areas) and crop productivity is low and riskier due to inadequate irrigation water availability. However, 83% of the population lives in rural areas in the province. Dir is one of the districts of NWFP that was merged with Pakistan in 1969. It was declared as a district in 1970, which was further divided into Upper and Lower Dir districts in 1996. The majority of the households participate in agriculture, both crop cultivation and animal husbandry, which is a

primary source of income for more than 90 percent of the population residing in rural areas (The Pakistan population census of 1998). The contribution of the agricultural sector in the household income is less than 40 percent. Animal husbandry is a driving force in all the farming activity and crop cultivation is as much dominated by the need for livestock feed during winter season as by the basic food requirements of the family.

Figure 2.18 District Dir (NWFP Province) Migration (1981-2013); Source: BEOE



The average size of landholding is not sufficient for the households to even meet their subsistence needs given the large family sizes[14]. In winter whole area remains snow covered, thus double cultivation is not possible and crop yields are unpredictable. The infrastructure is comparatively less developed, and it does not have any large industries due to its distance from sources of raw

[14] Farms in the project are generally small: below one Hectare on average, with about 70 per cent of the farms included in this segment.

materials and markets. The presence of micro-enterprise activities in the district is limited to the urban areas and is mainly non-manufacturing in nature[15].

The high mountains and forest with mostly Barani land dominate topography of the district. The main river is Panjkopra, which originates from Dir Kohistan. The supply of water is not enough to meet the demands of irrigation needs of the land due to a highly inefficient network of tributaries, channels and watercourses. However, heavy reliance on the agricultural sector for employment has shifted to the non-agricultural sector since 1980s. The non-agricultural sector activities are dominated by migration (internal and international) and engagement of households in semi-skilled work such as transport and construction. Overall, the stock of internal and international migrants accounted for 12 percent of the total population in the district. Furthermore, the migrant households are almost entirely dependent on migrant worker's remittances.

The other striking feature is a very scattered settlement pattern of the district. The households lived in about 1900 settlements with only 43 percent of them having more than 50 households and just over one-third of all settlements containing more than 500 people. The vast majority of the poor are small landowners, sharecropping tenants and landless labourers. The unemployment rate in the district was measured at 37.1% in 1998. The poverty rates, which had fallen substantially in the 1980s and early 1990s, started to rise again towards the end of the decade. In 2004-05, 33% of the population was living below the poverty line. Figure 2.18 shows the annual number of international migrants in Dir district. The number of international migrants is comparatively higher than the other districts covered in the survey. The annual number of international migrants stands at 5,029 in 2004 and increases to around 25,882 in 2012.

[15] See for more details the document of the International Fund for Agricultural Development (IFAD) Dir Area support Project. The project targets the following five areas: (i) Agricultural development (including crop's development, livestock development and irrigation) (ii) community and women's development (iii) roads development (iv) employment generation and (v) the Project Management Unit (PMU). The project targets the very poor households with landholding below one hectare on average, which accounts for the 70 percent of the farms included in this segment.

CHAPTER THREE

Review of Literature

This chapter presents an overview of the literature related to the four chapters contained in this thesis. In particular, it outlines the important advancement in the existing body of knowledge on migration and remittances. The areas of migration and remittances are so tightly intertwined with each other. This overlapping concept distinct depending on the different nature of research questions set for each chapter in the following discussion. For the ease of simplicity, my study will present the review of literature for chapter four under section 3.1. This is followed by a section 3.2 with a general overview of literature relevant to the determinants of remittances. Section 3.3 presents the literature related to multilevel analysis. Finally, section 3.4 outlines the literature of the multiplier or peer effects.

3.1 Chapter four review of the literature

3.1.1 Background

A history of the early contribution to the scientific study of migration begins with influential work of Sjaastad's cost-benefit analysis of migration (Sjaastad, 1962) and Harris and Todaro's (Harris and Todaro, 1969) model of migration and unemployment focuses on rural-to-urban migration. The driving force behind the rural out-migration in the Harris-Todaro model is lack of employment opportunities, natural calamities (such as floods, droughts, and earthquakes, etc.), non-existence of a well- functioning capital market (e.g. absence of insurance markets) and the reliance on subsistence farming in rural areas. Reliance on subsistence farming has affected the local and household economy throughout developing countries. Households in modern, especially

low-income developing countries are particularly exposed to these income shocks for the aforementioned reasons and poor households need to save as a precaution against downturn risk. As a result, the wealth choices for poor households[16] may be necessary to avoid the risk associated with expected income. In migration economics, numerous theoretical and empirical studies focus on households' abilities to cope with these shocks through either migrating internally or internationally.

In the last decade there has been an increasing body of research focused on international migration; such as, Massey et al. (1993) 'Theories of international migration: a review and appraisal', Castles et al. (2005) 'The Age of Migration: International Population Movements in the Modern World' and Massey and Taylor (2004) 'International Migration: Prospects and Policies in a Global Market' and so on. More recently concerns over job losses and excessive immigration in developed countries have provided some impetus to the study of international migration (Czika, 2012)[17]. It is a much-debated topic in developed countries due to different social and economic concerns over immigration (Skeldon, 2006)[18].

In contrast, the literature on both internal and international migration is rather less developed; most rely either on internal or international migration while not taking into account both types of migration in a single study due to the non-availability of suitable data, different disciplinary background of researchers, different analytical techniques, and different research agendas that

[16] The selected districts in the survey were poorest districts of Pakistan except Faisalabad, a prosperous district, which was chosen as a reference category.

[17] This paper uses the National Sample Survey of 2008 to study the likelihood of Indian out-migration (internal plus international) through disentangling the concept of relative deprivation by distinguishing feelings of individual and collective relative deprivation as sources of individual aspirations. For the likelihood of intra-state movements, both individual and collective relative deprivations are strong predictors. However, the likelihood of out-migration towards international destinations is significantly higher for households with lower levels of individual and collective relative deprivation. Our results are consistent that poor households or relative deprived households have stronger probability of out-migration either internally or internationally.

[18] This study tries to create a stronger link between internal and international migration in the Asian region. Internal and international migrations are integrated, and it is necessary to consider them as a unified system rather than in isolation. The hierarchical movements link richer and poorer groups together and need to be understood in the context of the implementation of programmes of poverty alleviation. By attempting to link internal and international migration, this paper emphasises for a more integrated framework for the study of migration.

reflect different policy concerns and funding sources (King and Skeldon 2010). But our perspective is the one from a developing country. The existing literature on migration in Pakistan also focuses either on internal or international migration, without taking into account both at the same time[19]. In recent years, there is only one study by Oda (2008), which used a multinomial logit model to investigate households' decision on migration choices.

Another study by Ilahi and Jafarey (1999) uses International Labour Organization's and Asian Regional Team for Employment Promotion (ILO-ARTEP) survey data to study the determinants of the preference of self-employment among returned migrants. The returned migrants with high savings choose self-employment while other with low saving prefers wage-employment. It is concluded that return migration in Pakistan leads to small business development. The study finds a negative relationship between remittances, savings and loan obligations to immediate family. This implies that the initial cost to finance migration through family requires a subsequent repayment. The extended family plays an important role in financing migration cost and sharing the benefits of migration through inter-household public goods financed by remittances. The higher the cost of migration, the higher demand will be for loans to finance the migration, which leads pre-migration wealth to fall. Further, savings retained abroad and remittances to immediate family both fall with the pre-migration loan. This study is restrictive for not including the control group of non-migrant households and secondly the study may have a 'self-selection' problem related to the decision of returning home (family health problem, retirement or hard to find new work contact).

There is a mixed opinion among the different researchers related to the productive use of remittances in Pakistan. A study by Amjad (1986) shows that remittances used for investment rose from 13% of total remittances in the 1980s to 30-35% in 1986. It also finds that most of the

[19] As Guzdar (2003; ii) writes "In general, there is a need for more in-depth and focused policy-oriented research on both internal and international migration in Pakistan".

remittances were spent on consumption good, consumer durables, buying land and building houses. Subsequently, Tsakok (1982) finds that, 62% of remittances were used for consumption, 13% for the purchase of houses and construction of new houses; and 25 % were used for agricultural, industrial, commercial and financial investment in the 1980s. There is also a mixed opinion amongst the researchers about the impact of remittances on poverty and rural household income in Pakistan. For example, Abbasi and Irfan (1983) used the Household Income and Expenditure Survey (HIES-1979) and finds that remittances contribute to unequal income or worsen the disparity of wealth in Pakistan. On the other hand, Adams (1991) uses household level panel data of three provinces in Pakistan to conclude that remittances are well distributed among rural households. Nishat and Bilgrami (1993) is one of the few empirical studies on the issues of migration and remittances. They surveyed 7,061 returned migrants from Kuwait and Iraq due to the Gulf crisis in 1990. This study finds that education, self-interest, family support, capital accumulation, level of skill and businesses are main determinants of remittances in Pakistan.

Recently, Ahmed et al. (2010) used the Household Integrated Economic Survey (HIES, 2004-05) survey data of Pakistan to study the link between remittances and poverty. At the macro-level, fall in remittances leads to a fall in investment and consumption thereby increasing poverty. However, at the micro-level, it finds that the probability of households becoming poor decreases by 12.7% if they receive remittances. The study of Amjad and Kemal (1997) uses time-series data of 1960-90 and finds that international remittances significantly reduced poverty in Pakistan. Similarly, Abbasi and Irfan (1983) highlight the importance of remittances for receiving households in terms of school enrolments in both urban and rural area. They find that school enrolment between boys and girls was higher for remittance receiving households than the non-migrant households. Recently, a Kock and Sun (2012) paper tries to answer the question as to why remittances in Pakistan have gone up and what were the factors responsible for its growth. The paper's key findings are as follows; first, it is due to an increase in worker migration in recent years and second it is due to more skilled than unskilled migration. In Pakistan, the

research lacks fundamental issues relating to household level determinants of both internal and international migration in a single study to separate two competing choices. However, the studies have been conducted to separate out the macro and micro-level impact of remittances. At the macro-level, remittances are the stable and valuable source of foreign exchange earnings, especially for the countries, which have largely experienced negative current account balances (Ratha, 2006). The nature of data is a major concern with this kind of studies. These studies use only the official data (the money sent through formal channel and informal remittances are not recorded), so it is very difficult or impossible to accurately measure the true size of remittances flows. At the micro level, a number of studies have been conducted in Pakistan, particularly on the impact of remittances on well-being and poverty reduction of the recipient households.

3.1.2 General overview of the migration literature

Todaro (1969) and Harris and Todaro (1970) provided a rigorous theoretical framework, which presented a two-sector model of rural-to-urban migration. This approach assumed that an individual migrates to the urban sector from the rural sector when the 'expected income' in the urban sector is greater than the rural sector. Todaro (1969) theoretically showed that migration is the response due to income differential between rural and urban sectors, but did not account for changes to the welfare of the rural sector after migration because the loss of productivity in the rural sector could have potentially large implications on overall growth in less-developed countries. The Harris-Todaro model (1970) was the first theoretical model, which considered the welfare aspect of migration and used a static framework consisting of risk-averse individuals. Subsequently, Borjas (1987, 1989) applied the Harris-Todaro model of internal migration with some modification to international migration. Similarly, Bauer and Zimmermann (1998) made slight modifications in the neo-classical model by assuming migration as an investment in human capital and further included the cost and risks of migration in order to explain migration selectivity. The neo-classical migration theory and Harris and Todaro models argued

geographical differences in expected income and wages as major drivers for migration. De Haas (2010) argues that the Harris-Todaro model didn't take into account other factors such as strong networks which usually migrant's share, labour market, power inequalities, policies, states and social group formation. These factors strongly affect individual decisions to migrate or choices of migration destinations.

The new economics of labour migration (NELM) developed by Stark and Bloom (1985) and Stark (1991) tried to counter the narrow focus of neoclassical models of migration. The NELM argues that migration is difficult to explain within a neo-classical framework, particularly under conditions of poverty and risk. Furthermore, NELM disagreed with the conventional neo-classical models that migration is the outcome of an individual's decision to maximize income into well-functioning markets based on the rational cost-benefit calculation. NELM hypothesizes that migration is a collective household strategy to spread income risk associated with market failures rather than the only response of income-maximizing individuals to expected wage differentials (Stark and Bloom, 1985; Stark and Levhari, 1982; Stark and Taylor, 1989, 1991). The NELM explains that migration is not the outcome of an individual's decision to migrate but that of the household in which, people act collectively not only to maximize expected income but also to minimize risks and to overcome the constraints associated with a variety of market failures (such as capital and insurance market that are imperfect, inaccessible, or non-existent). Given these sorts of market failures, which are common in developing countries, people migrate not only to reap a higher benefit but also to manage risk and gain access to capital. Unlike individuals, households are in a better position to diversify their allocation of labour to control risks to their economic wellbeing. In the event of crop failure in rural areas or other natural calamities, the household can rely on migrant remittances for support. NELM also argues that relative deprivation and income inequality within sending societies are major drivers of migration (Skeldon 2002; Stark and Taylor 1989).

The recent literature on migration determinants is dominated by household level studies unlike in the past when individuals were the main focus. Such studies have tried to relate migration to a host of household level variables, such as the education, gender, age of the head of the household and landholding of household, etc. The use of longitudinal data has the ability to highlight the migration decision-making process. The research conducted within the area of migration is dominated by research on Mexico. The empirical analysis of Stark and Taylor (1989) supports the view that relative deprivation in rural Mexico play a significant role in the decision of poor Mexicans to migrate to the USA. Migration is an effective tool for achieving income gains by migrant sending households. In addition, controlling for absolute income gains, the probability that households participate in migration is directly related to the household's initial relative deprivation. Similarly, Lipton (1980) and Stahl (1982) argue that migration is an expensive decision due to the cost that is associated with it and therefore, is only accessible to economically better-off households, particularly for international migration. It may be concluded that there is lack of consensus amongst researchers in explaining migration, which might have resulted in different socio-economic factors depending upon either absolute deprivation or economically better-off households.

A structural model of migration for rural Tunisia by Hay (1980) is a simplified version of a microeconomic model describing the relationship between migration behaviour based on rural and urban earnings and individuals characteristics. This paper argues that schooling, job skills, and work experience affect the probability of migration. However, the rate of return to these investments in human capital differs between the rural and urban sectors. King and Skeldon (2010) argue that the literature of migration is dominated by micro and macroeconomic studies. However, micro-level studies are further divided into internal and international migration, which is characterized by different literatures, concepts and policy agendas. Despite the fact that internal migration is more important but scholars nowadays is paying more attention to international migration. The distinction between internal and international migration is not clear due to

globalization, geopolitical events and the changing nature of borders. The study of migration without the reference of internal to international migration may result in a partial analysis because there is a considerable potential at both theoretical and empirical levels for bringing together the study of internal and international level migration. Furthermore, internal and international migration decision-making processes by the individual or household are influenced by a different set of economic, social, political and cultural factors.

The relationship between internal and international migration has not been sufficiently highlighted, identifying similarities and differences between the two types of migration. However, Light and Johnston (2009), and Finney and Simpson (2009) try to link internal migration with international migration within the frame of overall migration. These studies find that internal migration usually leads to international migration. Furthermore, international and internal migration may be alternative responses to available opportunities; the migrant's selection between internal and international migration may also be dependent on opportunities. To consider one form of migration without the other will result in a partial and unbalanced result (Skeldon 2006). In another study, Findley (1997) writes that the migrant's characteristics depend on economic, political, cultural and local conditions. But there are important variations across different countries and communities. Conceptually, according to the above-mentioned research, both types of migration, internal and international, derive from the different set of socio-economic factors, which includes inequalities in regional development, employment opportunities, incomes and living conditions, law and order conditions, infrastructure facilities, health and education, between and within countries. Internal and international migration is thus complementary and can indeed supplement or substitute each other. According to Czika (2012), the links between internal and international migration have recently begun to attract attention from the policy makers to disentangle underlying factors and forces.

3.1.3 The relationship between landholding and migration

A number of studies have examined the relationship between household landholding and migration, but still it lacks unanimity regarding the relationship. The studies that finds a negative relationship between migration and landholding includes; Nabi (1982), Hoddinott (1994), Massey et al. (1990), and Zhang and Song (2003). The Nabi (1982) research finds a negative relationship between internal migration and landholding in three villages of the Punjab province in Pakistan. Haddinott's (1994) migration model included both individual- and -household level characteristics to reach the same conclusion for Western Kenya. Massey et al. (1987) conducted a comprehensive study using data from twenty five Mexican communities to arrive at a negative relationship between landholding and migration. Similarly, Zhang and Song (2003) used survey data from the province of Hebei to conclude that migrants mostly originate from the landless farmer population in terms of the most disadvantaged in China. On the other hand, the studies that found a positive relationship between landholding, and migration includes Mines and Massey (1985) and Rozelle et al. (1999). The former studied the migration behaviour of two Mexican communities, and the latter studied migration from rural China. Most of the research discussed above use a dichotomous of whether a household owns land or not, or they make comparisons between large farmers and small farmers, whereas in our study, land is available as a continuous measure. We use the pre and post migration landholding to avoid the reverse causality between landholding and migration.

A number of studies also try to look at the relationship between remittances and asset accumulation in Pakistan. For instance, Adams (1998) uses 5 years panel data (1986-1991) of 469 households in four rural districts to study the first-order effects of internal and international remittances on rural asset accumulation in Pakistan. This study finds that households treat international remittances as transitory income (temporary shocks to income), which may be used for investment. By contrast, households treat internal remittances as a mixture of both permanent and transitory income, which may be used for both consumption and investment. Finally, it is

concluded that international remittances play a more important role in asset accumulation in rural Pakistan than internal remittances. In rural areas, the landholding is an important factor for migration in the absence of an informal and formal lending agent in Pakistan (Irfan, 1989).

The importance of landholding for the rural household economy has been highlighted in the literature by researchers. For example, VanWey's (2005) study is based on eight ethnic groups over the period 1991-2001 at the district and national level in Mexico. This study argues that, at first, land in rural areas serve as wealth for households (view land as an asset that can be made liquid with relative ease), as an investment opportunity (due to the absence of the financial sector to mobilize household saving), as employment (related to farming activities) and as an opportunity for migration through inequality in ownership (it motivates deprived household in terms of rural landholding to migrate and accumulate land). On the one hand, households living in rural areas respond differently to the available opportunities, because landholding can provide an employment and livelihood for rural households discouraging them to migrate. Similarly, Massey and Espinosa (1997) defines land as an "investment opportunity" for households to overcome market failures in the absence of the credit and insurance market in developing countries, and migration is a response to purchase land, when credit to purchase of land in unavailable. So, we take land as the household-level investment opportunity for productive investment. The less land a household owns, the more need there is for migration to purchase the land. Furthermore, productivity of land also depends on the household-level opportunity to invest in modern inputs such as moving from staple crops to cash crops, purchasing fertilizer, insecticides, irrigating land, herbicides and investing in high-yielding varieties of crops all require capital that is often inaccessible in rural areas of developing countries. In this case migration may be a response from a household to enhance productive capacity of the land.

Rodgers (1991) argues that households may be motivated by their relative deprivation in land ownership because land represents both current and future incomes to the household. It is

reasonable to assume that households compare their landholding with other households within the community, so migration would then be driven by the need for capital to purchase land, which would then improve their position on the distribution. However, Cain (1985) discusses “Land-Security Hypothesis” and “Land-Labour hypothesis," which states that land provides security to households in the absence of well-functioning credit markets in rural areas of developing countries. Land can be regarded as security in a rural setting where financial markets are poorly developed and social security systems do not exist. The risk of natural calamity is the only main risk that may directly or indirectly affect the security of land assets. More direct threats include land reform. The increase in size of landholding will also increase opportunities for labour employment; consequently, demand for farm labour should also increase. In this context, Murray’s (1981) studies on the impact of labour migration in Lesotho finds migration was linked to rural economic insecurity, which supports NELM that households take migration as a risk spreading strategy and argues that household also takes into account incomplete and imperfect information.

Findley (1987:166) argues, “Families with low incomes are expected to be more likely to migrate than high-income families, because they seek additional income sources or jobs to mitigate their poverty. This is consistent with the model of family migration for survival”. Additionally, Family Farm Status, in an agrarian setting, and family socioeconomic status is often tied up to its landownership position. It is hypothesized that farming, as tenants or landowners, will deter migration, but only if farming yields a sufficient income. Family size is hypothesized that the greater the household size, the greater the probability that someone in the family will migrate. It is also expected that if no one can take over the work of the migrant worker, the family may not be able to release that person, despite the expected net gains of migration. A large number of dependents in a family can stimulate the migration of other family members, but dependency alone may not engender migration. Studies in Keyna, Mexico and India showed that migrants are

more likely to come from large families in which there are other adults who stay behind while the prime candidates migrate.

3.2 Chapter five review of the literature

3.2.1 Determinants of remittances

The literature related to the determinant of remittances is divided into two main schools of thought internal and international remittances by using macro or micro-level data sets. The macro-level studies only focused on international remittances and its impact on the receiving countries (Lartey et. al., 2008), while the studies using micro-level survey data focused on the impacts of internal and international remittances on the origin communities (McKenzie and Rapoport, 2007). The origin of migration studies started from rural to urban areas thereby focusing on internal remittances (Todaro, 1969). Over the last two decades academic attention has diverted to international remittances due to its size and considerable impact on the receiving countries (Garip, 2014).

The determinants of remittances rages from pure altruism, inheritance-seeking hypothesis, insurance, loan repayment, and exchange motive to risk-diversification strategy (Lucas and Stark 1985; Stark and Taylor (1989). In a similar line of research, many studies have shown that remittances reduce poverty in the origin communities (Adams and Page 2005; Massey et al. 1993) by providing small-scale investment opportunities (Yang, 2008) and helps to accumulate wealth in term of land in rural economies (Adams, 1998). Other strands of literature studied the relationship between remittances on GDP growth (Barajas et al. 2009; Clemens and McKenzie, 2014), child participation in education (Yang, 2008), multiplier effects (Taylor et al. 1996) and networking effect (McKenzie and Rapoport 2007).

There is also a pessimistic view that remittances may create a cycle of dependency among non-migrant household members if remittances are used only for demonstration effect or solely for consumption (Garip, 2014). Remittances are a stable source of capital for developing countries (Mohapatra, et al. 2012), but it is unsustainable in the long run due to tougher immigration policies and border control (Mills 1999), it can decay or decline over the passage of time (Gammage, 2006), it may contribute to brain drain (Adams 2003), can result in the reduction of the labour endowment in origin communities (Miluka, et al. 2010), and leads to inequality in origin (McKenzie 2006) and inflation in local prices. The recent economic recession proved remittances as a resilient source of income for many destitute household in developing countries (Martin, 2009), which is tied with the well-being of receiving household to cope with poor local economies, labour market failure, and non-existence of insurance markets through its direct and indirect effects (Cohen, 2011). Research has strongly suggested that remittances maintain connections between migrants and their community through community development programmes, dissemination of knowledge for acquiring overseas jobs and supporting friends and family member on their arrival in overseas (Heyman, et al. 2009).

This study contributes to the literature by studying the relationships between participation and the amount of remittances in rural Pakistan. Millions of households are the beneficiaries of receiving remittances in the world, which is the source of rural livelihood in many developing countries. The studies in the rural Pakistan setting find that rural households accumulate land through remittances (Adams Jr. 1998), both remittances to origin households and savings retained abroad fall with the pre-migration loan (Ilahi and Jafarey, 1999), and international remittances serve as transitory income shocks (Alderman, 1996).

3.3 Chapter six review of the literature

3.3.1 Background

Pakistan's population was 30 million in 1947, which has increased by a factor of 6.2 in 63 years to reach approximately 185 million in 2010 (Burki, 2012). At 3.2% the annual population growth rate of Pakistan is one of the highest in the world. Historical trends of population growth rate are as follows: the average rate of population growth was around 2 percent over two decades spanning from 1950 to 1970, and it increased to 3.1 percent during 1970 to 1990. However, it slowed down to fall slightly below 2.5 percent in last two decades. This has been coupled with a rapid urbanization which led to increased internal migration, creating social and economic problems accentuated by inadequate public policies and planning. The United Nations Population Division has recorded that the urban population of Pakistan reached 48 million in 2010, double that from 2000, and estimated that it is expected to reach around 104 million in 2025. At the start of this century, around 33 percent of the population lived in urban areas, a figure that is expected to increase to 44 percent in 2025. The rate of growth of the rural population is expected to decline from 1.3 percent in 2000-05 to only 0.28 in 2020-25. This would lead to a migration rate (from rural to urban) exceeding the natural rate of growth of the rural population.

One might suspect that high population growth, urbanization and neglected agriculture (where three-quarters of the population live in the rural area) coupled with unemployment, inflation and unsuccessful transition from agriculture to the industrial sector (the nationalization of the industrial sector in 1971 acted as a big blow to the confidence of investors) led to a high rate of migration. Meanwhile, the oil boom in the Middle East provided an escape route to poor Pakistani workers. The shortage in the labour force faced by Middle East countries attracted many labourers from neighbouring countries such as India, Pakistan and Bangladesh. Pakistan's diaspora in the Middle East had a great impact on its early economic, political, and social development.

An estimated 4 to 5 million Pakistani workers were working in the Middle East in the 1970s, which resulted in a huge contribution to the economy in the form of remittances. A pool of roughly three to four million migrant workers earned higher wages. Most of them had a very high propensity to save, because they left their families at home; so then remitted nearly all of their savings back to Pakistan. Total remittances were around $25 billion between 1974 and 1988 through the official banking channels. But there was also a sizeable $10 billion that came through unofficial/informal non-banking channels such as friends or *Hawala* (*Hundi*). The contribution of remittances was almost 10 percent of Pakistan's gross domestic product, particularly in the 1970s and 1980s (Burki, 2012). This bounty in the form of remittances not only contributed to the foreign exchange reserves of the country, but also helped many families to lift out of the vicious cycle of poverty.

This was followed by another important era of international migration where the destinations of Pakistanis became the USA, Canada, and the UK, which has remained a traditionally popular destination. The migrants to Canada and the United States were comparatively more educated than the Middle East bound migrants; and the North American diaspora was also more prosperous than the diaspora in the Middle East and Britain. The North American diaspora (more skilled migration) contributed more in terms of remittances which, in turn, helped the development of the social sector such as health and education in Pakistan.

But this trend is not unique to Pakistan. The world has become more open for importing foreign workers from developing countries in the last two decades; global remittances to developing countries have increased manifold from $17.7 billion in 1980 to $30.6 billion in 1990; and further to nearly $80 billion in 2002 and $406 billion in 2012. Despite its importance for the receiving household, it also emerged as the single biggest source of foreign exchange for poor countries overall.

The officially recorded flow of remittances to developing countries is now three times larger than the amount of official development assistance. Furthermore, according to the international migration annual review[20], the total number of international migrants throughout the world was estimated at 214 million in 2010, compared with 191 million in 2005. According to the United Nations Development Programme (UNDP), the estimated number of internal migrants was 740 million in 2009.

The principal beneficiaries are lower middle income countries, where per capita income ranges from $736 to $2,935; and remittances were double the amount of foreign aid and ten times higher than net private capital transfer (Kapur and McHale, 2003). The International Organization for Migration (IOM) estimates that 154 million people were living outside their country of birth in 1990; increasing to 175 million in 2000 and to 214 million in 2010. Out of that, 60 of percent the migrant population resided in developed countries. Oil-exporting Persian Gulf countries constitute more than 50 percent of foreign labour.

3.3.2 Remittances

Remittances are the stable source of income for developing countries unlike other sources such as aid, foreign direct investment (FDI) and loans. The remittances have ability in protecting households against natural disasters and coping with consequent losses. Evidence from many countries confirms this. For example, in Bangladesh per capita consumption was higher in remittance-receiving households than in others after the 1998 flood. Ethiopian households that receive international remittances rely less on selling assets or livestock to cope with droughts (Mohapatra et al., 2009). In addition, remittances provide an opportunity for investment in those communities where credit markets are missing or not functioning properly. Furthermore,

[20] For more detail see International Migration Annual Review 2010-2011.

remittances offer an opportunity for investment, which is necessary for the development of the community above and beyond their basic needs for capital (Kapur, 2003). Remittances have the potential to expand productive capacity in receiving communities through reshaping their agrarian economy by enabling them to adopt modern techniques of production, such as, fertilizer, pesticides, insecticides, hybrid seeds and availability of water. This source of income may be channelled into development projects, which include community related small and medium enterprises, leading to further employment opportunities for local communities (De Haas, 2010).

De Haas (2005) writes that the percentage share of international migrants in the global population over a century has remained stable between 2.5 percent to 3 percent. This fact reveals that we are not living in the era of mass migration. That is to say, 'globalization' has not given a specific boost to international migration. Secondly, the contribution of remittances from international migrants represents only 1.3% of the total GDP of all developing countries in 2001. Furthermore, highly skilled migration may result in useful effects such as counter-flow remittances, investments, trade relations, new knowledge, innovations, attitudes and information. Since the 1970s it is believed that remittances are mainly spent on conspicuous consumption and non-productive investments such as on houses, flats, cars, clothes and imported consumption goods. Many studies have concluded that migration might not lead to passive dependency on remittances, but will also result in an increased economic activity and wealth to non-migrant households through the positive multiplier effects of remittances. It follows that remittances significantly result in a general increase in the well-being of migrant sending areas in the long run.

A study by Massey (1990), stresses that the community level-variables influence household migration decisions in various ways. Firstly, the inequality of landholding in different communities affects the probability of migration. Secondly, better access to the transportation sector in a community may enable individuals to migrate internally first and then internationally.

The optimistic view of migration argues that remittances promote good institutions or result in an institutional growth. Remittances are used to invest in youth education, farm land, buying of commercial land, enhancing agricultural production and generating employment opportunities. Alternatively the pessimistic view argues that remittances are wasted: local opportunities for production and employment do not expand; forcing others to migrate. Remittances create income inequality with the rural communities, giving rise to a sense of relative deprivation among non-remittance receiving households.

Kapur (2003) elaborates on five features that contribute to the importance of remittances. Firstly, they are a stable source of external financing for developing countries unlike other financial flows such as debt, aids and FDI. The remittances of developing countries have emerged as the second largest source (after foreign direct investment) of net financial flows, which are contrasted to the net official flows (aid plus debt). The developing countries received a total amount of $72.3 billion as remittances, which was one and half times net Official Development Assistance ($52 billion) and half the net private flows (FDI plus debt flows) amounting to $153 billion in 2001. Secondly, the amount of international remittances does not flow to the poorest countries; half of the remittances to developing countries flow to lower middle-income countries, while the remaining half are received by upper middle-income countries. Thirdly, remittances have developed into either a critical insurance mechanism or the most stable source of financial flow for poor countries stricken by natural calamities, economic crisis, political crisis, international sanctions and failed states. Fourthly, many small countries such as small islands in the Caribbean and the Pacific rely heavily on remittances, often combined with foreign aid and tourism as sources of income. Finally, in the case of foreign aid, the net benefits of foreign aid might go into the pockets of a corrupt government official, whereas remittances can flow directly or indirectly into the pockets of the general public. That said migrant households who receive remittances, enjoy a higher living standard than non-migrant households. Remittances may reduce the inequality within a region, if they mostly flow to poorer households; but may also increase

inequality across different regions because certain communities tend to migrate more than others due to the different social networks they belong to.

Borjas (1987) argues in favour of the negative-selection hypothesis, which states that in poor countries, migrants are those with below-average skill levels; and migration usually comes from the poor households or relatively deprived households. Chiquiar and Hanson (2002) find evidence of a positive-selection hypothesis in the case of migration from Mexico to the United States. Regardless of a positive or negative-selection hypotheses, (either migrants drawn from poor or relatively rich households) remittances are poor-friendly through their indirect multiplier effects. Remittance-receiving households are more likely to have higher propensity to save than other households. In another study, Woodruff and Zenteno (2001) find that remittances are responsible for almost 20 percent of the capital invested in microenterprises throughout urban Mexico.

The importance of remittances for developing countries can be grasped from this paragraph…"In contrast to foreign investment or loans, remittances are insulated from the herd behaviour of private investors and money managers. In financial terms, remittances are a free lunch. While other sources of capital carry a cost for the receiving country, be it interest payments for loans or profit repatriation for investments, remittances require no fees or services. Within the development community, remittances strike the right cognitive chords. They fit in with a communitarian, "third way" approach—neither inefficient socialism nor savage capitalism—and exemplify the principle of self-help. People from poor countries can just migrate and send back money that not only helps their families but their countries as well" (Kapur and McHale, 2003, p.50-51).

De Haas (2005) highlights the importance of remittances for receiving communities in the following way: "What seems essential is that remittances, just like any other source of additional income, potentially give migrants, households and communities greater freedom to concentrate their activities and to allocate investments to those economic sectors and places that they perceive

as most stable and profitable. Thus, depending on the specific development context at the sending end, remittances may enable households to retreat from, just as much as to invest in, local economic activities." It follows that remittances have an ability to provide a safety net for relatively poor and backward rural regions that are most in need of development capital. Unfortunately, existing research ignores the selectivity and heterogeneity of the impact of migration and remittances on the development of migrant-sending communities and countries. This selectivity process in migration ensures that the direct benefits of remittances are also selective and do not tend to flow to the poorest members of communities. This implies that migration and remittances do not result in economic development of migrant-sending communities, and there is a need for linking migration with development policies.

Moreover, Kapur (2003) accentuates the factors that contribute towards the growth of remittances. The most significant factor is the surge in legal or illegal annual flows of migrants, particularly to rich countries. Other factors include the economic and financial crisis in developing countries in the past two decades, foreign exchange controls and the absence of state machinery in developing countries; plus the switching in remittances from informal to formal channels.

3.3.3 Multilevel analysis

Multilevel modelling is used to handle clustered or grouped data. In the multilevel approach, random variations between groups are modelled and aggregate patterns of variation are examined. Multilevel designs are suitable where individuals are nested within social contexts and for observing both contextual effects and the aggregate outcomes. The structure of random effects may also have important policy implications (Garip, 2012). Findley (1987) highlighted the use of the multilevel model of migration by assuming the household as a basic decision-making unit in the Philippines; arguing that inclusion of higher units such as, village and district in the analysis

maximizes the chance of intra-unit differences while minimizing the chances of unobserved multilevel effects at the smaller level of aggregation. He further argues that if the process of migration involves interactions (group characteristics affect the individual behaviour through individual or household characteristics), then group characteristics or a community's characteristics must be included in the analysis to get consistent estimates.

In our context, household and community characteristics include: family size, economic status, family farm status, family human capital, community socioeconomic development, community facilities, community agricultural situation and community migration history. It can be concluded that cultural and social integration, labour market structure, existence of an insurance market, transport and infrastructure affect the choices a household makes related to migration and remittances. We study the community effects at various levels of spatial aggregation. Multilevel migration models provide a variety of links between household and community characteristics and help identify how they jointly determine remittances. Remittance is an outcome of household decisions, which depends on regional socioeconomic conditions. These regional conditions are, in turn, affected by political, social and economic structure. Therefore, analyses benefits greatly by using multilevel models.

While adopting a multilevel analysis, we follow the approach of the new economics of labour migration (NELM) where the unit of study is a household rather than an individual. Developing countries such as Pakistan present a good example for the application of NELM, because here the unit of analysis is a household. In a rural setting, a poor household usually does not have access to the credit market. Even the availability of a credit market in rural areas does not ensure that poor households will get a loan due to the favouritism practised by formal credit institutions towards big landlords.

3.4 Chapter seven review of the literature

3.4.1 Background

Migration and Development Brief 21 (2013), issued by the World Bank, noted that the developing world received $414 billion (in remittances in 2013 (an increase of 6.3 percent versus 2012) and this is projected to reach $540 billion by 2016. Globally, the world received $550 billion in migrant remittances by 232 million international migrants in 2013, and this is projected to reach $700 billion by 2016. Since 2009, there has been an increasing trend in remittances. Remittances are the second largest source of capital flowing into developing countries after foreign direct investment and nearly three times the size of official development assistance. During the financial crisis of 2008, remittances seem to be a more resilient source of capital for developing countries than foreign direct investment and official development assistance.

Remittance flows to South Asia are projected to reach approximately around $114 billion in 2013. There are nearly 35 million cross border migrants from the South Asian Region (SAR), and about 10 million have migrated within the region. The internal migrants within national boundaries are nearly 10 times larger in South Asia. Remittances growth rate was 6.8% in 2013 after averaging 14.1% in 2011 and 2012 in South Asia Region. The five lowest cost corridors for sending $200 in South Asia regions are Singapore to Bangladesh, UAE to Pakistan, Saudi Arabia to Pakistan, UK to Pakistan, and UAE to Sri Lanka. Similarly, the five highest costly corridors for sending $200 in South Asia; Canada to India, Germany to India, France to India, Singapore to Pakistan, and Japan to India. There is a need to reduce the cost of remittances transaction, whether promoting competition by avoiding exclusive contacts or effectively utilizing postal networks in order to increase the net receipts of the intended beneficiaries, many of whom are poor. For example, the remittances flowing from the USA to India were almost $11 billion in

2012 with an average transaction cost of around 4.8 %. If this cost is reduced from 4.8% to below 2% this would have resulted in an additional $333 million going to beneficiaries in India. Similarly, from Singapore to Pakistan, such a reduction from the current 15.3% could result into an additional $52 million going to beneficiaries in Pakistan. These large sums of money could benefit a large number of remittance receiving households in developing countries.

Pakistan is in top ten recipients of officially recorded remittances for 2013 (roughly around $15 billion). In nearly 14 developing countries remittances are higher than foreign exchange reserves and it is almost 137% of the foreign exchange reserves in Pakistan. As many emerging economies are facing a deteriorating balance of payments, in this case the remittances are serving as a lender of last resort in the form of a permanent source of foreign currency earnings.

Remittances have been a focal point of interest for both the private and public sectors after its immense growth through formal channels during the last decade. In the private sector, remittances attracted substantial attraction from remittance transmission operators such as, Western Union, MoneyGram, Banks, and credits union. Mobile banking is part of other financial institutions providing money transaction services in recent years. In the public sector, many governments in developing countries have established public sector agencies to direct international migrant remittances for national economic development. The Government of Pakistan, after realizing its importance as a permanent source of capital unlike other financial transfers such as official development assistance (ODA), constituted a formal body to deal with oversees remittances in a more productive setting. The State Bank of Pakistan (SBP), Ministry of Overseas Pakistanis, and Ministry of Finance initiated the Pakistan Remittance Initiative (PRI) in 2009 to serve as an ownership structure for remittance facilitation in Pakistan. Moreover, its other objective includes facilitating and supporting, faster, cheaper, convenient and efficient flow of remittances. Example of the other public sector agencies includes India's Ministry of Overseas

Indian Affair (MOIA), El Salvador's Vice-Ministry for Salvadorans Abroad, and Philippine Overseas Employment Agency (POEA). The actual remittances flows would have been larger than those registered in official data sources by taking into account money sent through a variety of nonfinancial firms or brokers known as informal channels systems such as *hawala*, *hundi* and *padala*. Migration and Development Brief 21 (2013), issued by the World Bank, notes that about two-third of remittance recipients in the South Asia Region are using informal channels to make transfers, with very few using both informal and formal mechanisms.

The literature in economics has already shed light on issues such as why migrants send remittances? What are their motivating factors? The answers to these questions falls between altruism, loan repayment, exchange, insurance, investment in small and medium enterprises, education, and for consumption smoothing (Rapoport and Docquier, 2006; Stark, 1995; Hoddinott, 1994; and Ilahi and Jafrey, 1999). Even so, other literature in economics focuses on the remittances receiving households and countries by using cross-sectional data at the country level. Research analyzing the relationship between remittances and economic growth at the national level is inconclusive, with some studies find negative relations (Chami et al., 2003) and others finding a positive relationship (Faini, 2007). However, research using micro data is more conclusive in establishing a better identification by separating consumption or investment expenditures to understand remittance impacts in more details on receiving households. Some studies find that remittances mainly go to unproductive investment mainly for higher consumption (Brown and Ahlburg, 1999); yet other research finds that remittances are mainly used for productive investment (Adam, 2003; Dustmann and Kirchkamp, 2002). However, Yang (2011; 137) writes that "A central methodological concern with existing work that attempts to understand the effect of remittances on household consumption or investments is that migrant earnings are in general not randomly allocated across households, so that any observed

relationship between migration or remittances and household outcomes may simply reflect the influence of unobserved third factors".

Remittances serve as a risk diversification strategy and as insurance for the households, which are severely exposed, to natural calamities such as droughts, flooding, storms and earthquakes in many developing countries. In that situation, households greatly benefit from remittances, which serve as an insurance in the absence of the well-functioning credit market to satisfy their need for additional capital for health, education, and daily consumption (Sana and Massey, 2005; Stark, et al. 1986). In another study by Ashraf, et al. (2011) using the randomized controlled trial among migrants from El Salvador to answer the three basic questions; motivations for migration, intra-household resource allocation, and what might instigate remittance flows or channel them towards more productive uses in migrant source countries? Their study finds that migrants control over saving accounts will result in saving accumulation in destination and home country.

3.4.2 Multiplier or Peer effects

Our paper belongs to the literature, which tries to clarify the contribution of social interaction on household-level remittances. We are not aware of studies analyzing the influence of neighbors on household level remittances decisions. Although, the literature of migration and social network highlight the importance of networking which facilitate migration and reduce cost of migration (McKenzie and Rapoport, 2007). The overall impact of remittances on economic activities for the origin communities is still unclear. Whether it induces more investment or consumption and its impact on migration decisions of other community members is still an open question. But some sort of communication and social interaction between migrants and non-migrants households at origin communities exists. The coexistence of migrant versus non-migrant households produces "peer pressures". This kind of interaction in economic literature is also called "knowledge

spillover" or "social network" (Cornelissen, et al. 2013). In sociology this kind of social network is labelled the cost-reducing factor of migration. Massey and Espinosa (1997) argue that social networks play an important role in increasing migration by showing the preferred routes and techniques of crossing borders, which will result in the increase of remittances, by creating peer pressure for non-migration households at origin. In a similar line of research Munshi (2003) and McKenzie and Rapoport (2007) find that households with larger social networks are more likely to have a migrant member and find jobs at destination countries more easily, hence resulting in lower cost of migration. As a result, net remittances that flow to the origin communities will result in multiplier effects.

Our research allows us to examine the multiplier effects of remittances. This research is not restricted to direct or indirect effects of remittances detailed above, but is interested in multiplier effects of remittances, which are generated through social interaction. Remittances can produce multiplier effects through their spending on products and services produced by other community members, and other spillover effects. This also includes the social interaction effects of migration on the costs and benefits of remittances for other community members. Previous literature has not examined the multiplier effects of remittances focusing instead mainly on the effect of remittances alone on receiving communities. Similarly, Stark, et al. (1986) analyzed the direct effect of remittance income in two villages in Mexico. This study compares the household income with and without remittances and finds that remittances reduced inequality in receiving villages. If remittances result in reducing inequality, then there is no doubt about the indirect effect of remittances in the origin communities. It may be concluded that remittances has an ability to produce the multiplier or peer effects. Yang (2011; 130) writes "remittances are more readily observable for analysis than other financial intermediaries and are also often asked about in household surveys in developing countries. Analysis of remittances has the potential to shed

new light on old debates over whether intra-household resource allocations can possibly be viewed as made by a unitary decision maker".

Most of the empirical studies have estimated the social multiplier in a diverse area such as schooling performance, financial decision and criminal behavior. Examples include Graham's (2008) study that uses the new method for identifying social multipliers through conditional variance restrictions and finds that differences in peer group quality were an important source of individual-level variation in the academic achievement of Project Student-Teacher Achievement Ratio (STAR). A similar study by De Giorgi, et al. (2010) using the linear-in-means model of social interaction and shows that identification is still possible in case where peer groups do not overlaps fully to study peer effects in the choice of college major. Their results show that individual behavior is influenced by the peer behavior to choose a same major (subject) and peers can divert students from majors in which they have a relative ability advantage, with adverse consequences on academic performance, entry wages and job satisfaction. In another study by Towe and Lawley (2013) examining the contagion effect of residential foreclosures in Maryland for the years 2006-2009 based on 13 nearest neighbors, findings indicate strong evidence of social interactions to influence on default decisions where the interaction is based on neighbors' behavior in a previous period. They find that a neighbor in foreclosure increases the hazard of additional defaults by 18 percent, which further leads to temporary reduction in local house prices and a negative social multiplier effect of foreclosures.

The study by Maurin and Moschion (2009) using neighbor children sex mix as an instrumental variable find that neighbor labor-force participation has a positive and significant effect on a mother's participation. However, the main finding follows that mother's labor market participation is influenced by the sex composition of her two eldest siblings and also by the other mothers living in the same close neighborhood. Additionally, their study also concludes "the

precise size of this social effect is difficult to evaluate." Another possibility is that neighborhoods matter a lot, but their effects are hard to detect with the methods that have been used. The social multiplier literature explores the effect of neighbors on individual decision. The influence of neighbors can generate the positive externalities through a small change in the distribution of private incentives and resources. This positive externality is known as a "social multiplier" which arises from neighborhood effects. Households living in the same close neighborhood influence each other participation decisions, whether, due to the same background or knowledge spillover. Similarly, this line of research also has been employed to the estimate crime as the outcome behavior. Drago and Galbiati (2012) used the 2006 Italian prison pardon to exploit the peer effects in criminal behavior and find that the reduction in the individuals' recidivism due to an increase in their peers' residual sentence is at least as large as their response to an increase in their own residual sentences where the social multiplier of crime is equal to two. However, Duflo et al. (2011) use a randomized tracking experiment conducted in 121 primary schools in Kenya to find that lower-achieving pupils are likely to benefit from tracking when teachers have incentives to teach to the top of the distribution.

Only few have studied the peer effect in the labour market such as one study by Guryan et al. (2009) in the field of professional golf tournaments to estimate peer effects in the workplace using random assignment. This research finds no compelling evidence that playing partners' abilities affect performance, contrary to recent evidence on peer effects in the workplace from laboratory experiments by Falk and Ichino (2006), grocery scanners by Mas and Moretti (2009) and soft fruit pickers by Bandiera, et al. (2009). This research is useful in explaining how a social multiplier varies across labour markets, and across individuals. These studies differ on the selection of outcome variables, but no study has gone beyond the conventional wisdom to study the remittances as an outcome variable to estimate the spillover or multiplier effects. Most transfer program such as food stamps, government intervention and Medicaid are targeted for particular social groups or deprived social groups to uplift their economic conditions through

affecting incomes by generating social interaction (Moffitt, 2001). Similarly, remittances are not much different from support programs, which too generate spillover effects in receiving households through affecting their income. A question addressed in this chapter is whether there is any empirical evidence that remittances have any spillover effects in receiving communities. The answer to this question, in turn, leads to an investigation of whether there have been internal or international migrations in the past which have had resulted in remittances that have been shown to have positive effects. This is the motivating issue for this paper. This study can also be seen as a contribution to the literature analysing the variation in remittance outcomes across districts or across subgroups of households within the districts.

CHAPTER FOUR

(ESSAY ONE)

Determinants of Internal and International Migration

4.1 Introduction

A history of the early contribution to the scientific study of migration begins with influential work of Sjaastad's cost-benefit analysis of migration (1962) and Harris and Todaro's (1969) probabilistic model of migration and unemployment focuses on rural-to-urban migration. As has been highlighted in the literature review provided in the chapter three, the key factors behind the rural out-migration are the lack of employment opportunities in the rural sector, natural calamities (such as floods, droughts, and earthquakes) and non-existence of a well-functioning capital market (e.g. absence of insurance markets). Households in low-income developing countries are particularly exposed to various income shocks for the aforementioned reasons, and personal saving is often the only way to cope with a downturn risk. Migration provides an opportunity not only to escape the rural economic uncertainties, but also to increase lifetime income and savings. International migration in particular, allows for a significant jump in income that can help a poorer household to come out of a low-income trap, however it also requires a more substantial cost of migration. It is well documented that relatively low-skilled workers from developing countries are employed in some labour scarce rich countries through international employment agencies. Overseas migration is therefore a feasible option for the poor, despite the higher costs when compared to internal migration.

Over the last two decades there have been some important contributions on international migration such as Massey et al. (1993), Massey and Taylor (2004) and Castles et al. (2005). Recently, all the positive benefits associated with migration conflict with concern over job losses for domestic labour from excessive immigration. This is emphasized by authors such as: Skeldon (2006)[21] and King and Skeldon (2010). There are not many empirical studies that have simultaneously considered both types of migration – internal and international – for a developing country in South Asia. Czaika (2012)[22] is an important exception and his study concerns internal and international migration for India. The existing literature on migration in Pakistan also focuses either on internal or international migration, without taking into account both at the same time[23]. For Pakistan, there are some notable studies, relating to internal or international migration, which are Nishat and Bilgrami (1993), and Oda (2007).

In this work we employ a household panel data from 1986-91 that covered four districts from three provinces of Pakistan to study location and migration. These provinces are Punjab (districts Faisalabad and Attock), Khyber Pakhtunkhwa[24] or NWFP (district Dir[25]) and Sindh (district Badin). The dataset is unique in the sense that it contains information on households having an

[21] This study tries to create a stronger link between internal and international migration in the Asian region. Internal and international migrations are integrated, and it is necessary to consider them as a unified system rather than in isolation. The hierarchical movements link richer and poorer groups together and need to be understood in the context of the implementation of programmes for poverty alleviation. By attempting to link internal and international migration, this paper emphasises the requirement for a more integrated framework for the study of migration.

[22] This paper uses the National Sample Survey of 2008 to study the likelihood of Indian out-migration (internal plus international) through disentangling the concept of relative deprivation by distinguishing feelings of individual and collective relative deprivation as sources of individual aspirations. For the likelihood of intra-state movements, both individual and collective relative deprivations are strong predictors. However, the likelihood of out-migration towards international destinations is significantly higher for households with lower levels of individual and collective relative deprivation. Our results are consistent that poor households or relatively deprived households have a stronger probability of out-migration either internally or internationally.

[23] As Gazdar (2003) writes in general, there is a need for more in-depth and focused policy-oriented research on both internal and international migration in Pakistan." However, Gazdar (2003) provides the compressive review of migration issues in Pakistan, although it is not based on the household level data (or empirical), and rather it is more descriptive in it nature.

[24] Formally known as the North-West Frontier Province (NWFP); Khyber Pakhtunkhwa is one of the four provinces that comprises Pakistan. In April 2010, the constitution of Pakistan was amended and the former NWFP renamed to Khyber Pakhtunkhwa. This paper identifies the province as NWFP because the data was collected under this name.

[25] The district was split into Upper Dir and Lower Dir in 1996.

internal migrant or international migrant or not having any migrant at all. It contains information on remittances, along with an array of household and individual level characteristics. For most of the households, migration decisions were made before the survey was conducted and the migration status did not change during the course of study period (1986-1991) when 14 rounds of survey were conducted. There were changes in remittances between survey rounds, but the landholding of the households did not change much. The initial landholding (recorded at the beginning of the survey) is a key measure of initial wealth. For this purpose, we use the pre-migration initial wealth and post-migration initial wealth, as detailed in the data section. Overall the data is rich, and this fact allows us to study the decision to migrate within the country or overseas, within one single model, and also to determine how migration might have been financed – by taking loans or by selling land. The dataset also contained information on loans and farm equipment.

We first investigate migration as a whole and then look at the more disaggregate spatial choice. The results provide evidence that households' human capital and specific assets are key determinants for migration. As a whole, we detect an intriguing size-composition effect on the household's probability of migration: the larger the household, the greater the probability of migration; an additional household member increases the likelihood by 2.9%. On the other hand, the more dependants a household has (in the form of children and young females), the less likely it is to have a migrant member. The number of children and young women appear to have significant and negative effects on the likelihood of migration by 2.5% and 2.9%, respectively.

Also, we see that the lower the pre-migration initial landholding (i.e. landholding observed at the beginning of the study period, which we interpret as part of the initial wealth, prior to the decision to migrate), the higher the probability of migration. This seems to suggest that poorer and desperate families are more likely to migrate, which is consistent with the 'push' theory of migration or deprivation theory (Stark and Bloom 1985). However, migration is costly even if it

is within the country. So how can a very poor family finance migration? It has to either borrow, or deplete its landholding to raise the finance. If the borrowing route is most commonly used, we should see that the probability of migration is positively related to loans taken. But the coefficient of loans is negative and significant - loans seem to have a negative effect on the probability of migration. It can therefore be concluded that migration is financed by selling off land, which explains the negative relationship between land ownerships and the probability of migration. Post-migration initial wealth variables mostly have a positive relationship with migration, but post-migration initial money borrowed from informal sources has assumed significance now. This might explain that households become more credible for repaying their loan if they have a migrant family member.

We can investigate these relations by separating the internal migrants from the international migrants and studying the determinants of these two types of migration. The household characteristics (consisting of household size and composition effects) are not similar for both types of migration in the size and significance of the coefficients. For internal migration, composition effects have a less dominant effect than international migration. We express the result in terms of odd ratios. The odd of the international migration is increased by 30% relative to a never migrant household with an additional member and it is 19% higher for internal migration.

There are also significant differences in the size and significance of the coefficients of pre-migration initial wealth and post-migration initial wealth. The negative coefficient of pre-migration initial landholding is larger for international migrants – 0.113 times that of the internal migrants. International migration is 11% more likely to occur with every one acre decrease in landholding compared to 1% for internal migration. In addition, a loan (informal borrowing) has negative and significant effect on the probability of internal and international migration.

This suggests that the two types of migrants differ in the way they face informal credit constraints. Neither is able to finance their migration cost through borrowing, as we would have seen a positive and significant coefficient for informal borrowing if this was the case. As migration involves a risk of not returning and not paying off the loans, having an outstanding loan adversely affects the probability of migration, possibly because of the local lenders insistence to pay off the loan before taking up outside employment. This is particularly so for internal migrants, who might not return to the village on a permanent basis. The sign of the loan variable is negative and significant. For international migrants the story is slightly different. The risk of not returning to the village is very low in this case, because low skilled migrants are not allowed to settle abroad. Therefore having an outstanding loan does not affect the chance of migration. A local lender here may even not be willing to lend some money toward covering migration costs, as the negative sign of the loan variable suggests. However, as the loan variable is significant, we can argue that the international migrants also finance their migration cost by selling land. This explanation seems to be consistent with the pattern of landholding borne out by the descriptive statistics (to be discussed in the next section). The international migrants have the least amount of land on average (7 acres of land), while the non-migrant household has the most (8.8 acres on average).

The post-migration initial wealth variables are insignificant but have a positive trend for both types of migration except for money remitted to relatives. The findings of this study are consistent with the fact that rural households face severe credit constraints. It is very difficult to secure loans for uncertain activities like migration, where the migrant cannot be directly monitored. Hence, household assets determine their capability to send migrants away, especially

when the destination of migration is abroad. Our results tally with the findings of two other studies for Pakistan, namely Kurosaki (2006)[26] and Nabi (1982)[27]. Kurosaki found that rural households in Pakistan dealt with the macroeconomic downturns of the 1990s by depleting livestock. Nabi showed that for internal migration at the household level, migration is negatively related to landholding in rural Pakistan. In sum, our findings support 'negative asset-migration hypotheses' rather than the deprivation theory.

However, results for international migration accentuate the importance of the district spatial development. For international migration costs can be significant, and financing of foreign travel is a major issue. It is therefore reasonable to expect that families who have limited access to credit will have to deplete their assets (such as land) to undertake such a migration. The insights of this analysis can be useful in forming public policy. Governments should facilitate greater movement of labour by reducing the cost of migration. The rural credit market should also be developed so that people can get affordable loans without having to sell land, which is a vital asset for survival in rural areas.

The remainder of this chapter is structured as follows: Section 4.2 and 4.3 discuss the data set and descriptive statistics respectively. Section 4.4 introduces the econometric method, and discusses the main control variables used in the estimation. Section 4.5 analyses the determinants of

[26] This study analyses the dynamics of assets held by low-income households in three villages in the NWFP during the late 1990s in Pakistan. Results show that the size of livestock holding was reduced in all villages hit by macroeconomics stagnation, while land holding was reported only in a village with inferior access to market. The author mentions the two types of non-agricultural sectors employment activities that have been growing; short-term migration (both internal and international) and rural non-agricultural activities in villages. Our concern is that the depletion of livestock and landholding may be used to finance initial migration cost, which is consistent with our finding and also to finance the non-agriculture activities.

[27] The four villages Khunda, Jatli, Mehdiabad and Chak in the Punjab province of Pakistan are studied in the analysis. This study tries to establish relationships between size, tenure, internal migration and input use and find a positive correlation between fertilizer use and migration. This may indicate that remittances from migration may be an alternative to borrowing in the village capital markets for purchasing these new inputs.

internal and international migration in Pakistan and the final section draws some conclusions from this analysis.

4.2 Data set

The data set relates to four rural districts of Pakistan (Faisalabad, Attock, Dir, and Badin). The data were obtained from the International Food Policy Research Institute (IFPRI) and is a longitudinal survey of households in rural Pakistan in the five years between July 1986 and October 1991 over 14 rounds of interviews with 927 households. The four selected districts were Faisalabad and Attock in Punjab, Badin in Sindh, and Dir in Khyber Pakhtunkhwa which were chosen using the district ranking methodology of Pasha and Hassan (1982). The selected districts in the survey were the poorest districts of Pakistan, except for Faisalabad, a prosperous district, which was chosen as a reference district. Within each district, three markets (*Mandi*) were chosen and areas selected in relation to their proximity to these markets, firstly those within five kilometres of the market, secondly those within ten kilometres and finally those between ten and twenty kilometres. The villages and households in each district were picked randomly from these three areas.

With the objective of studying poverty, employment opportunities and migration decisions, the survey collected a wide range of information, such as household characteristics (including the composition and size of the households and the members' education details), occupation, wealth, asset, income and financial details. Types of landholding, whether irrigated or rain-fed (*barani*) were also recorded. At the community level, it includes information on local infrastructure, markets (*Mandi*) and services.

A household is considered as migrant if at least one of his members is working away from home or travelling at the time of the survey (around 33 per cent of the sample). We further define a

household as internal migrant household, if at least one household member is traveling in the country or working away from home within the country (about 24 per cent of the sample). We label a household as international migrant household if at least one of its members is working or traveling abroad (9 per cent of the sample). If a household has both internal and international migrant members, we consider that household as an international migrant household.

Our dataset is longitudinal and the variable migration varies over time and households (like few other variables). During the interim period some families stop being migrant just as some turn from non-migrant to migrant. Thus, the household migration outcome is not time invariant.

Given that the outcome of migration is either binary (when migration is defined as a whole) or takes at most three different values in its more disaggregated version, we employ empirical models that are suitable for this type of discrete outcome data to answer our research question. Specifically, we employ a logit model to analyse migration and a multinomial logit model to evaluate the type of migration. For the logit model we assign zero to a non-migrant household (67 per cent of the households) and 1 to the migrant household (33 per cent of the households covered in the survey). Our second model is a multinomial logit model. Here we associate zero to the non-migrant household (67 percent of the household), 1 to an internal migrant household (24 percent of the households), and 2 to the international migrant household (9 per cent of the households). Finally, for estimation we pool the cross-sectional data.

Table 4.1 presents a summary of the geographical data for the 927 households, which were distributed as follows: 380 households from Punjab province distributed between two districts: 180 from Faisalabad (covering 1-6 villages) and 200 from Attock (covering 7-14 villages), 275 from Sind province, which includes Badin district (covering 21-40 villages), 272 from NWFP which includes Dir district (covering 41-52 villages). During the survey each household was visited up to 14 times spanning the five years from 1986-87 to 1990-91. The fourteen rounds were distributed within five years as follows: the first six rounds were covered in first year (1986-

87), three rounds from 7 to 9 covered in the second year (1987-88), a further three rounds from 10 to 12 covered in the third year (1988-89), one round 13 was covered in fourth year (1989-90) and the last around 14 was covered in fifth year (1990-91).

Table 4.1 Households distribution by region

	Province	District	Households number
	Punjab	Faisalabad	180
	Punjab	Attock	200
	Sindh	Badin	275
	NWFP	Dir	272
Total	3	4	927

In this study, income data sets were collected at the year basis and remaining data sets relating to household characteristics were collected on the round basis. For this reason, we transform our data on a year basis. The year (1986-87) is used to construct initial wealth variables in order to establish causality between migration and initial wealth by representing it as period 0. Similarly, period 1 represents the year (1987-88), period 2 represents the year (1998- 99) and so on. For the regression analysis, period 1 represents the base category and wealth variables will be constructed from period 0. Period 0 (1986-87) is only used to construct initial condition variables and is then excluded from the regressions. The actual periods used in the analysis are four years (1987-88, 1988-99, 1999-1990, and 1990-91).

This chapter focuses on determinants of migration, and while several factors are important, the focus is on the impact of wealth on migration. Is wealth and migration causally related or just correlated? If they are causally related, could the relationship be bi-directional (for instance could previous migration by a household member affect the current wealth)? The primary interest is in measuring the impact of household (HH) level initial wealth, i.e., wealth pre-migration, on decision of a HH member to migrate (internally within Pakistan or overseas), while controlling

for other HH level and regional factors. To this end, first a binary logit model is estimated --migrate or not being the dependent variable --followed by a multinomial model --not migrate, migrate internally, and migrate externally.

The problem in the data set is that actual migration at HH level by some member may have taken place prior to the first observed period, and an event which might have affected the wealth in the first period (positively or negatively due to remittances, or loans, or selling of land). In that case, if unexplained factors that led to earlier migration were also correlated with the first period wealth, then the estimates from the logit and multinomial logit model would be biased. To overcome this difficulty, we construct two separate variables of wealth and call them pre- and post-migration wealth. They are constructed as follows. We generate a dummy equal to one if any HH member has migrated in the first observed period (1986) and set to zero otherwise. The variable is time invariant and is household-specific. We interact wealth with that variable and call the variable post-migration wealth and then interact wealth with one minus the dummy variable and name the new variable `pre-migration wealth'.

The scope of generating two separate variables for wealth (pre- and post-migration) is to demarcate the observations where wealth might have changed as a result of by migration via remittances (post-migration wealth) and wealth observed prior to migration (pre-migration wealth). Under the assumption that the error term on the structural equation of the migration outcome is uncorrelated with the pre-migration variable, and only correlated with the post-migration variable, our empirical analysis is valid.

One possible option is to restrict the empirical estimation to the sub-sample of households that migrated after 1986.[28] In this case the problem is that the estimates based on the sub-sample of

[28] This point was suggested by the examiners.

later migrant households may differ from that of the initial migrant households, limiting the external validity of the approach. We have preferred to include both variables and in the explanation of the results concentrate our attention on the pre-migration wealth only, provided the biased effect of the other measure of wealth is minimal. Furthermore, the inclusion of both variables in the estimates is useful to observe the direction, and entity, of the bias. As robustness check, we have included in the appendix a separate estimation of migration for the subsample of initial migrants and for the subsample of non-initial migrants (see tables A.3 and A.4). The significance and sign of the wealth variables confirm the results discussed in results section.

The problems of reverse causality, measurement error, and unobservable household characteristics are well known. There is a possibility of reverse causality between migration and wealth, which we have largely discussed in the previous two points.

Survey data usually raise some concerns about measurement error, which can arise for several reasons[29]. Quoting Cameron and Trivedi (2005; p. 899) "There are virtually no models discussed in this book that are protected from the problem of measurement errors". Similarly, also in our data one can expect that some variables suffer of measurement error, possibly not at random. When measurement error occurs in the explanatory variables, it can lead to biased estimated coefficients. While one needs to be cautious in interpreting the results, very little can be done to fix the problem given the data availability.

Searching for proxy variables that act as instruments to solve the issue of endogeneity caused by the simulation error is not a viable task with the kind of data we have access to. Clemens and

[29] For more detailed discussion see Angrist and Krueger (2000) and Cameron and Trivedi (2005). The former provides a comprehensive empirical strategies example from labour economics. However, later provides a detailed discussion of the series of endogeneity issues related to empirical work.

Mackenzie (2014; p.17) provide an explanation of the issue of under-reporting of remittances, "An alternative source of data on remittances comes from household surveys in the remittance-receiving countries. These surveys directly ask households how much they have received as remittances. They have the advantage of capturing remittances through both formal and informal channels. Potential concerns are that households may misreport. Furthermore nationally representative surveys may contain relatively few households with migrants. Nevertheless, there is no reason to strongly suspect these potential issues change sharply over time, and so even if household surveys understate the levels of remittances, they may provide a reasonably accurate picture of it. Unfortunately few developing countries have frequent household income and expenditure surveys that extend back to the 1990s, and not all of those that do ask separately about remittances".

Hence we opt for the alternative solution, which is to acknowledge that due to measurement error some of the estimated coefficients may be biased. The level of bias depends on the severity of the measurement error. Next, we wish to acknowledge that we have estimated the model using a pooled methodology, which works fine if the unobserved heterogeneity at the household-level is uncorrelated with the explanatory variables. If that is not the case, again we meet the problem of endogeneity and estimation biased. There are solutions that can be adopted which rely on panel data solutions to remove the endogeneity caused by the unobserved heterogeneity. For example random effects with Mundlak correction is an option that one can investigate for nonlinear model as the ones that we have estimated in the relevant chapters.

Table 4.2 shows that the 927 households' participation in the survey over the span of five years. We observe that 722 households are interviewed all year, which is around 78% of the total observation. Similarly, 90 households have observations for only the first year and this accounts for nearly 10 % of the total surveyed households.

Table 4.2 Household participation in survey over time

Household	1, 2, …..,975	year	1, 2, ……,5
	Household	Pattern	Proportion
	722	11111	77.89
	90	1….	9.71
	40	111..	4.31
	24	1111.	2.59
	17	111.1	1.83
	14	1.1..	1.51
	14	11…	1.51
	5	1.11.	0.54
	1	1..1.	0.11
Total	927		100.00

4.3 Descriptive statistics

Table 4.3 The proportion of different type of the Household by districts

Districts	Never Migrant Households	Internal Migrant Households	International Migrant Households	Total
Faisalabad (Punjab)	548 (20%)	242 (25%)	31 (8%)	821 (20%)
Attock (Punjab)	584 (21%)	227 (24%)	48 (13%)	859 (21%)
Badin (Sindh)	1,054 (39%)	157 (16%)	3 (1%)	1,214 (30%)
Dir (NWFP)	539 (20%)	323 (34%)	301 (78%)	1,163 (29%)
Total	2,725 (67%)	949 (24%)	383 (9%)	4,057 (100%)

Table 4.3 shows the household status of different migration choices by the four districts of Pakistan. The 'never-migrant' households constitute 67% of the households whereas the internal migrant households are 24% and international migrant households are 9%[30].

Table 4.4 presents summary statistics for comparable covariates of three types of households with mean and standard deviation of key household level characteristics. All financial values are reported in the Pakistani currency (PKR) called '*Rupees*' and wealth variables descriptive statistics are reported for the initial year as discussed earlier. Overall, 46 years is the average age for the never migrant head of the household, and it increases to 50 years for internal and international migrant head of households, which is not contrary to the conventional wisdom accentuated by migration theories. Also, the table summarizes the covariates by the maximum educational attainment (in years) of all head of households by their status of migration. Contrary to conventional wisdom, household heads average education for different types of households is almost three years, except for international migrant household head, whose average is four years. There are opposing effects of household head education for the three competing choices of household. Characteristics that can affect migration behaviour differ between never migrant households, and internal and international migrant households. Firstly, the international migrant households are more likely to live in a household with a higher average number of children between the ages of 0 to 11 years (about five children compared with four children for other competing choices). Household composition does not differ much for the number of females aged 12 to 30 years for different types of households; on average, only one female for no migrant members, two for internal and three for international migrant households. International migrant households have more males aged 12 to 30 years (an average of five males compared with four

[30] The international migrant household consists; firstly, household has both member already working abroad and member traveling abroad (around 4 percent) and secondly, household has only one kind migrant either already working abroad or traveling abroad (around 5 percent). Due to few observations, we generated the variable international migrant household consisting of these two types of migrant that add up to 9%. If a household has both internal and international migrant, in that case, our dominating category is international migrant household.

males for internal migrants and three males for never migrant households). International migrant households have more family in the home country than internal migrant households and never migrant households: the average household size for international migrants is 13 people (statistically different from the mean household size of 11 people for internal migrants and 9 people for never migrant households). Another piece of conventional wisdom, that more education at the household level is more likely to produce a migrant, is also supported by the descriptive statistics. Average education for internal and never migrant households is around two years, and an additional year's education changes the status to international migrant households.

We construct initial wealth covariates to measure household economic status prior to their three competing choices. However, there is considerable heterogeneity regarding initial wealth between the different types of household. Concentrating on the descriptive statistics in Table 4.4 for land holding (in acres), a typical international migrant household has on average 7 acres of land holding. An internal migrant household owns on average 8.5 acres and never migrant households own an average of 8.8 acres of land holding. On average, maximum landholdings for never migrant household are 200 acres, whereas they are 162 acres for internal migrant and 88 acres for international migrant households. Comparatively internal and international migrant households own less land than never migrant households, which might be interpreted as another motivating factor for migration. However, it seems that most of the households are small landowners, and relatively deprived household in terms of average landholding are either internal or international migrant households. Interestingly the above summary statistics confirm the intuition that households in the rural area rely more heavily on landholding as a source of insurance against natural shocks due to non-existence or under developed financial sector. This also confirms the New Economics of Labour Migration approach which identifies that rural households use migration as a strategy to overcome failures in markets in their home communities.

On average, international migrant households borrow around PKR 2,067 from informal sources such as friends, relatives and so on. Internal migrant households borrow an average of PKR 2,037. The initial money borrowing is slightly relatively higher among international migrant households than internal ones. Households rely on their land holding to finance their migration cost in the event it is substantial and cannot be accomplished from the informal sector. The use of destination country data is pivotal for answering the questions set in this work. This kind of survey can tell us which households have an international migrant, and receive remittances, but cannot inform us about their destination country and whether migrants have moved abroad with their whole family.

Table 4.5 shows the descriptive statistics by district. In Faisalabad district, on average a typical household head is a 51-year-old who has 3.5 years of education, 3 children, 3 males, and 1.5 females with a family size of around 9 people and 5 acres of landholding. Comparably, in Attock district on average a typical household head is 46-year-olds with 4 years of education with 2 children, 2.5 males, and 1 female and has family size of 7.5 people with 13.5 acres of landholding. In Badin district, on average a typical household head is a 42.5 year-old who has 1.8 years of education and has 4 children, 3 males, and 1.5 females with family size of around 10 people and 11 acres of landholding. Finally, in Dir district on average a typical household head is a 50-year-old who has 2.6 years of education with 5 children, 4 males, and 2 females and has a family size of 12.5 people with 5 acres of landholding.

There is a considerable level of heterogeneity amongst household between different districts in rural Pakistan that makes it interesting to study the determinants of migration.

Table 4.4 Household level characteristics by their status of migration

	Never Migrant Households				Internal Migrant Households				International Migrant Households			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Household Head Education in years	3	4	0	16	3	4	0	14	4	4.5	0	14
Household Head Age (years)	45.5	13	13	85	50	14	18	90	50	15	16	85
Number of Children age 0 to 11 years	3.5	3	0	28	4	3	0	21	5	3	0	20
Number of Male age 12 to 30 years	3	2	0	15	4	2.5	0	15	5	3	0	13
Number of Female age 12 to 30 years	1.5	1	0	7	2	1	0	8	2.5	1.5	0	9
Household Size	9	4	1	42	11.5	5	3	42	13	5	4	37
Household average age in years	19	9	0	73	20	8	6	62.5	18	6	3	44
Household SD age in years	18	6	0	44	18	6	0	40	17	5	1	33
Household average Education in years	2	2	0	10	2	2	0	10	3	1.5	0	7
Household SD Education in years	2	1.5	0	7	3	1.5	0	7	3	1.5	0	7
Land Holding (in acres)[31]	8.8	21	0	200	8.5	17	0	162	7.0	11	0	88

[31] The land holding, borrow formal, borrow informal and so on are based on their initial values.

Remit Relative (Pakistani Rupees)	43	292	0	9000	63	450	0	9000	31	138	0	1000
Loaned Other (Pakistani Rupees)	259	2163	0	90000	479	5169	0	90000	776	4944	0	90000
Borrow Formal (Pakistani Rupees)	1167	11160	0	200000	1099	6929	0	90000	2068	17554	0	154400
Borrow Informal (Pakistani Rupees)	2034	3597	0	30000	2038	3681	0	30000	2219	4176	0	20000
Animal Sale (Pakistani Rupees)	688	2036	0	30000	406	1226	0	15000	226	1221	0	12000
Machine Sale (Pakistani Rupees)	18	531	0	16000	34	734	0	16000	0	0	0	0

Table 4.5 Descriptive statistics by District

Variable	Faisalabad		Attock		Badin		Dir	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Household Head Age (years)	50.71	14.12	46.11	12.94	42.55	13.13	49.72	13.87
Household Head Education in years	3.40	4.29	4.02	4.53	1.87	3.19	2.61	4.09
Number of Children age 0 to 11 years	3.01	2.37	2.17	1.81	4.06	2.85	5.30	3.23
Number of Male age 12 to 30 years	3.24	2.14	2.68	1.89	2.89	2.16	4.30	2.78
Number of Female age 12 to 30 years	1.55	1.31	1.33	1.07	1.56	1.15	2.11	1.52
Household Size	8.92	3.66	7.66	2.80	9.63	4.95	12.42	5.68
Land Holding (in acres)	4.07	7.50	13.55	30.00	11.15	20.57	5.21	10.45
Remit Relative (Pakistani Rupees)	167	673	0.93	19.28	40	189	1.28	25.37
Loaned Other (Pakistani Rupees)	104	1170	277	1700	288	1142	674	6023
Borrow Formal (Pakistani Rupees)	3890	20877	166.47	1296	779	8531	630	6441
Borrow Informal (Pakistani Rupees)	2499	3743	1497	2610	1971	3378	2232	4459
Animal Sale (Pakistani Rupees)	1061	2984	304	957	874	1862	129	654
Land Sale (Pakistani Rupees)	189	1855	22	226	32	274	3632	22393
Machine Sale (Pakistani Rupees)	97	1245	0	0	2.05	32.3	0	0

4.4 The econometric regression and main determinants

We aim to explore the empirical linkage between pre and post-migration initial wealth and migration with the help of a logit and multinomial logit model. Later on in the next chapter we will also look at the determinants of remittances with the help of a Box-Cox double hurdle model, which accounts for the zeroes.

The regression estimates address two questions: first, what is the probability of a household having a migrant (logit estimation) and second, what is the probability of a migrant choosing an internal or international destination with reference to a never migration (Multinomial Logit model)?

The first regression logit predicts, the observed probability of out-migration of a member of the household at the time t, conditional on the household head characteristic, household characteristics, pre- and post-migration initial wealth, with respect to the reference group of households with no migrants and a vector of other covariates.

Based on model estimates, odds ratio of the probability of out-migration of a household member are calculated for each explanatory variable with respect to the reference group – the never migrant household.

For the second regression (Multinomial logit model) the discrete outcome variable for out-migration is set to zero if the household is neither internal nor international migrant, set to 1 if the household is an internal migrant household and set to 2 if the household is an international migrant household, which is estimated by a multinomial logistic regression. Based on the model estimate, relative risk ratio (RRR) on the probability of the out-migration of the household is calculated for each explanatory variable with respect to the reference group – the never migrant household. The explanatory variables are the same as described for the first regression.

We need to explain why a multinomial model is proposed to analyse the migration decisions as opposed to a nested logit model. One reason is data availability. For a nested logit model, one needs individual characteristics that vary by outcome. As we do not have such dataset, we have opted for an alternative multinomial logit model. Also, it is not clear whether a tree structure of migration and non-migration is the right approach. From an individual point, the type of migration is an integral part of the migration decision.

Migration involves a discrete or dichotomous choice between two or more alternatives. A multinomial logit (MNL) specification is fairly common in the migration literature (Chiswick and Miller, 2009; Mora and Taylor, 2006; and Banerjee, 1984), whereas, Nested Logit (NL) models have been used in transportation mode choice (Wen and Koppelman, 2001), consumer durable choice (Dubin, 2014) and household energy demand choice (Scarpa and Willis, 2010) literatures. Cameron and Trivedi (2005; p. 507) write, "An unordered multinomial model such as multinomial logit is appropriate, when there is no clear ordering of the outcome variable. Nested logit is the obvious model to use if there is an obvious nesting structure, but usually there is no obvious structure".

The multinomial model offers the important advantage of being computationally feasible, even for the relatively large choice sets. That feasibility is, however, obtained by assuming that error terms associated with the various alternatives follow a multivariate normal distribution (Hoffman and Duncan, 1988). A second alternative is the nested logit model, which retains the computational virtues of the multinomial logit model, but selectively relaxes the independence assumption by assuming a set of 'nested' choice sets (Koppelman and Bhat, 2006). It follows that in MNL model, there exists a unique optimum for the set of parameters, but the parameters of an NL model may include multiple optima.

The MNL model has been widely used for labour market and migration-related choices due to its simple mathematical form, easy to estimate and interpret, and the flexibility to add or remove

choice alternatives. On the other hand, MNL model has been criticised for an assumption of Independence of Irrelevant Alternatives (IIA) property. This IIA property allows to add or remove of an alternative from the choice set without affecting the structure or parameters of the model, an inappropriate assumption in many choice situations. An extreme example of this problem is the classic "red bus/blue bus paradox (Ben-Akiva and Lerman, 1994)."

The other limitations of the MNL approach include the following. The order is not taken into account (where it is relevant) and correlation between error terms is assumed away. Similarly, NL model limitations may include the following. For some choices, there is natural tree structure and for others, there may be none (Greene, 2003). Further, sequential (two-step) estimators are not efficient, and different nests can produce very different results (unobserved factors are correlated, and relative odds are independent of other alternatives).

The multinomial regression procedure allows a comparison of relative risk ratios for the set of explanatory variables across different statuses of household variables. For both regression logit and multinomial logit our core explanatory variables of the interest are the pre and post-migration initial wealth of the household and the household characteristics[32].

A household's initial wealth can affect the household willingness to participate in risky migration activities and secure financing for these activities. Furthermore, the initial wealth of a household, including land controls for resource availability is seen as a migration-enabling factor. However, at the same time, land owned can have a migration-reducing effect if the land is the main source of income. We distinguish between different kinds of wealth.

[32] There are households which include more than one migrant either working internally or international. In our analysis, we selected only one migrant from each household.

As mentioned earlier, the important explanatory variable in our migration function is the total landholding of the household because this variable is closely related to the wealth of the household and allows us to test for the familiar argument that migration may result from a fall in the landholding of the household, especially for poorer households.

The decision of a household to have one of its members migrate is assumed to be explained by a whole set of household, socio-economic and geographical factors. Among the household controls, we use the number of household members (household size) as proxy for the importance of an economic intra-household risk diversification strategy (Stark and Levhari, 1982). The head of household's age provides a proxy for household head's work experience. As such, it gives some indication of the earning potential of the household head. As there are typically diminishing returns to experience, a quadratic formulation is appropriate. Similarly, the household members average age references the idea of work experience. Household head education also provides the earnings potential of the prospective household and as educational attainment rises, the propensity to migrate is expected to increase.

The demand for capital is difficult to model but it is related to a variety of indicators included in our statistical model. Considerable work suggests that the acquisition of initial wealth constitutes the primary motivations for migration. If members of households migrate for this reason, then those who already own a home, land, or a business should have less need of capital and, hence, lower need of migration. In rural areas in absence of well-functioning and well-connected capital markets, land could be the potential source of a liquid asset. Similarly, the relationship between migration and landownership has mixed results, some studies find a positive relationship for landlessness and others find a negative effect of landholdings on migration.

DaVanzo (1981: 45) writes "The concepts of location-specific capital (assets that are more valuable in their current location than they would be elsewhere) and information costs provide powerful explanations for the migration". In rural areas landholding is an important factor in

determining the social status of the households. The higher the landholding in the village implies a higher status in the village, so poor households may encourage their members to migrate either internally or internationally. Similarly, higher landholding may discourage migration in another way: households that have a large landholding provide greater employment opportunities for family members as farm supervisors. On other hand, if the households have small landholdings and surplus labour due to large household size, that may encourage migration. It could be argued that migrants are more likely to come from households with smaller land holdings as they are in general need of additional income, on the other hand, it may be characterised by surplus labour which may encourage migration.

We have also included the control variable for the indebtedness of households in our analysis. For this reason, we include the variable household borrowed any amount of money either from informal or formal sources prior to migration as additional covariate. In addition, we add the money received from the sale of livestock and machinery (tractors and tube wells). It is quite reasonable to expect that migration decisions, whether internal or international will be positively correlated with the household indebtedness to meet travel and job search costs. At the same time, it is hard to ignore the biased behaviour of the informal sector towards poor households and the non-existence of formal credit sources in rural Pakistan. In this situation, any correlation between them is too difficult to be captured by our results. Ultimately, land serves as a lender of last resort for most households in rural areas and migration as a hope and blessing in terms of remittances.

We also take into account the influence of regional factors, and control for likely differences in migration of various regional groups. We account for households that belong to either one of the three poorest districts of Pakistan (i.e. Attock, Badin or Dir) and our reference district Faisalabad, which is relatively rich. The comparison between different rural districts of Pakistan will enable us also to test the argument that different regions play a significant role in explaining migration

choices. Additionally, the year effects are incorporated in the model to capture general shifts in out-migration behaviour, which occurred after controlling for the other influences.

Children between the ages of 0 and 11 years and females at between 12 and 30 years proxy for dependency and one would expect that migration would fall as the number of dependants in the households rose. Adam (1998) argues that the life-cycle models suggest that children provide a good proxy for dependency status of households. The male members between the ages of 12 and 30 years represent adults available to execute household-farm duties, and household landholdings. Landholdings may be an indication of the demand for labour on the household farm, especially where limited land rental markets exit, as in rural Pakistan (land-reform), assuming that households allocate their members' time so as to maximise utility.

4.5 Results and discussion

4.5.1 Logit regression result

We are interested in testing the relative importance of a household's initial wealth in explaining out-migration propensities. Hence, we investigate whether the decision about out-migration is influenced by 'initial wealth' or other household characteristics. Firstly, the logit model is used for binary outcome variable 'migrate' or 'not migrate'. Secondly, the multinomial logit model is used for discrete outcome variable—'never migrate', 'internal migration', and 'international migration'—to investigate whether which type of migrants have greater migration propensity -- internal or international migrants.

Table 4.6 shows the regression results of the logit model[33] with odds ratio of out migration for the key variables. The chi-squared statistics, testing the null hypothesis that all regressors are jointly zero, is strongly rejected. As we see certain household characteristics and pre-migration initial land holding are the most important determinants of migration. The age of the household head reduces the probability of migration, but the age squared has an opposite effect. The coefficient of children aged 0 to 11 years, which is of the proxies for dependency, is negatively related with migration, and it is significant at 5%. Similarly, the number of females aged 12 to 30 is also statistically significant and it discourages migration. Once again the dependency argument holds.

The major finding of this study is consistent with the New Economic of Labour Migration (NELM); that pre-migration wealth plays a significant role in explaining the out-migration in the absence of well-developed credit and insurance markets in rural Pakistan. Even though household level factors, including regional effects may be more powerful to explain out-migration, key factors for us remain the pre-migration initial landholding. We find pre-migration landholding is statistically significant and negatively related to migration.

We find pre-migration landholding is statistically significant and negatively related to migration. The money received from livestock sales is negatively related to migration. In rural Pakistan most of the households derive income from farming and diversify their income generation activities into livestock farming and nonfarm occupations. One possible reason for this could be sell land or livestock to finance migration.

[33] The logit regression coefficients give the change in the z-score or logit index for a one unit change in the predictor. A positive coefficient means that an increase in the predictor leads to an increase in the predicted probability. A negative coefficient means that an increase in the predictor leads to a decrease in the predicted probability.

Table 4.6 Determinants of migration (Logit Regression)

Variables	Coefficient	Odds Ratio
Constant	-1.472**	--
	(0.705)	
Household head's education	0.007	1.007
	(0.017)	(0.017)
Household head's age	-0.040	
	(0.025)	0.998
Household head's age squared	0.0004	(0.008)
	(0.0002)	
Number of children aged 0 to11 years	-0.158**	0.854**
	(0.073)	(0.062)
Male at age12-30	0.126	1.134
	(0.080)	(0.091)
Number of females aged 12 to 30 years	-0.130*	0.878*
	(0.080)	(0.070)
Household size	0.188***	1.207***
	(0.062)	(0.075)
Pre-migration Initial wealth[34]		
Landholding in acres	-0.017***	0.983***
	(0.005)	(0.005)
Money Loaned to other	-0.050**	0.951**
	(0.024)	(0.023)
Money borrowed from formal source	-0.020*	0.980*
	(0.010)	(0.010)
Money borrowed from informal source	-0.071***	0.931***
	(0.021)	(0.019)
Money received from sale of animals	-0.163***	0.850***
	(0.047)	(0.039)
Post-migration Initial wealth		
Landholding in acres	0.011	1.011
	(0.007)	(0.007)
Money remitted to Relative	1.695*	5.447*
	(1.012)	(5.512)
Money borrowed from formal sources	0.011**	1.011**
	(0.006)	(0.006)
District (reference category is Faisalabad)		
District Attock	0.248	1.281
	(0.173)	(0.222)
District Badin	-0.935***	0.393***
	(0.201)	(0.079)
District Dir	0.772***	2.164***
	(0.181)	(0.392)
Other controls	Yes	
Year effects	Yes	
Observations	3130	
Pseudo R2	0.2699	
Clusters in household	837	

Note: Clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The extended version of Table 4.6 is in Appendix A.1.

[34] Amount in Pakistani Rupees.

However, this study should not be taken as representative of the whole of Pakistan, yet future research should endeavour to test the implications further by examining the costs of migration and variables that are likely to be correlated with it. The concepts used here offer an explanation for migration based on pre-migration wealth and information costs. The members of the household to migrate internally or internationally based only on the expected benefits and costs partly explain the true motivation behind it. Instead, it is more or less a risk diversification strategy by households as accentuated by NELM. Furthermore, with imperfect information, it is not easy for households to correctly weigh the advantages and disadvantages in deciding whether and where to move. Migration is not costless, and at a minimum involves sociological costs (subject to the limited information that is available).

The other finding that money loaned to others and money borrowed from formal and informal sector is statistically significant and negatively related to migration. In the context of missing or incomplete markets, only well-off households have the ability to secure the loan from either formal or informal sectors due to their credibility to return loans when they are mature. However, negative influences of loans on migration suggest that migration may lead households to diversify less when household can raise finances in difficult times. It may follow that household diversify their risks through migration due to missing and incomplete markets. However, if these markets are accessible to household, then there is less need for migration.

The finding from post-migration initial wealth suggest only money borrowed from formal sources are positive and significant. This positive interaction effect illustrates the importance of migration for securing loan. The earlier study on the spatial pattern of international migration in Pakistan finds that less developed districts have a high propesity to migrate and a low propensity to return, while the more properous districts (by industrial base and agricultural productivity) have a low propensity to migrate and a high propensity to return (Altaf and Obaidullah, 1992). In our study, the poor district of Sindh (Badin) is characterized by negative migration when compared with a

base category of the more developed district. This district has the common feature of large landholdings and high tenancy ratios (high feudal districts). However, it might follow that the land tenure system in Sindh (Badin) has a significant effect on out-migration in explaining the spatial pattern of internal as well as international migration. We also see that compared to the relatively prosperous district of Faisalabad (our base category), the probability of migration is lower for a poor district like Badin, but higher for Dir. This suggests that the level of regional development is not a clear cut driver of migration. Perhaps historical practices and existing migration networks are more important than just regional development.

Table 4.6 also shows the odds ratio of out migration. An odds ratio (OR) is defined as the ratio of the odds of an event occurring in one group to the odds of it occurring in another group, or to a data-based estimate of that ratio. A one child increase in children in the age group 0 to 11 years and a female in the age group 12 to 30 years will produce a 2.5% and 2.0% decrease in the probability of migration respectively. This finding is not contrary to the conventional wisdom accentuated by migration theories that the more dependants a household has, the lower probability of migration will be. These findings suggest that migration decision outcomes in rural Pakistan are governed in part by general family norms and specific marital roles restricting migration.

One of the more significant findings to emerge from this study is that each additional household member increases the probability of migration by about 2.9%. Furthermore, households that have a larger household size are in better position to diversify their human resources in order to cope with uncertainties and vulnerabilities exposed with agricultural activities. In Pakistan's context, the literature generally suggests that large household size is associated with wealth and prestige and more male members in a family is associated with greater influence and power in rural areas.

The findings observed in this study mirror those of studies that have examined the effect of migration on household land ownership. In predicting the probability of migration as a function of pre-migration land ownership, when all other covariates are at their mean value, ten-acres lower land holding leads to 3% increase in the probability of migration. The evidence from this study suggests that land acts as source of wealth that facilitates migration but it effects is marginal. In a similar case for Mexico and Thailand, VanWey (2005) identified that the effect of landownership on out-migration, whether international or internal, is negative for the vast majority of households. The evidence presented thus far supports the idea that the opportunity to invest in the purchase or improvement of land sustains migration. The other finding is that PKR 10,000 (Rupees) loaned to others, money borrowed from the formal sector and money borrowed from the informal sector will lead to an 8%, 3% and 3% reduction in migration, respectively.

The year's effect is included in the estimation to capture the general shift in migration behaviour, which occurred after controlling for the other influences captured by the model. Other than year 3 (1999-1990) and 4 (1990-1991), the results suggest that there was no general shift in mobility patterns over the 1987-1991 period covered by the data: with year 1 (1987-1988) as the base category. There is a substantial evidence of a downward shift in out-migration in years 3 and 4. The predicted probability of migration is 30.6% less for migrant households in year 3 and 4.5% less in year 4, than for households in the year 1.

There are two districts (Badin and Dir) that are statistically significant. The odds ratio for Badin tells us that, for two hypothetical households with all other covariates at their mean level, the predicted probability of migration is 13.7% less for the migrant households in Badin than for the households in Faisalabad district. The odds ratio for Dir tell us that, the predicted probability of migration is 13.8% greater for the migrant households in Dir than for the households in Faisalabad district. These results confirm the earlier overviews of the district discussed in the

section 2.5 of the study area that Dir district has higher out-migration tradition in Pakistan through the nature of the area in which they reside.

4.5.2 Multinomial logit regression result

While the binary outcome aforementioned is informative, the discussion and conclusion on the implications for internal and international migration has still to be addressed. Table 4.7 shows the result of the multinomial logit regression. The outcome measure in this multinomial logit regression analysis is the migration status (migration) that is '0' for never migrant households, '1' for internal migrant households and '2' for International migrant households. The relative risk ratio (or odd ratios) for multinomial logit is also reported in table 6. Standard interpretation of the relative risk ratios is for a unit change in the predictor variable, the relative risk ratio of outcome '*y'* relative to the referent group is expected to change by a factor of the respective parameter estimate given the variables in the model are held constant. We will relate this categorical variable to household head characteristics, household characteristics, pre-migration and post-migration initial wealth, time effects and regional characteristics[35].

Our new model also does not captures a significant role of household heads in terms of education and age, same to the earlier finding of the logit model. Household heads in rural Pakistan are less likely to engage in international migration, but more likely to engage in internal migration. The result no doubt reflects differences in opportunity costs between internal and international migration for household heads. For heads of household, responsibilities include administrative

[35] The first iteration (called iteration 0) is the log likelihood of the "null" or "empty" model; that is, a model with no predictors. At the next iteration, the predictor(s) are included in the model. The log likelihood decreases because the goal is to minimize the log likelihood. When the difference between successive iterations is very small, the model is said to have "converged", the iteration stops and the resulted log likelihood is the log likelihood of the fitted model which is -1858.93 in our model.

duties on the family farm and other obligations in the districts which generally create opportunities for international migration networking, which typically involves a large commitment of both time and capital. However, our results for household head characteristics are not different with the finding of other authors, such as Stark and Taylor (1991).

Internal and international migration is negatively associated with the indicator of dependent children. A possible explanation for this result may be that the more dependent households have more care responsibilities. The odd ratios show that if the internal migrant household relative to the never migrant household were to increase, one dependent child would be expected to decrease internal migration by 11%, whereas the odd ratios for international migrant households show a much larger decrease of around 28%.

Larger families tend to favour both internal and international migration, but with different probabilities. The odd ratio shows an increase in internal migration to around 19% but comparatively the international migrant household shows an increase of around 30% with an additional household member. Every additional member in the household will result in a higher probability of international migration. However, the presence of females discourages only internal migration may be due to the care-giving responsibilities for rural females. This indicator taps different aspects of family relationships and responsibilities of the rural female. In addition, the multinomial logit estimate for females is statistically significant and shows that if the internal migrant households were to increase by one female the multinomial odds for internal migrant households relative to never migrant households would be expected to decrease by 20%, while holding all other variables in the model constant.

Table 4.7 Determinants of migration: (Multinomial Logit Regression)
Base category for Migration = "0" Never Migrant
= "1" Internal Migrant
= "2" International Migrant

Variables	Internal Migration	Relative Risk Ratio	International Migration	Relative Risk Ratio
Constant	-1.695***	--	-4.134***	
	(0.678)		(1.521)	
Household head's education	-0.009	0.991	0.047	1.048
	(0.017)	(0.017)	(0.036)	(0.038)
Household head's age	-0.025		-0.052	
	(0.0250)	0.999	(0.047)	0.998
Household head's age squared	0.0003	(0.008)	0.0005	(0.154)
	(0.0003)		(0.0004)	
Number of children aged 0 to11	-0.118*	0.888*	-0.323**	0.724**
	(0.070)	(0.062)	(0.143)	(0.104)
Male at age12-30	0.175**	1.191**	-0.067	0.935
	(0.077)	(0.091)	(0.156)	(0.146)
Number of females aged 12 to 30	-0.226***	0.798***	0.145	1.156
	(0.077)	(0.062)	(0.147)	(0.170)
Household size	0.177***	1.194***	0.259**	1.296**
	(0.058)	(0.070)	(0.120)	(0.156)
Pre-migration Initial wealth[36]				
Landholding in acres	-0.013***	0.987***	-0.113*	0.893*
	(0.004)	(0.004)	(0.065)	(0.058)
Money Loaned to other	-0.063	0.939	0.007	1.007
	(0.050)	(0.047)	(0.066)	(0.067)
Money borrowed from formal sources	0.002	1.001	0.016	1.016
	(0.006)	(0.006)	(0.012)	(0.012)
Money borrowed from informal sources	-0.059***	0.943***	-0.119**	0.887**
	(0.022)	(0.021)	(0.053)	(0.047)
Money received from sale of animals	-0.168***	0.845***	-1.181	0.307
	(0.042)	(0.035)	(0.772)	(0.237)
Post-migration Initial wealth				
Landholding in acres	0.009	1.009	0.015	1.016
	(0.007)	(0.007)	(0.011)	(0.011)
Money remitted to Relative	1.939**	6.955**	3.112	22.472
	(0.941)	(6.546)	(2.069)	(46.486)
Money borrowed from formal sources	0.002	1.001	0.016	1.016
	(0.006)	(0.006)	(0.012)	(0.012)
District (reference category is Faisalabad)				
Attock	0.158	1.171	1.023*	2.781*
	(0.170)	(0.199)	(0.565)	(1.572)
Badin	-0.968***	0.380***	-1.837	0.159
	(0.193)	(0.073)	(1.276)	(0.203)
Dir	0.060	1.061	2.727***	15.28***
	(0.185)	(0.196)	(0.518)	(7.92)
Other controls		Yes		
Year effects		Yes		
Observations		3130		
Pseudo R2		0.2993		

[36] Amount in Pakistani Rupees.

Log pseudo-likelihood	-1858.93
Wald Chi2 (58)	785.27
Clusters in household	837

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The extended version of Table 4.7 is in Appendix A.2.

Also, only pre-migration initial landholding needs to be depleted for both types of migration. In addition, the multinomial logit estimate for household pre-migration initial landholding is statistically significant and shows that if the internal migrant households were to decrease household landholding by one acre, the multinomial odds for internal migrant households relative to never migrant households would be expected to increase by 1%, while holding all other variables in the model constant. Similarly, the multinomial logit estimate for a one-acre decrease in landholding for international migrant households relative to never migrant households given the other variables in the model are held constant would be expected to increase by 11%. Both internal and international migration has negative associations with pre-migration initial landholding, but the effect of international migration is much greater. Our results for post-migration initial wealth did not capture any significant effect of wealth on either internal or international migration.

However, now there are some additional variables that assume significance. Loans taken from informal sources and money raised by selling animals are now important; but they negatively affect internal migration and international migration. The multinomial logit estimate for a one thousand Rupees increase in money borrowing from informal sources for internal migrant households relative to never migrant households shows that the multinomial odds for internal migrant households in this scenario relative to never migrant households would be expected to decrease by 6% while holding all other variables in the model constant. On the contrary, the multinomial logit estimate for a one thousand Rupees increase in money borrowed from the informal sector for international migrant households relative to never migrant households would be expected to decrease by 11%. It seems that people who have taken more loans or have sold

animals are probably in a debt trap and therefore unable to migrate. This argument favours our already stated assumption that relatively deprived households compared to richer households may migrate internationally to accumulate investible surplus and diversify risk. This is consistent with the hypothesis that wealthy households are able to overcome liquidity and risk constraints on production without participating in migration (Rozelle, et al. 1999).

Our result for year's effect in context of internal and international migration confirms the earlier finding of logit regression. Other than year 2 (1998-1999), the results suggest there was a general shift in internal and international mobility patterns over the 1987-1991 periods covered by the data. The odd ratio estimate for Badin relative to Faisalabad is 62% lower for being an internal migrant household relative to 'never migrant' households. For international migrants, two districts are significant and only Badin is insignificant. Similarly, for district Attock and Dir the odd ratios (relative to Faisalabad) are 2.781 and 14.28 units higher respectively for being in international migrant households relative to never migrant households. The district Badin has fewer odds of internal as well as for international migration compared to the more prosperous district Faisalabad. This suggests a weak link may exist between Badin district and Faisalabad district in term of internal and international migration. A positive correlation was found between Dir, Attock and the reference category Faisalabad district for only international migration.

The regional indicators suggest that households in the Badin district are less likely than households living in the Faisalabad District to migrate internationally. Only households in the Dir and Attock district are more likely than those in the Faisalabad District to migrate internationally for work. Our results confirm that regional differences clearly discriminate between internal and international migration in rural Pakistan, while the empirical results indicate that international and internal migrant pre-migration landholdings have a negative influence on both international and

internal migration. The analysis has assumed that pre and post-migration landholding play a similar role regardless of their location within those general destinations.

4.6 Conclusions

In this chapter we made use of a unique panel data set of 1986-1991 for rural Pakistan to analyse internal and international migration within a common framework. However, with the control of household head characteristic, household level characteristics, wealth along regional fixed effects and year effects, the results generally indicate significant differences between internal migration and international migration. This outcome does not run contrary to the conventional wisdom on the benefits of internal and international migration as a household risk diversification strategy in a local restrictive environment. Typically, the more dependants a household has (in the form of children and young females), the less likely it is to have a migrant among its members. But at the same time, we also see that the larger the household, the greater the likelihood of sending a member to work within the country or abroad. More importantly, we see that the selling of land is an important way of financing international migration. This is consistent with other authors' findings and the conventional wisdom. Overall, the motivation for a household member migration is to find better opportunities in a new location and is associated with the local social conditions, political exclusion and economic deprivation. Whether the internal or international migration in question is due to 'push factors' or 'pull factors', the sole objective is the same since the net effect of migration is an improvement in the well-being of the households. In our case, the linkage between pre and post-migration initial wealth and internal or international migration is negotiated through sacrificing through the landholding. However, migration provides opportunities for upward economic mobility to many households in rural Pakistan.

The insight of this analysis can be useful in making public policies. Government should facilitate greater movement of labour by reducing the cost of migration. The rural credit market should also

be developed so that people can get affordable loans without having to sell land, which are vital assets for survival in rural areas. Other costs such as documentation costs, passports and work visas, health examination, criminal checks and other formalities should be charged nominally. Promoting cooperation between governments to simplify recruitment and reduce the scope of exploitation of workers by unscrupulous intermediaries and contractors. The other sets of government policy failure in rural areas of Pakistan include numerous development constraints directly linked with inadequate infrastructure, tenancy agreement (sharecropping versus fixed rent tenancy), undeveloped financial markets, non-existence of insurance markets, non-involvement of the private sector and targeted intervention by the state.

There are several limitations of the study. First is the time period of the study. Although the data set is detailed, it relates to a time period that might be useful for policy formulation now, as the Pakistani economy has changed significantly and the flow of international migration has increased in recent years. The second problem is that the data was not rich enough to find migrant-specific information, though the household level information is very detailed. We hope to overcome these limitations to some extent in the next two chapters where we will be using a more recent data set.

Appendix:

Table A.1 Determinants of migration: (Logit Regression)

VARIABLES	Migration	Odds Ratio
1-Household Head Characteristics		
Constant	-1.472**	---
	(0.705)	
Household Head Education	0.007	1.007
	(0.017)	(0.017)
Household Head Age	-0.040	
	(0.025)	0.998
Household Head Age2	0.0004	(0.008)
	(0.0002)	
2-Household Characteristics		
Children at age 0-11	-0.158**	0.854**
	(0.073)	(0.062)
Male at age12-30	0.126	1.134
	(0.080)	(0.091)
Female at age12-30	-0.130*	0.878*
	(0.080)	(0.070)
Household size	0.188***	1.207***
	(0.062)	(0.075)
Household Average Age	0.005	1.005
	(0.011)	(0.011)
Household SD Age	0.022*	1.022*
	(0.012)	(0.012)
Household Average education	0.127**	1.135**
	(0.056)	(0.064)
Household SD education	-0.013	0.987
	(0.061)	(0.060)
3- Pre-Migration Initial Wealth[37]		
Landholding in acres	-0.017***	0.983***
	(0.005)	(0.005)
Money remitted to Relative	0.257	1.293
	(0.239)	(0.309)
Money Loaned to other	-0.050**	0.951**
	(0.024)	(0.023)
Money borrowed from formal sources	-0.020*	0.980*
	(0.010)	(0.010)
Money borrowed from informal sources	-0.071***	0.931***
	(0.021)	(0.019)
Money received from sale of animals	-0.163***	0.850***
	(0.047)	(0.039)
4- Post-Migration Initial Wealth		
Landholding in acres	0.011	1.011
	(0.007)	(0.007)
Money remitted to Relative	1.695*	5.447*
	(1.012)	(5.512)
Money Loaned to other	0.007	1.007
	(0.007)	(0.007)
Money borrowed from formal sources	0.011**	1.011**
	(0.006)	(0.006)
Money borrowed from informal sources	0.029	1.029
	(0.029)	(0.030)
Money received from sale of animals	0.135	1.021
	(0.100)	(0.102)

[37] All amount in thousand Rupees

5-Time Effects: (base category Year1)			
Year2	-0.135		-0.874
	(0.100)		(0.087)
Year3	-2.198***		0.111***
	(0.140)		(0.016)
Year4	-0.253**		0.092**
	(0.119)		(0.092)
6-Regional Characteristics: (base category Faisalabad)			
Attock	0.248		1.281
	(0.173)		(0.222)
Badin	-0.935***		0.393***
	(0.201)		(0.079)
Dir	0.772***		2.164***
	(0.181)		(0.392)
Observations		3,130	
Pseudo R2		0.2699	
Prob > chi2		0.000	
Clusters in household		837	

Cluster standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.2 Determinants of migration: (Multinomial Logit Regression)
Base category for Migration = "0" Never Migrant
= "1" internal Migrant
= "2" International Migrant

	1	Relative Risk Ratio	2	Relative Risk Ratio
VARIABLES	Internal Migrant	Internal Migrant	International Migrant	International Migrant
1-Household Head Characteristics				
Constant	-1.695***		-4.134***	
	(0.678)		(1.521)	
Household Head Education	-0.009	0.991	0.047	1.048
	(0.017)	(0.017)	(0.036)	(0.038)
Household Head Age	-0.025	0.976	-0.052	0.949
	(0.0250)	(0.024)	(0.047)	(0.045)
Household Head Age2	0.0003	1.0003	0.0005	1.0005
	(0.0003)	(0.0002)	(0.0004)	(0.0005)
2-Household Characteristics				
Children at age 0-11	-0.118*	0.888*	-0.323**	0.724**
	(0.070)	(0.062)	(0.143)	(0.104)
Male at age12-30	0.175**	1.191**	-0.067	0.935
	(0.077)	(0.091)	(0.156)	(0.146)
Female at age12-30	-0.226***	0.798***	0.145	1.156
	(0.077)	(0.062)	(0.147)	(0.170)
Household size	0.177***	1.194***	0.259**	1.296**
	(0.058)	(0.070)	(0.120)	(0.156)
Household Average Age	0.012	1.012	-0.023	0.977
	(0.011)	(0.011)	(0.034)	(0.033)
Household SD Age	0.017	1.017	0.038	1.039
	(0.012)	(0.013)	(0.030)	(0.031)
Household Average education	0.155***	1.168***	0.094	1.098
	(0.057)	(0.066)	(0.122)	(0.134)
Household SD education	-0.063	0.939	0.118	1.126
	(0.061)	(0.058)	(0.129)	(0.145)
3- Pre-Migration Initial Wealth[38]				
Landholding in acres	-0.013***	0.987***	-0.113*	0.893*
	(0.004)	(0.004)	(0.065)	(0.058)
Money remitted to Relative	0.194	1.214	1.648	5.197
	(0.179)	(0.218)	(1.264)	(6.571)
Money Loaned to other	-0.063	0.939	0.007	1.007
	(0.050)	(0.047)	(0.066)	(0.067)
Money borrowed from formal sources	-0.013	0.987	-0.350	0.705
	(0.010)	(0.010)	(0.372)	(0.262)
Money borrowed from informal sources	-0.059***	0.943***	-0.119**	0.887**
	(0.022)	(0.021)	(0.053)	(0.047)
Money received from sale of animals	-0.168***	0.845***	-1.181	0.307
	(0.042)	(0.035)	(0.772)	(0.237)
4- Post-Migration Initial Wealth				
Landholding in acres	0.009	1.009	0.015	1.016
	(0.007)	(0.007)	(0.011)	(0.011)
Money remitted to Relative	1.939**	6.955**	3.112	22.472
	(0.941)	(6.546)	(2.069)	(46.486)
Money Loaned to other	0.005	1.005	0.003	1.003
	(0.004)	(0.004)	(0.009)	(0.009)

[38] All amount in thousand Rupees.

Money borrowed from	0.002	1.001	0.016	1.016
formal sources	(0.006)	(0.006)	(0.012)	(0.012)
Money borrowed from	0.009	1.009	0.051	1.052
informal sources	(0.026)	(0.026)	(0.046)	(0.049)
Money received from	0.130	1.139	0.217	1.242
sale of animals	(0.096)	(0.110)	(0.162)	(0.201)
4-Time Effects: (base category Year1)				
Year2	-0.129	0.879	-0.120	0.890
	(0.106)	(0.093)	(0.129)	(0.114)
Year3	-4.185***	0.015***	-0.555***	0.574***
	(0.358)	(0.005)	(0.206)	(0.083)
Year4	-0.322***	0.724***	0.054	1.056
	(0.127)	(0.092)	(0.167)	(0.177)
5-Regional Characteristics: (base category Faisalabad)				
Attock	0.158	1.171	1.023*	2.781*
	(0.170)	(0.199)	(0.565)	(1.572)
Badin	-0.968***	0.380***	-1.837	0.159
	(0.193)	(0.073)	(1.276)	(0.203)
Dir	0.060	1.061	2.727***	15.28***
	(0.185)	(0.196)	(0.518)	(7.92)
Observations		3130		
Pseudo R2		0.2993		
Prob > chi2		0.000		
Clusters in household		837		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.3 Determinants of migration for the subsample of initial migrant households: (Logit regression)

VARIABLES	Migration
1-Household Head Characteristics	
Constant	-0.157
	(1.70)
Household Head Education	0.066**
	(0.033)
Household Head Age	-0.051
	(0.060)
Household Head Age2	0.0001
	(0.0006)
2-Household Characteristics	
Children at age 0-11	-0.223*
	(0.124)
Male at age12-30	0.057
	(0.141)
Female at age12-30	-0.050
	(0.133)
Household size	0.134
	(0.110)
Household Average Age	-0.018
	(0.023)
Household SD Age	0.017
	(0.027)
Household Average education	0.127
	(0.085)
Household SD education	-0.092
	(0.107)
3- Post-Migration Initial Wealth[39]	
Landholding in acres	0.003
	(0.007)
Money remitted to Relative	0.551
	(1.034)
Money Loaned to other	0.006
	(0.007)
Money borrowed from formal sources	0.010
	(0.009)
Money borrowed from informal sources	-0.020
	(0.022)
Money received from sale of animals	0.230
	(0.102)
4-Time Effects: (base category Year1)	
Year2	-0.176
	(0.218)
Year3	-2.287***
	(0.215)
Year4	-0.488**
	(0.241)
5-Regional Characteristics: (base category Faisalabad)	
Attock	0.725**
	(0.325)
Badin	-1.017***
	(0.426)
Dir	1.676***
	(0.302)
Observations	904
Pseudo R2	0.2512
Prob > chi2	0.000
Clusters in household	249

Cluster standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

[39] All amount in thousand Rupees

Table A.4 Determinants of migration for the subsample of non-initial migrant households: Logit regression

VARIABLES	Migration
1-Household Head Characteristics	
Constant	-2.210**
	(0.741)
Household Head Education	-0.022
	(0.021)
Household Head Age	-0.004
	(0.029)
Household Head Age2	0.00001
	(0.0003)
2-Household Characteristics	
Children at age 0-11	-0.094
	(0.086)
Male at age12-30	0.149
	(0.101)
Female at age12-30	-0.154
	(0.099)
Household size	0.179**
	(0.074)
Household Average Age	0.010
	(0.013)
Household SD Age	0.023
	(0.014)
Household Average education	0.119*
	(0.073)
Household SD education	-0.032
	(0.077)
3- Pre-Migration Initial Wealth[40]	
Landholding in acres	-0.011***
	(0.004)
Money remitted to Relative	0.234
	(0.241)
Money Loaned to other	-0.028
	(0.024)
Money borrowed from formal sources	-0.014
	(0.010)
Money borrowed from informal sources	-0.033
	(0.021)
Money received from sale of animals	-0.177***
	(0.040)
4-Time Effects: (base category Year1)	
Year2	-0.151
	(0.124)
Year3	-2.770***
	(0.274)
Year4	-0.207
	(0.147)
5-Regional Characteristics: (base category Faisalabad)	
Attock	0.070
	(0.201)
Badin	-0.987***
	(0.227)
Dir	0.043
	(0.228)
Observations	2,226
Pseudo R2	0.1939
Prob > chi2	0.000
Clusters in household	588

Cluster standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

[40] All amount in thousand Rupees

CHAPTER FIVE

(ESSAY TWO)

A Box-Cox Double Hurdle Model of Remittances

5.1 Introduction

The migration in the literature has been identified as a phenomenon of life improvement for many poor households in the developing countries that creates social and financial benefits not only for migrants but also for their families in the origin countries. If the migration route is from developing to developed countries, whether it is due to cost and benefits analysis or wage differential, it will lead to 'brain gain' for migrants. However, the resulting 'brain drain' due to human capital loss for migrant families in home countries is compensated by the remittances sent by migrants. The remittances received by many households increase consumption and investment in local economies (where capital is scarce) and will result in a multiplier effect. At the macro level, in many developing countries, this unrequited transfer in the form of remittances has a positive effect on the balance of payment. It is also an important source of foreign exchange, which covers a substantial portion of the trade balance. At the micro level, migration and remittances enable financial and social inclusion for many rural households. Similarly, the World Bank (2014) estimated that the flow of remittances to developing countries are expected to grow by 7.8% from $404 billion in 2013 to reach $436 billion in 2014, and further grow to $516 billion in 2016. Given this historically unprecedented benefit of migration and remittances on the household economy in many countries, it is important to understand the factors that promote migration or leads to remittances.

The determinant of remittances has been studied in the literature of migration to understand the underlying motivation to remit. The new economics of labour migration (NELM) has already highlighted the combination of factors ranging from altruism (Lucas and Stark, 1985), self-interest (Carling, 2008), micro-enterprise or investment (Yang, 2008), loan repayment (Ilahi and Jafarey 1999) to inheritance (Hoddinott, 1994) that determine this flow of remittances from migrants to their extended family. The role of remittances differs from one household to another household and from one region to another region depending on the underlying motives of the migration. The analysis of remittances enables us to understand the complexity of the household arrangement involved in migration.

Although there is extensive research on the issue of migration and remittances only a few of them is focused on this aspect in Pakistan, which comes in the world top ten remittance receiving countries. We fill this gap in the literature by analysing the determinants of remittances by employing the double-hurdle model using the panel data of Pakistan.

If one wishes to model remittances, they have to be aware of the large number of zeroes in the data. The motivation behind using the Box-Cox double hurdle model in remittance studies is that there is a large cluster of zeroes denoting households receiving no remittances. Due to the presence of zero-s OLS yields inconsistent estimates, and we need to consider an alternative estimation approach. Next, we need to recognize the fact that some migrants may not remit at all, and it is only those who decide to remit that choose an optimal amount to remit. For this reason, we employ a double-hurdle model to study the determinants of remittances. In this model, the household decisions on whether and how much is to receive are split. In light of this, our paper tries to analyse the factors that play an important role in determining the probability, and the amount of remittances received by households from the migrants who are currently abroad. We use the panel data set from rural Pakistan to approach our research question from the receiving household perspective. Thus, our empirical model include the determinants of remittances in

terms of household head characteristics, household composition, household level wealth, loan variables and regional characteristics suggested by existing theories of remittances, which influence the incidence and amount of remittances received by household.

Our results clearly differentiate between the probability to remit, and the level of remittances received by the household. It is noted that there exist opposing effects of probability to receive remittances and the level of remittances at a district level. We find that the determinant of remittances in terms of the participation and the level of remittances received by a household is different. A combination of household level observed characteristics and regional variables are key to explaining the remittance behaviours in rural Pakistan.

We find that internal migrants and international migrants have a positive impact on both the probability to remit and also on the level of remittances. The square term for international and internal migration confirms that the number of members traveling internally and internationally both exhibit positive relationships, but with diminishing marginal returns. The remittances rise with the number of migrants travelling in the household, but it increases at a decreasing rate. This result confirms that households that have sent migrants outside, are improving their welfare by receiving greater welfare, but that depends on the household wealth and its capacity to send multiple members outside. In short, the richer families receive greater remittances. Although, money loans to others has a positive impact on the level of remittances but not on the probability to remit. Finally, our district variable Attock and Dir with base category Faisalabad is only significant for the first hurdle 'likelihood to remit'. Similarly, district Dir and Badin are only significant for the second hurdle 'level of remittances'.

The rest of the paper is organised as follows. Section 5.2 explains the data and provides sample description. The research methodology is presented in section 5.3 while the discussion and results are presented in Section 5.4. Finally, the last section concludes the chapter.

5.2 Descriptive statistics

Continuing with the same data set as in the previous section, but making use of the remittances information, we estimate the Box-Cox double hurdle model proposed above. The data panel contains information on 975 households for five years. But it has one limitation that it does not distinguish between internal versus international remittances. By using support information on the migration status – internal or international—we could have distinguished between the sources of remittances, however, we have not done so.

In our data, remittances are measured at the household level and we include a vector of household characteristics representing household head characteristics, the number of male and female members, dependant in the households, wealth status of the household, members traveling within and outside of a country and district level fixed effects. Table 5.1 presents a summary of the remittances received by households at the district level. On average Dir district received around 11,510 Pakistani Rupees (PKR) per annum (with a standard deviation of 35,448 PKR), which is the highest amongst the surveyed districts. This finding is consistent with the previous chapter's descriptive statistics that Dir district has the highest share of internal and international migrants. Similarly, remittances received by district Faisalabad stands on average at 4,135 PKR with a standard deviation of 18,029 PKR. On average remittances received by Attock and Badin district are 3,557 PKR and 1,205 PKR respectively, which is comparatively lower than others.

Table 5.1 Summary of remittances at District level

District	Average	Std. Dev.	Observations
Faisalabad	4135	18029	821 (20%)
Attock	3557	12983	859 (21%)
Badin	1205	4262	1214 (30%)
Dir	11510	35448	1163 (29%)
Total	5250	21995	4057

Table 5.2 summarizes the household level characteristics of whether or not a household receives remittances. The sample is restricted to households with at least a migrant away, but few of the household might receive remittances from friends, and relatives. Recalling from last chapter that there are 33% of the migrant's household. The household receives remittances consists of 35%. These 2% of the households might receive remittances from friends, and relatives.

We present summary statistics for overall household economic status by including landholding and other wealth proxies. By concentrating on the remittance receiving households in the first part of Table 5.2, we see that on average the age of a household head is around 48.5 years, with three years of education, a household size of 10.19 members and receives remittances of 14,771 PKR per annum with 7.5 acres of landholding. The number of household members traveling abroad ranges from 0 to 7, while the number of the household members traveling internally ranges from 0 to 5. In contrast, analysing households who do not receive remittances in the second part of the table 5.2 we see that the typical age of a household head is around 46 years, with three years of education, a household size of 9.5 members and 8.65 acres of land holding. Similarly, the number of household members traveling internally is from 0 to 9 and traveling abroad is from 0 to 3. In our data set, 36% of the households received remittances while the remaining 64% of households do not receive remittances. The data set is informatively rich enough to study the determinants of remittances.

Table 5.2 Summary statistics of households receive and do not receive remittances

	Household receives remittances (Observation = 1442)				Household not receive remittances (Observation = 2615)			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Remittances	14771	34943	0	600000	-	-	-	-
Head Education	2.91	4.13	0	16	2.82	4.04	0	16
Head Age	48.45	14.19	13	85	46.22	13.69	13	90
Number of Children	3.67	2.86	0	21	3.87	2.97	0	28
Number of Males	3.73	2.46	0	15	3.10	2.32	0	15
Number of Females	1.79	1.34	0	9	1.60	1.30	0	8
Household Size	10.19	4.92	2	42	9.69	4.89	1	42
Travelling in a country[41]	0.50	0.88	0	5	0.29	0.70	0	9
Travelling abroad[42]	0.22	0.60	0	7	0.037	0.23	0	3
Land Holding	7.5	16.75	0	200	8.65	19.10	0	200
Remit Relative	87.21	522	0	10000	64.36	486	0	15000
Loaned Other	951	5547	0	100000	1792	22279	0	900000
Borrow Formal	862	9746	0	220000	506	6162	0	200000
Borrow Informal	2335	8688	0	212000	2168	13324	0	400000
Animal Sale	1415	3770	0	54700	2214	10239	0	422000
Land Sale	889	9130	0	236000	1549	16689	0	350000

The comparison of the households that receive remittances with the households that do not receive remittances shows that there is a substantial variation between these two types of household in rural Pakistan. All these descriptive statistics give us an incomparable socio-economic picture of the household that is essential to understand their remittance behaviour.

[41] These are the internal migrant member of the household traveling in a country

[42] These are the international migrant member of the household traveling outside a country

5.3 Research Methodology

5.3.1 Historical evolution of double-hurdle Model

This paper studies the determinants of remittances using Pakistan's panel data set. Sinning (2011) explains that conventional literature of migration and remittances apply Tobit's (1958), but Vuong-test reveals that the double-hurdle model is the correct specification rather than Tobit's model for analysis of migration and remittances. Flood and Grasjo (2001) explain Heckman's (1978) generalisation of Tobit's model (Tobit type II), which is an extension of the standard Tobit model (Tobit type, I). Furthermore, the Jones (1989) double-hurdle model is further an extension of Heckman's model. The Heckman's (1978) model was the first to study the participation.

The standard Tobit's model (Tobit type, I) can be written as following.

Structural equation: $y_i^* = x_{1i}\,\alpha + \epsilon_i$

Threshold structural equation: $y_i = \begin{cases} y_i^* & if\ y_i^* > 0 \\ 0 & else \end{cases}$

y_i^* represents the latent or unobserved variable, and y_i represents a corresponding observed variable. However, x_{1i} is a vector of explanatory variables and α is a vector of parameters. Furthermore, it is assumed that x_{1i} and ϵ_i is uncorrelated.

Similarly, Heckman's generalised Tobit's model (Tobit type II) includes a structural equation, an index equation, and threshold equations along with a stochastic specification.

Structural equation: $y_i^* = x_{1i}\,\alpha + \epsilon_i$

Index equation: $d_i^* = x_{2i}\,\beta + \mu_i$

Threshold index equation: $d_i = \begin{cases} 1 & if\ d_i^* > 0 \\ 0 & if\ d_i^* \leq 0 \end{cases}$

Threshold structural equation: $y_i = \begin{cases} y_i^* & if\ d_i = 1 \\ 0 & else \end{cases}$

Stochastic specification: $\epsilon_i\,, \mu_i \sim N\ (0{,}0, \sigma^2, 1\,, \rho\ )$

y_i^* represents the latent or unobserved variable, and y_i represents a corresponding observed variable. Similarly, d_i^* represents a binary censoring latent or unobserved variable, and d_i represents a corresponding observed variable. However, x_{1i} and x_{2i} are vectors of explanatory variables, similarly, α and β are vectors of parameters. It is assumed that x_{1i} and x_{2i} are uncorrelated with ϵ_i and μ_i respectively. Heckman used a two-stage method known as Heckit rather than a maximum likelihood function for estimation. Heckman's estimation involves binary regression to get estimates of α and β.

The double-hurdle model is simply an extension of Heckman's model, which censored y at 0.

Structural equation: $y_i^* = x_{1i}\,\alpha + \epsilon_i$

Index equation: $d_i^* = x_{2i}\,\beta + \mu_i$

Threshold structural equation: $y_i = \begin{cases} y_i^* & if\ d_i = 1\ and\ y_i^* > 0 \\ 0 & else \end{cases}$

Stochastic specification: $\epsilon_i, \mu_i \sim N\,(0,0,\sigma^2,1,\rho)$

The double-hurdle model estimation is based on the maximum likelihood function, which based on Jones's double-hurdle model, is the following.

$$L = \prod_{y=0}\left\{1 - \Phi\left({}^{x_{2\beta}, x_{1\alpha}}/_{\sigma,\rho}\right)\right\} \times \prod_{y>0}\left\{\Phi\left(\frac{x_{2\beta}+\frac{\rho}{\sigma}(y-x_1\alpha)}{\sqrt{1-\rho^2}}\right)\frac{1}{\sigma}\phi\left(\frac{y-x_1\alpha}{\sigma}\right)\right\}$$

The likelihood function above only used the information that y=0 and y>1, and it does not use Tobit censoring (d=1 and y=0). The following likelihood function uses Tobit censoring at (d=1 and y=0).

$$L = \prod_{d=0}\{\Phi(-x_{2\beta})\} \times \prod_{d=0,y=0}\{\Phi(x_{2\beta,} - x_1\alpha/\sigma,\rho)\} \times$$
$$\prod_{y>0}\left\{\Phi\left(\frac{x_{2\beta}+\frac{\rho}{\sigma}(y-x_1\alpha)}{\sqrt{1-\rho^2}}\right)\frac{1}{\sigma}\phi\left(\frac{y-x_1\alpha}{\sigma}\right)\right\}$$

The extension of the double hurdle model for panel is provided in the next section.

5.3.2 A Box-Cox double hurdle approach

It has long been recognised that when dealing with censored data some information will be lost if the data relating to the non-observed outcome is discarded. Throwing away these observations will lead to inconsistent OLS estimates. Also treating such cases as a corner solution as was done by Tobit (1958) may also not be appropriate (Sinning, 2011). The double hurdle approach proposed by Cragg (1971), overcomes these and other econometric problems that arise when the dependent variable takes a value of zero in a logarithmic regression, which is the case with non-remitters in our model.

Typically a double-hurdle model has two parts. In our case the first part estimates a migrant's decision[43] to remit as a function of a set of covariates, using the entire sample. The dependent variable is a dichotomous variable of 1 for remitters and 0 otherwise. The second part of the regression uses only a part of the sample, for which remittances are positive (Cameron and Trivedi; 2005). Given that our data set is a panel, we need to consider a Box-Cox panel double-hurdle model, similar to Moffatt (2005)[44] and Jones and Yen (2000)[45]. A somewhat similar approach was taken by Bettin, et al. (2012) in the context of remittances.

The only difference between the double hurdle model and Box-Cox double hurdle model is the transformed dependent variable in Box-Cox, and the relaxation of the normality assumption of an unobserved error. This transformation of a dependent variable involves the estimation of one more parameter λ. If an estimate of the parameter λ is close to zero this indicates that the model

[43] The decision is taken by the migrant household member.
[44] The double-hurdle model with dependence is extended by incorporating the Box-Cox transformation, in case of hurdle model of loan default
[45] Box-Cox hurdle model of US beef consumption

should be estimated with the dependent variable logarithmic transformed. A value of λ close to one means no logarithmic transformation is necessary (Muller 2010).

It is assumed that two hurdles should be passed for a positive contribution to be observed. The first hurdle explains why a migrant is a remitter or a non-remitter. If a migrant or member does not pass the first hurdle it means that he/she is a non-remitter type and his/her contribution throughout the analysis will be null. Similarly, if a member passes the first hurdle, the second hurdle determines whether the member's remittances are positive or zero. The first hurdle is denoted as "participation" which is a censoring mechanism and the second hurdle is denoted as "remittances intensity" which is the outcome or the level of remittances.

The model in the general form can be written as follows. The first hurdle (participation) is assumed to be time invariant:

$$d_i^+ = z_i'\alpha + \varepsilon_{1,i} \qquad i = 1, \ldots\ldots, n$$

$$d_i = 1 \; if \; d_i^+ > 0; d_i = 0 \; otherwise,$$

$$\varepsilon_{1,i} \sim N\,(0, 1).$$

In the above d_i is an outcome variable (remits or does not remit) which is determined by d_i^+ which in turn depends on a number of covariates denoted by the row vector z_i'. The second hurdle (intensity) draws for time variation and is written as:

$$R_{it}^{++} = x_{it}'\beta + u_i + \varepsilon_{2,it} \qquad t = 1, \ldots\ldots, T$$

$$R_{it}^{+} = R_{it}^{++} if \; R_{it}^{++} > 0;$$

$$= 0 \; otherwise.$$

In the above index *i* represent households and *t* represents time.

$$\varepsilon_{2,it} \sim N(0, \sigma_\varepsilon^2); \; u_i \sim N(0, \sigma_u^2) \;\; corr(u_i, \varepsilon_{1,i}) = \rho$$

The random variables u_i and $\varepsilon_{1,i}$ are assumed to be independently distributed.

The observed remittances are given by the following equation (which combines both hurdles):

$$R_{it} = d_i \times R_{it}^{+}$$

R_{it} is the amount of remittances of households' i at time t and z_i' be the vectors of characteristics of households' i which explains whether households pass the first hurdle. Furthermore, x_{it}' is the vector of characteristics of household i at time t that are relevant for remittances.

The observed dependent variable is transformed according to the Box-Cox hurdle model:

$$\tilde{R}_{it} = \begin{cases} \frac{{R_{it}}^{\lambda-1}}{\lambda} & if\ \lambda \neq 0 \\ \ln(R_{it}) & if\ \lambda = 0 \end{cases}$$

The Box-Cox double model is then given by

$$\tilde{R}_{it} = \begin{cases} R_{it}^{+}\ if\ R_{it}^{+} > \frac{1}{\lambda}\ and & d_i^{+} > 0 \\ 0 \quad if\ R_{it}^{+} \leq \frac{1}{\lambda}\ or & d_i^{+} \leq 0 \end{cases}$$

The estimation method is the maximum likelihood estimation which maximizes the following log-likelihood function.

$$\log L = \sum_{0} ln\left[(1 - \Phi(z_i'\alpha))\Phi(\frac{\frac{1}{\lambda} + x_{it}'\beta}{\sigma_i})\right] + \sum_{+} ln\left[\Phi(z_i'\alpha){R_{it}}^{\lambda-1}\frac{1}{\sigma_i}\phi(\frac{\tilde{R}_{it} - x_{it}'\beta}{\sigma_i})\right]$$

The above model has been used in different applications such as the household consumption of cheese by Yen and Jones (1997), household expenditure on a prepared meal by Newman et al. (2003), loan default by Moffatt (2005), and labour market studies by Zaiceva and Zimmermann (2014).

5.4 Results and discussions

Table 5.3 provides the estimates for the participation equation and the level equation of the Box-Cox double hurdle model. The second column of Table 5.3 reports the results of the model to

determine the probability of receiving remittances using a binary dependent variable for receipt for only the last year (D=1 if the household received remittances and 0 otherwise), while column three shows the continuous choice of the amount of remittances received ($\tilde{R}_{it}$, conditional for those household that receive remittances). The explanatory variables considered both for participation and the level equation in the analysis of remittance behaviours include household head characteristics (age, years of education), household level characteristics representing the structure of the migrant household in the origin country (number of children aged less than 11 years, the presence of males and females age between 12 and 30 years and household size), and the wealth status of the household (landholding in acres, money received from sale assets, and money borrowed from formal and informal sources). Further, it includes the future migration status of the household members (travelling outside and within a country), and the regional fixed effect.

Table 5.3 MLEs for Box-Cox double hurdle model
(Dependent variable: amount of remittances)

Variables	D (First hurdle)	$\tilde{R}_{it}$(Second hurdle)
Constant	0.262	-43.12
	(0.469)	(51.05)
Household Head Education	-0.010	2.294*
	(0.013)	(1.368)
Household Head Age	-0.003	-2.428
	(0.018)	(1.981)
Household Head Age-squared	0.00001	0.036*
	(0.0001)	(0.200)
Children at age 0-11	0.097**	-4.735
	(0.043)	(4.570)
Male at age12-30	0.072	12.83**
	(0.052)	(5.322)
Member travelling in a country (internal migrant)	0.253**	36.49***
	(0.122)	(10.66)
Member travelling in a country-squared	-0.071**	-6.375**
	(0.035)	(3.198)
Member travelling outside a country (international migrant)	1.296***	226.80***
	(0.323)	(17.86)
Member travelling outside a country-squared	-0.307**	-29.83***
	(0.126)	(5.198)
Land Holding (in Acres)	-0.008	0.424
	(0.006)	(0.589)
Land Holding-squared	0.0001	-0.005
	(0.0001)	(0.005)
Money loaned to others (in thousand)	0.062	8.655***
	(0.044)	(1.161)
Attock (base category Faisalabad)	0.455***	12.62
	(0.153)	(15.27)
Badin	0.009	-25.50*
	(0.146)	(15.87)
Dir	-0.669***	68.60***
	(0.146)	(16.02)
σ	-	189.91
		(0.019)
σ_u	-	68.317
		(6.054)
ρ	-	0.115
		(0.019)
Sample size (n)	927	3094
Log L	-538.44	-10689.69

Standard errors in parentheses; *P<0.10, **P<0.05, and ***P<0.01 (The extended version of Table 5.3 is in the Appendix B.1)

5.4.1 The Participation Equation

Analysing column two of Table 5.3, we observe that the maximum age of the household head is approximately 55 years to receive remittances. In the presence of a quadratic term for the household head age, we cannot interpret household head age in isolation. However, we did not find any significant impact of the household head education in years on the probability to receive remittances. It seems the household participation to receive remittances in the presence of more or less educated household head matters less in rural Pakistan.

The variable capturing the strength of ties between the migrant and the household is the presence of the number of children aged less than 11 years. This variable captures the household dependence on the additional resources for expenditure related to better education of children. A number of research reports find that remittances enable households to afford better education for their children (Edwards and Ureta, 2003). We find that the participation of the household in receiving remittances also increases with the number of children in the household. It may suggests a possible contractual agreement between the household and the migrant to exchange child care for remittances (Garip, 2014; Banerjee, 1984).

Both variable relating to members travelling in a country and members travelling abroad have a quadratic term, and are highly significant. Our results confirm that it is more likely to receive remittances if a household member travels within a country. Interestingly, the positive coefficient of the members travelling in a country and the negative coefficient of its square, confirm that the extent of remittances increase with a decreasing rate. The relationship between household members travelling in a country and remittances share an inverted U-shape. However, we also find that the maximum number of members travelling within a country is 2 for the household to participate in receiving remittances. Remittances are a positive function of migration, and the remittances income further helps in the migration of the other family members in rural China

(Taylor et al. 1999). This results support the NELM hypothesis that migrant remittances relax capital constraints for household to cover up migration costs such as information, the job search and other related expenses.

Similarly, we find that the household members travelling abroad have a positive impact on the likelihood of remittances. The members travelling abroad also share an inverted-U relationship. This suggests that remittances decrease with the presence of more than two migrants in the household.

The first hurdle also includes the district fixed effects to capture the key differences in the likelihood of receiving remittances by households. The base category for the district fixed effect is Faisalabad, which is the relatively better-off district. We find that there are statistically significant differences for probability of receiving remittances and the level of remittances received by the households in different districts. However, residing in Dir district has a strong negative effect in terms of participation when compared with the base category of Faisalabad district. This is consistent with the presence of a weaker sharing norm pressure in a more remote locality in comparison with those living in Faisalabad. On the other hand, for Attock district, the coefficient is positive and strongly significant for participation in remittances. This is indicative of the effect that Faisalabad and Attock district are from the same province, so both districts share the same norms. These norms can be enforced by the similar geographical neighbourhood of the same province and have a positive impact on the probability of receiving remittances.

Thus, with regard to the probability to receive remittances, the result from the Box-Cox double hurdle model suggests that the variation in remittances in Pakistan can be explained by the age of household head, the number of children aged less than 11 years, member traveling within and outside of the country and the district level fixed effects. From these factors, it can be concluded that household level characteristics, and regional factors are the important determinants for the

probability of remittances and no other variable (that we have information on) plays any significant role in the decision to remit.

5.4.2 The level Equation

Column 3 of Table 5.3 shows the results for the second hurdle (level of remittances), that is conditional upon the first hurdle (participation for the remittances). Our result in Table 5.3 confirms that in the case of rural Pakistan the two hurdles – participation and level of remittances - are independent. We find the determinants that affect the probability to receive remittances are different when compared to the level of remittances.

Contrary to the earlier findings household education (in years) assumes significance for the level of the remittances, conditional on the participation. Each additional year of education increases the amount of remittances, and it appears to be the important determinant for the level of remittances. Similarly, the maximum age of household head is around 33 years for the level of remittances. The relationship between the age of the household head and remittances is an inverted U-shape. It is interesting to note that household head education and age (in years) appear to affect the level of remittances, unlike the participation results.

The expected level of remittances is significantly related to the number of male members in the household. If the migration is the contract between the migrant and household, then households receives more remittances even in the presence of male members of the household (Hoddinott, 1994). Secondly, if the household wants to diversify its human resources in order to overcome market imperfections, in that situation, it needs more additional resources (Taylor et al. 1996).

Interestingly for both members travelling within and outside of the country, there are two effects: one is a positive occurring linear effect and the other is a negative occurring through the quadratic

term exerting a level effect. The relationship between household members travelling within and outside of the country and remittances is an inverted U-shape. Interestingly, the positive coefficient of the members working within and outside of the country, and the negative coefficient of it square, confirm that the extent of the remittances increase with a decreasing rate. Comparing the impact across the incidence and the amount of remittances received by the household, we find that both members traveling within and outside of the country are the important determinant for both hurdles. This suggests that for richer families remittances increase slowly and eventually fall. This is consistent with the general view that the poor migrants remit more than the rich or educated migrants. More importantly, remittances will bear an inverted-U relationship with a family's human resources or access to better labour market opportunities (such as members working within and outside of the country). This indicates that as the family's wealth position improves its need for additional remittances falls and after a point it is weaned off.

Our model does not capture any wealth effects on the incidence and the amount of remittances received by a household. For both hurdles landholding in acres is not statistically significant although it is positively related to the remittances, but earlier research by Adam (1998), using the same data set, finds that remittances contribute to asset accumulation in rural Pakistan. Contrary to conventional wisdom, we do not find any statistically significant relationship between money borrowed from informal and formal sources. It may be possible that households in rural areas cannot raise finances through the formal money channels due to the absence of a credit market, but households can easily raise finances through the informal sector.

Moreover, the money loaned (in thousand rupees) positively affects only the amount of remittances, but for participation, it is not statistically significant. This suggests that remittances also serve as an insurance mechanism for other households in rural Pakistan. In addition to the above, we also include the districts fixed effect to identify the key differences and how the amount of remittances varies between districts.

The district Badin has a negative effect on the level of remittances when compared with the base category of Faisalabad district. On average, households in Badin district receive a relatively lower amount of remittances than the Faisalabad district. However, the Badin district is not statistically significant for probability of receiving remittances. It is noted that there exists an opposing effect of probability to receive remittances and the level of remittances at a district level. On the other hand, for Dir district, the coefficient is positive, and statistically significant for the level of remittances, contrary to earlier findings with negative impact for the participation of remittances. One possible interpretation of this result is that the decrease in participation does not translate into a significant decrease in the level of remittances in Dir district. There are substantial regional differences between the districts included in this study. The migrant households from Attock district show a higher participation in remittances, whereas the migrant households from Dir constitute a larger level of the remittances. A substantial portion of the indirect effect of remittances at a household-level may reflect these regional differences.

5.5 Conclusions

We used the panel data from rural Pakistan to study the variables that determine the propensity to receive remittances and the amount of remittances by using the Box-Cox double hurdle model. The Box-Cox double hurdle model is more appropriate and superior for considering the non-remitter in the analysis of remittance determinants. Thus, our empirical model included the determinants of remittances in term of household head characteristics, household composition, household level wealth, loans variables and regional characteristics suggested by the existing theories of remittances. We find that the determinant of remittances in terms of the participation, and the level of remittances received by household is different, a combination of household level observed characteristics and regional variables are key in explaining the remittances behaviour in rural Pakistan.

The empirical analysis reveals that the age of household head is an important determinant for participation and level of remittances. Moreover, household head education in years is only a significant determinant for the level of participation. The number of children turns out to have a significantly positive impact only for household participation in receiving remittances, indicating a possible contractual agreement between the household and the migrant to exchange child care for remittances. If the migration is a contract between the migrant and household, then the household receives a greater level of remittances even in the presence of male members of the household. In addition, we find that presence of male members of the household is only determinant in the level of remittances in rural Pakistan.

At the same time, the members traveling within and outside of a country, determines both the participation and the level of remittances. The relationship between household members traveling within and outside of the country and remittances is an inverted U-shape. Interestingly, the positive coefficient of the members working within and outside of the country, and the negative coefficient of it square, confirm that the participation and the extent of remittances increase with a decreasing rate. There is a substantial regional differences between the districts included in this study. The migrant households from Attock district show a higher participation in their remittances, while migrant households from Dir comprise a larger level of the remittances. A substantial portion of the indirect effect of remittances at a household level may reflect these regional differences.

These results imply that migration motives are in line with the risk diversification strategy of the rural households for receiving remittances to their origin countries (Stark and Taylor 1989). It may be concluded that migration affects household income through remittances and also helps reallocation of the labour supply.

Appendix:

Table B.1 MLEs for Box-Cox double hurdle model;
(Dependent variable: amount of remittances received)

Variables	D (First hurdle)	$\tilde{R}_{it}$ (Second hurdle)
Constant	0.262	-43.12
	(0.469)	(51.05)
Household Head Education	-0.010	2.294*
	(0.013)	(1.368)
Household Head Age	-0.003	-2.428
	(0.018)	(1.981)
Household Head Age-squared	0.00001	0.036*
	(0.0001)	(0.200)
Children at age 0-11	0.097**	-4.735
	(0.043)	(4.570)
Male at age12-30	0.072	12.83**
	(0.052)	(5.322)
Female at age12-30	0.075	-5.189
	(0.057)	(5.819)
Household size	-0.053	-2.058
	(0.039)	(3.987)
Member travelling in a country (internal migrant)	0.253**	36.49***
	(0.122)	(10.66)
Member travelling in country-squared	-0.071**	-6.375**
	(0.035)	(3.198)
Member travelling outside a country (international migrant)	1.296***	226.80***
	(0.323)	(17.86)
Member travelling outside country-squared	-0.307**	-29.83***
	(0.126)	(5.198)
Land Holding (in Acres)	-0.008	0.424
	(0.006)	(0.589)
Land Holding-squared	0.0001	-0.005
	(0.0001)	(0.005)
Money remitted to relative (in thousand)	0.113	12.76
	(0.171)	(13.40)
Money loaned to others (in thousand)	0.062	8.655***
	(0.044)	(1.161)
Money borrowed from formal sources (in thousand)	-0.001	-0.392
	(0.004)	(0.514)
Money borrowed from informal sources (in thousand)	-0.015	1.954
	(0.013)	(1.360)
Money received from sale of animals (in thousand)	0.004	1.108
	(0.027)	(2.703)
Money received from sale of land (in thousand)	0.001	-0.057
	(0.004)	(0.373)
Attock (base category Faisalabad)	0.455***	12.62
	(0.153)	(15.27)
Badin	0.009	-25.50*
	(0.146)	(15.87)
Dir	-0.669***	68.60***
	(0.146)	(16.02)
σ	-	189.91
		(0.019)
σ_u	-	68.317
		(6.054)
ρ	-	0.115
		(0.019)
Sample size (n)	927	3094
Log L	-538.44	-10689.69

Standard errors in parentheses; *P<0.10, **P<0.05, and ***P<0.01

CHAPTER SIX

(ESSAY THREE)

Household Heterogeneity and Hierarchical Decision-Making for Remittances

6.1 Introduction

Remittances are an essential source of income in reshaping the countries of the developing world. In the last three decades, they are quietly transforming societies and regions through the notion of "self-help" undertaken by poorer households all over the world. This phenomenon has been called "Mother's milk for poor nations" (Kapur, 2010). According to the recent World Bank Migration and Development Brief[46] the officially recorded remittances to developing countries reached $406 billion in 2012 compared to the $381 billion recorded in 2011 an increase of 6.5%. This is uptrend expected to steadily grow at the rate of 8% and 10% in 2013 and 2014, respectively. Pakistan is a country in the top 5 by population amongst all developing countries and in the top 10 recipients of remittances among these countries.

An important question is whether the remittance pattern can be explained only by household characteristics, or also by heterogeneity at the community level, such as the village or district levels, which may capture different cultural environments or different agro-economic climates.

With the aim of addressing the above question we consider a 2001-02 dataset from the Household Integrated Economic Survey (HIES) of Pakistan, covering all four provinces (Punjab, Sindh,

[46] For more detail see World Bank, Migration and Development Brief 19 published November 20, 2012.

NWFP and Balochistan), and consisting of 14,831 households from 1,050 villages nested into 147 districts. We highlight the relative importance of different remittances (internal or international), paying particular attention to the random unexplained heterogeneity at district and village level.

We use a three-level logistic model, which allows estimation of coefficients associated with random household and community effects on two types of remittances: internal remittances and international remittances. One key focus of our work is examining the extent to which remittance related behaviour is correlated within the village or within the districts.

The benefits of adopting a multi-level model are as follows. Firstly, it allows us to measure random unobserved heterogeneity at different levels. Secondly, it takes into account the clustered structure, when observations are clustered into higher-level units (such as at the district or provincial levels). Thirdly, the random effects (unobserved heterogeneity) estimated from the multilevel model help retrieving the various level of the total variance and covariance associated with the outcome variable.

We find, for the internal remittances, the age of the household head and the gender and number of dependants all exert positive and significant effects, whereas adult male household members (aged 15-30 years) and landholding exert negative and significant effects. This is consistent with conventional wisdom. If there are more male members at home, or the household owns significant land, then the need for sending remittances back home is less. On the other hand, if there are more elderly people or children, remittances rise. Generally speaking, the effects of household characteristics tend to vary between internal and international remittances, and they too get further modified when we introduce regional fixed effects. We find that the presence of female members in the household determines only internal remittances. However, land holding in acres positively related the international remittances. The household size is a more robust determinant of international remittances rather than internal remittances.

We also study the village and district level unobservable heterogeneities. For this purpose we calculate the odd ratios of two randomly selected households' prospects of receiving internal and international remittances, in two distinct cases – in one, the two households are located in same village within the same district, and in the other, they are located in two different villages within the same districts. It is worth noticing that the odds ratios are higher for international remittances than the internal remittances, which is not surprising. But the fact that the odds ratio of comparing two households from the same village within the same district are generally higher than the odds ratio of two households from different village within the same district is not in line with conventional wisdom. Households in close proximity should have higher odds of receiving remittances. It suggests that inter-village variations are significant. These results are useful to understand the importance of the village level network for information gathering and seeking insurance from each other.

In line with the conventional wisdom, the odd ratios for the same village within the same district are generally higher than the odds ratios for different villages within the same district. Households in close proximity should have similar odds of receiving remittances. It is, however, clear that inter-village variations are significant, and the occurrence of migration is more widespread in same villages than the different villages in Pakistan.

In general regional policies, infrastructure and village networks all play important roles in both fostering migration and encouraging remittances. What we see is that the decision to send remittances is a complex one. Not only do the household characteristics matter, but the village and district level heterogeneities also play some role.

The remainder of this chapter is structured as follows: Section 6.2 presents the data set. Section 6.3 discusses the descriptive statistics. Section 6.4 introduces the research methodology. Furthermore, section 6.5 analyses the determinants of internal and international remittances in Pakistan. The conclusion is presented in Section 6.6.

6.2 Data set

Despite the importance of remittances to the country's political, economic, and social standing very little academic attention has been paid to this area. Why is this so? The answer may lie in an argument made by Massey (1990), who said that a complete account of remittances requires specific kinds of data, that enable us to link large social structures with individual and household decisions, connect micro and macro levels of analysis, and relate causes to consequences over time. The development of such a data set would enable empirical research to take into account the different individual, household and community factors. Further it would require the multilevel model for an appropriate analysis. The multilevel model is capable of investigating the different link between individual, household, and community characteristics and pondering how they jointly determine remittances.

Past academic research into the issues of migration and remittances for Pakistan has been limited due to the shortage of data. The only panel data set that includes information on migration, and remittances goes back to 1986-91. It was originally collected to study poverty. Another data source is the "Household Integrated Economic Survey" (HIES), which was started in the 1990s and collected information on a range of variables. The sample for every HIES survey is drawn independently from the population every period, so it is impossible to ensure that the same household is selected in every year to form a panel. As a result, most Pakistani studies were either macro studies or very descriptive. There has previously been no link to carry out a systematic analysis on remittances both at the micro and macro-level.

This study uses national cross sectional survey data to study the internal and international determinants of remittances; paying particular attention to the unexplained heterogeneity at village and district level, using the aforementioned multilevel modelling. In addition to household

characteristics, remittances may also be influenced by the community structure such as landholding, savings and loans. These interconnections among households and community-level factors determine remittances at each level. Most work on migration and remittances is based on the single level of analysis; however, less work has been done on interrelationships between levels. This analysis includes community characteristics that condition the effect of household variables to the remitter's decision.

This study provides evidence on how much random unexplained heterogeneity in remittances is explained at the village and district level in Pakistan. Despite the massive migration from Pakistan that resulted in immense remittances the research is rather limited on how it has affected either rural migrant-sending communities or remittance-receiving communities.

Pakistan's Household Integrated Economic Survey (HIES 2001-02) data is used for this chapter. The Federal Bureau of Statistics (FBS) Pakistan collects survey data at provincial and district levels through the Pakistan Social and Living Standard Measurement survey (PSLM) and the Household Integrated Economic Survey (HIES). The PSLM collects data on social indicators at district levels, whereas the HIES collects data on social and economic indicators such as income and consumption at provincial levels in alternative years. The PSLM data collection is based on several rounds to have information at both the individual and the household level on different aspects such as income, expenditure, education, health and access to basic services. The PSLM survey covers both urban and rural areas. The urban area consists of either cities or towns and is further divided into enumeration blocks. Each enumeration block consists of 200 to 250 households. However, each enumeration block can also be divided into three income categories: high, middle and low income groups. The population census organization published the list of villages in rural areas in 1998, which is used to collect data.

The provincial (HIES) has a sample size of around 17,600 households containing 1,252 enumeration blocks and villages. The district (PSLM) has a sample size of around 79,600

households containing 5,563 enumeration blocks and village[47]. The data collection methodology of HIES is based on a two-stage stratified sample design. Stage one is Primary Sampling Units (PSUs) and stage two is Secondary Sampling Units (SSUs). The former includes enumeration blocks and villages in urban and rural areas respectively. The latter includes households, which are selected (16 for rural areas and 12 for urban areas) using a systematic sampling technique with a random start.

In rural communities, information is also collected on a range of attributes such as employment, income, local infrastructure and provision of services such as health and education. The probability of each household residing in different parts throughout the country differs. This sampling weight, used for different households, is weighted by a factor that is inversely proportional to their probability of selection in the survey sample.

The data set also provides information on transfer payments received and paid-out by households. For the transfer payments received, it includes remittances received by households within Pakistan (internal remittances) and remittances received by households outside of Pakistan (international remittances). For the transfer payments paid-out, it includes remittances paid-out by households within Pakistan and remittances paid-out by households outside of Pakistan.

However, the data set does not include any information about the actual migrant. The only available information is the amount of remittances from a member to the family. The household which does not receive remittances is either due to not having a member migrated or having a member migrated but not receiving remittances. The information on dwelling consists of type of dwelling, occupancy status, rooms, electricity, and gas and telephone connection. Moreover, data identifies ownership of agricultural land, non-agricultural land, residential buildings and commercial buildings. Further information is collected by questions such as, did any members

[47] For more details see http://www.pbs.gov.pk

own or previously own any property? Is this property currently owned? If yes, how much agriculture land is there in acres? Finally, agricultural activity includes information of the household's total operational land owned. The total land holding is further divided into two types *irrigated* and rain-fed (*barani*) and also into cultivated and uncultivable. Information is also available on household borrowing, lending, net current savings, and the total value of sold/purchased gold, securities and dividends.

6.3 Descriptive Statistics

The definition of a household includes either a single person (or more than one person) who live and eat together under the same roof and have no other usual place of residence elsewhere. Absent members of the household, whether internal or international migrants, are not considered members of the household. If these members are present in the household at the time of the survey, then their income is included as remittances received. Similarly, if the household has a member recorded as internal and another as international (few cases) we treat it as an international migrant household. Table 6.1 shows the summary statistics of selected variables at the household (level-one), village (level-two) and district level (level-three). A total of ten household level variables are selected from the first wave of the HIES (2001-02) survey data set; eight of these ten variables are documented at the village-level and district-level. The data set consists of 14,831 households (level-one) nested within 1,050 villages (level-two) which are further nested in 147 districts (level-three) into two region (rural versus urban) and four provinces. Table 6.1 displays the averages at the household level (level-one) of these 14,831 clusters are similar to those at the village and district level. The table includes household specific variables, such as the proportion of female heads of households, the age of the head of household, household size, and the number of children aged less than 11 years of age, females aged 16 to 26 years of age, land holding in acres, the amount of loan expressed in Rupees, the amount of savings in Rupees and loan paid back in Rupees. A female head of household represents 7% of

the total sampled households. At the household level the age of the household head varies between13 years and 97 years. The head of household average and standard deviation ages are 45 years and 14 years, respectively.

The female head of the household role is more common, if the husband or male members of the household are migrants. We expect the probability of receiving either internal or international remittances to be higher for a female head of the household. The age of household head provides a proxy for experience, networking and interaction with other members of the community. A higher average age of the household head is associated with higher probabilities of receiving remittances. The household size is associated with a risk diversification strategy for the household. A larger household size is linked with a higher probability of remittances and vice versa. We have selected different age brackets for the children aged less than 11 years, males aged 15 to 30 years and females aged 16 to 26 years. More dependency in terms of children and female will result in more remittances. The presence of males aged 15 to 30 years in the household show that alternative human resources are available, so more males in the household will result in a lower probability of receiving remittances.

The household size at the household level varies from 1 to 44 members with an average of 7 members and a standard deviation of approximately 3 members. Whereas, the village level average household size varies from almost 4 to 13 members, at the district level the average household size varies almost 5 and 10 members[48]. The village level household size shows wider variation than the district-level. At a household level, children less than 11 years of age vary from 0 to 24 children, the average is 2.40 and a similar average is present at village and district level. The district and village level averages of other explanatory variables (number of females aged 16 to 26 years, males age 15 to 30 years, landholding in acres and the amount of loan and saving in

[48] They are integers because level 2 and level 3 represent averages of these variables at village- and district-levels, respectively.

Rupees) shows minimal variation between them. At the household-level; landholding in acres varies from 0 to 7 acres, and average landholding is around 0.62 acres.

Table 6.1 Summary statistics

Variables	**Average**	**Std. Dev.**	**Min**	**Max**
Households level (level-1)				
1-Proportion of Female headed Households	0.07		0	1
2-Age of Household Head	45.62	14.22	13	97
3-Household size	7.21	3.60	1	44
4-Number of children aged 11 or less	2.40	2.07	0	24
5-Number of females aged 16 to 26 years	0.79	0.92	0	7
6-Number of males aged 15 to 30	0.82	1.10	0	9
7-Landholding in Acres	0.62	1.15	0	7.25
8-Amount of Loan in Rupees (‘000)	2.85	4.55	0	15.42
9- Amount of Saving in Rupees (‘000)	0.83	2.87	0	14.85
10- Loan paid back in Rupees (‘000)	0.73	2.56	0	15.38
Village level averages (Level 2)				
1-Household size	7.19	1.48	3.92	13.17
2-Number of children aged 11 or less	2.38	0.85	0.08	5.5
3-Number of females aged 16 to 26 years	0.80	0.29	0	2
4-Number of male aged 15 to 30	0.82	0.37	0.06	2.42
5-Landholding in Acres	0.62	0.67	0	3.52
6-Amount of Loan in Rupees (‘000)	2.85	2.24	0	9.75
7- Amount of Saving in Rupees (‘000)	0.83	1.54	0	9.69
8- Loan paid back in Rupees (‘000)	0.73	0.98	0	6.47
District level averages (Level 3)				
1-Household size	7.25	0.97	4.88	10.06
2-Number of children aged 11 or less	2.42	0.60	0.67	4.00
3-Number of females aged 16 to 26 years	0.80	0.15	0.33	1.38
4-Number of males aged 11 to 30	0.82	0.21	0.27	1.40
5-Landholding in Acres	0.63	0.52	0	2.02
6-Amount of Loan in Rupees (‘000)	2.85	1.71	0	7.65
7- Amount of Saving in Rupees (‘000)	0.83	0.99	0	4.80
8- Loan paid back in Rupees (‘000)	0.73	0.59	0	3.17
Observations	**14,831**			

Table 6.2 shows the household distribution by region and province - 5,613 households live in the urban area and 9,218 in the rural area. The distribution of households among provinces is the following: the Punjab province includes 2,599 households in the urban area and 3,796 in the rural area which make a total of 6,395 household. Sindh province includes 1,534 households in the

urban area and 2,174 in the rural area for a total of 3,708 households. NWFP [49] province records 857 households in the urban area and 1,842 household in the rural area, amounting to 2,699 households. Finally, Balochistan province covers 623 households in urban area and 1,406 in urban area, totalling 2,029 households. Similarly, Table 6.2 shows the percentage distribution of households among two regions and four provinces. Overall, 38% of households live in urban area and 68% in rural areas. The percentage distribution of households among different provinces is as follows: In Punjab and Sindh, approximately 40 percent of households live in urban areas and the remaining 60 percent in rural areas. The provinces of NWFP and Balochistan share the same approximate distribution of households in rural areas (32%) and urban areas (68%).

Table 6.2 Household Distribution by Region and Province

	Region		
Province	**Urban**	**Rural**	**Total**
Punjab	2,599	3,796	6,395
	(40%)	(60%)	
Sindh	1,534	2,174	3,708
	(41%)	(59%)	
NWFP	857	1,842	2,699
	(32%)	(68%)	
Balochistan	623	1,406	2,029
	(31%)	(69%)	
Total	5,613	9,218	14,831
	(38%)	(62%)	

[49] Stand for North-West Frontier Province, now it is called Khyber Pakhtunkhwa (KPK) province.

Table 6.3 is only restricted to internal and international remittances receiving households. It shows the percentage distribution of internal and external remittances for regions and provinces - 28% of internal remittances belong to urban areas and the remaining 72% to rural areas. Internal remittances are characterised by a more unequal distribution among regions versus international remittances. The share of internal remittances amongst Punjab, Sindh, NWFP and Balochistan are 52%, 4%, 41% and 3%, respectively. The percentage frequencies of international remittances between urban and rural areas are 47% and 53%, respectively. The percentage share of international remittances between Punjab, Sindh, NWFP and Balochistan are 47%, 6%, 41% and 8%, respectively.

Table 6.3 Internal and International remittances by Region and Provinces

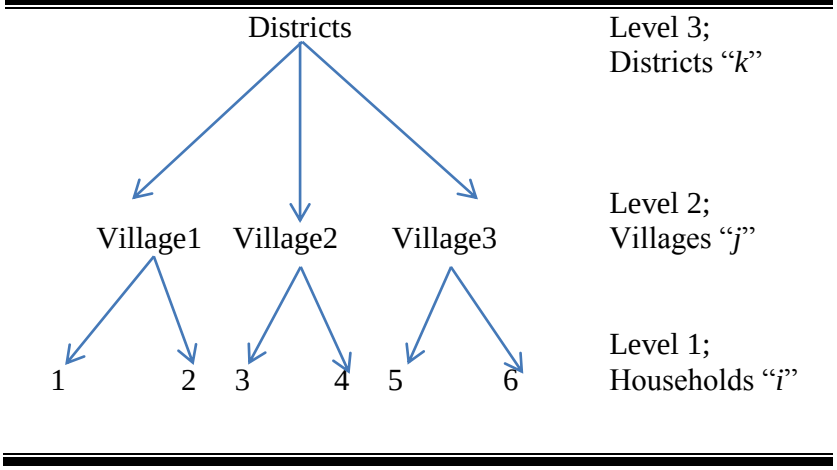
		Internal Remittances	International Remittances
Region			
	Urban	471	278
		(28%)	(47%)
	Rural	1,211	317
		(72%)	(53%)
Total		1,682	595
Province			
	Punjab	882	267
		(52%)	(45%)
	Sindh	63	33
		(4%)	(6%)
	NWFP	694	246
		(41%)	(41%)
	Balochistan	43	49
		(3%)	(8%)
Total		1,682	595

6.4 Research Methodology

The econometric regression that we estimate relies on a five-level hierarchical model, however, of these five levels we postulate that only three have unobserved random heterogeneity. Hence, we name the model a 3-level nested model. The dependent variable that we wish to estimate is the binary variable – whether a household is receiving remittances or not. We will report the analysis both for internal and international remittances. The historical multilevel modelling in binary data has been used in different fields, characterised by discrete events such as child immunization, voting behaviour, student drop outs of high school, giving birth, divorcing and marrying (Guo and Zhao, 2000). The multilevel hierarchical structure is depicted in Figure 1: a household (level 1) is nested in a village (level 2), and in turn the village is a nested in a district (level 3). The discussion in this section follows that of Rabe-Hesketh and Skrondal (2008). We use the three-level models, to study the determinants of internal and international remittances in Pakistan employing data from the Household Integrated Economic Survey (HIES-2001-02), and also account for the two additional deterministic levels of province and region. Rabe-Hesketh and Skrondal (2006: 809) write "Since there is usually unobserved heterogeneity between clusters even after conditioning on the covariates, responses tend to be correlated within clusters. This dependence must be taken into account."

In three-level models, the clusters are nested in the higher cluster to form a hierarchical structure.

Figure 2.19 Three-level model; Sources: Rabe-Hesketh and Skrondal (2008: 431)



Measurements within the same district are correlated as well as measurements within the same village. We expect the correlation at the village level to be larger. It seems reasonable to assume that measurements within the same district are more similar than those across different districts. This intra-district heterogeneity (level-3) is modelled by introducing the district-level random intercept $\zeta_k^{(3)}$, where k stands for a district. Similarly, the intra-village inter-district heterogeneity (level-2) is modelled by introducing another random intercept $\zeta_{jk}^{(2)}$ for each combination of village and district, where *j* is the notation used to denote a village.

With the help of the above notation a simple three-level model without any covariate can be formulated as:

$$y^*_{ijkmn} = \beta_1 + \zeta^{(2)}_{jkmn} + \zeta^{(3)}_{kmn} + \epsilon_{ijkmn}$$

The indices are *i=1…I; j=1…J; k=1…K; m=1, 2* and *n=1, 2, 3, and 4*. Where, subscript *i* represent the household, *j* represent (as mentioned above) the village and *k* the district. We then indicate with the additional deterministic levels the region and province with the letters *m* and *n*, respectively. The asterisk on y denotes a latent variable. As discussed earlier the term $\zeta^{(2)}_{jkmn}$ is the random intercept for the village *j* in district *k* in region *m* and province *n*; whereas the term

$\zeta^{(3)}_{kmn}$ is the random intercept for district *k* in the same region and province. ϵ_{ijkmn} is a pure idiosyncratic *iid* error term. In our study the random effect for a village nested within districts takes on a different value for each combination of village and district. A more complete model including covariates (*x* and *z*), with random intercepts and (uncorrelated) error term can be expressed as:

$$y^*_{ijkmn} = \underbrace{\beta + x_{ijkmn}\,\alpha + z_{jkmn}\,\gamma + \omega_{kmn}\,\delta + \theta_m + \varphi_n + \zeta^{(2)}_{jk}}_{\text{Fixed part}} + \underbrace{\zeta^{(3)}_{k} + \varepsilon_{ijkmn}}_{\text{Random part}}$$

We assume the random intercepts satisfy the following properties:

$\zeta^{(2)}_{jk} \mid x_{ijkmn}, z_{jkmn}, \omega_{kmn}, \theta_m, \varphi_n, \zeta^{(3)}_{k} \sim N\left(0, \psi^{(2)}\right)$.

Its conditional distribution (conditional on covariates and the higher hierarchical level) has a zero mean and a constant variance. Similarly, the random intercept varies over the districts (level 3) as follows:

$\zeta^{(3)}_{k} \mid x_{ijkmn}, z_{jmn}, \omega_{kmn}, \theta_m \; and \; \varphi_n \sim N\left(0, \psi^{(3)}\right)$.

The random effects $\zeta^{(2)}_{jk}$ and $\zeta^{(3)}_{k}$ are assumed to be independent of each other and across clusters and $\zeta^{(2)}_{jk}$ is assumed independent across units as well.

The assumption for the idiosyncratic error term is:

$\varepsilon_{ijkmn} \mid x_{ijkmn}, z_{jmn}, \omega_{kmn}, \theta_m, \varphi_n, \zeta^{(2)}_{jk}, \zeta^{(3)}_{d}$ (assumed to have a logistic distribution with constant variance $\pi^2/3$). We observe the binary variable y_{ijkmn} which relates to the latent variable y^*_{ijkmn} as:

$$y_{ijkmn} = \begin{cases} 1 \; if \;\; y^*_{ijkmn} > 0 \\ 0 \quad otherwise. \end{cases}$$

The covariates x_{ijkmn} , Zz_{jkmn} , ω_{kmn} , represent household level characteristics, averages of village-level characteristics and the averages of district level characteristics. The fixed effects for region and provinces are written as θ_m and φ_n , respectively.

6.4.1 Intra-class Correlations

The different types of interclass correlations for the latent responses of two households of two households residing in the same village (and obviously the same district) $y_{ijk..}$ and $y_{i'jk..}$ and different villages $y_{ijk..}$ and $y_{i'j'k..}$ in the same district can be calculated as follows50:

Where, $\psi^{(2)}$ is random part observed heterogeneity at village level and $\psi^{(3)}$ is random part observed heterogeneity at district level.

$$\rho(village, district) \equiv \mathrm{Cor}\,(y_{ijk..}, y_{i'jk..|}\, covariates) = \frac{\psi^{(2)} + \psi^{(3)}}{\psi^{(2)} + \psi^{(3)} + \pi^2/3}$$

and

$$\rho(district) \equiv \mathrm{Cor}\,(y_{ijk..}, y_{i'j'k..|}\, covariates) = \frac{\psi^{(3)}}{\psi^{(2)} + \psi^{(3)} + \pi^2/3}$$

The correlation across different districts is zero. The above correlation coefficients are called the intra-village and inter-village correlation, respectively. We expect that $\rho(village, district) > \rho(district)$. It is due to the fact that households in a given village (and district) are more similar than households in the same district, but from different villages. This is because the estimated variance of the random intercepts is positive, $\psi^{(2)} > 0$ and $\psi^{(3)} > 0$ leading to $\rho(village, district) > \rho(district)$.

6.4.2 Odds ratios

[50] The two dots refer to the region and province.

The unobserved heterogeneity can be quantified by taking into consideration the odds for the pairs of randomly sampled unit households having the same covariate values, where the units with the larger random intercept are compared with the unit with the smaller random intercept. The odds of the two randomly selected households of the same villages and obviously the same district can be calculated as follows:

$$Odds_{(village.district)} = \exp\{\ \rho(village, district)\}$$

Similarly, by comparing two randomly selected households of different villages in the same districts we get:

$$Odds_{(district)} = \exp\{\rho(district)\ \}$$

The odds ratio of the two households from same village and same district relative to the two households from different villages and same district can be calculated as follow:

$$\text{OR} = \exp\{\ \rho(village, district)\}/\ \exp\{\rho(district)\ \}$$

A multi-level modelling approach is used to study the three-level variance-component model for internal and international remittances received by households of the different regions within the four provinces of Pakistan. In our case, the measures of variation are important to understand the significance of specific settings for different household remittance outcomes. Comparatively, the measures of association does not inform on the multilevel distribution of remittances. A major advantage of the multilevel approach is the ability to explore effects of group-level predictors, while accounting for the effects of unobserved group characteristics. Two separate analyses are covered with data from the HIES (Households Integrated Economic Surveys 2001-02) survey: one for internal remittances and the other for international remittances. The first binary outcome variable (dependent variable) is households receiving international remittance: the variable is set to 1 for households receiving international remittances and 0 otherwise. The second binary,

outcome variable (dependent variable) is households receiving internal remittance: it equals 1 for households receiving internal remittances and 0 otherwise. The data set used in the three-level model contains the following subset of covariates;

For level one (household)
- Indicator variable for households receiving remittances (Internal and International, y_{ijkmn})
- Age of the Household head
- Gender of the Household head
- Number of Children aged less than 10 years in the household
- Number of Females aged between 16 and 26 years in the household
- Number of Males aged between 15 and 30 years in the household
- Household size
- Log of landholding in acres
- Log of loans in rupees
- Log of savings in rupees
- Log of loans paid in rupees

For level-two (village) and level-three (district)
- The mean age of Children aged less than 10 years
- The mean age of Females aged between 16 and 26 years
- The mean age of Males aged between 15 and 30 years
- The mean Household size
- Log of the mean landholding in acres
- Log of the mean loan in rupees
- Log of the mean saving in rupees
- Log of the mean loan paid in rupees

A dummy that is 0 for urban region and 1 for rural region captures the region fixed effect. Provinces fixed effect is made by a dummy for each province. The multilevel modelling used in this paper is restricted to study the determinants of remittances of households in villages and in districts, controlling for deterministic regional and province effects.

6.5 Results and Discussions

We run two separate logistic regressions for internal and international remittances as discussed in the previous section. The explanatory variables such as household loans in Rupees, household savings in Rupees and household total land holding in acres are log-transformed. The estimates of the logistic regressions are given in Tables 6.4 and 6.5 for internal and international remittances,

respectively. They include estimates with and without regional fixed effects. Table 6.4 and 6.5 present the multilevel logistic regression results for internal and international remittances without and with regional fixed effects, respectively. The models present the probability of receiving internal and international remittances with odd ratios for each covariate. The odd ratios are calculated by exponentiation of each covariate. The binary outcome logistic model is better understood by comparing the odds of an event occurrence (remittances) to the non-realisation of the event. When the probability of receiving the remittance is greater than the probability of not receiving, the odds are greater than one.

In Table 6.4, the results for internal remittances without regional effects show that the odds of receiving internal remittances are 11.03 times greater if the household head is female than male. Similarly, the odds ratio for the age of the head of the household is 1.02. Thus, there is a 2% increase in the odds of receiving internal remittances for every one year increase in the age of the household head. This finding is consistent with the New Economic of Labour Migration (NELM) that household head characteristics are a key determinant for receiving remittances in the origin countries. It is worth noting that in our case the household head and sex emerge as key determinants of remittances. The female head of the household resulted in substantial odds of receiving remittances. Household composition in terms of the number of female and male adults is an important determinant of internal remittances. However, household size is not a significant determinant for receiving internal remittances.

There is a 23% decrease in the odds of receiving internal remittances as the number of males in the household (age between 15 to 30 years) increases by one. The probability of receiving remittances is lower in the presence of a young male in the household. It may be possible that presence of a male in the household provides a shield against any unforeseen circumstances or change in the economic condition at the origin. Another reason may follow that they can participate in the labour market for an additional income for the household. On the contrary, the

presence of an additional female member in a household results in a 19% increase in the odds of receiving internal remittances. Similarly, when other variables are held constant, there is an 18% decrease in the odds of receiving internal remittances if a household increases its landholding by one acre and household saving in thousand rupees also resulted in 3% decrease in the odds of receiving remittances.

At a village-level only land holding in acres and the male population (aged 15-30 years) is statistically significant. Opposite to the earlier finding at the household level, the landholding is positively related to the internal remittances at the village level, which shows a 21% increase in the odds of receiving internal remittances. Similarly, one additional male member results in a 32% decrease in the odds of receiving internal remittances at a village-level. At a district level, only male members of the household are significant and have a negative relationship with probability of internal remittances. However, the odds of receiving internal remittances are substantially reduced by 90% with an additional male member, which is the largest among the different levels of clustering. Similarly, every additional acre of land holding results in a 52% decrease in the odds of receiving internal remittances. The household composition and wealth appeared to be important determinants of internal remittances in Pakistan at the different levels of clustering.

In Table 6.4, once controls for regional and provincial effects are introduced, the predicted probabilities of internal remittances at a household level, village level and district level do not differ much from the results discussed. However, the estimates are more refined with the introduction of the regional effect. Now some additional variables assume the significance at the household level, such as household size. At a village and district-level, only mean land holding in acres and mean male age in years are statistically significant.

The provincial level result for internal remittances shows that, the odds of receiving internal remittances are 2.30 times greater for the Khyber Pakhtunkhwa province than for the base

category of Punjab province. Similarly, there is 78% and 47% decrease in the odds of receiving internal remittances for Sindh and Balochistan province, respectively. Table 6.5 presents the determinants of international remittances with and without regional effects. First we will discuss the results without regional effects. At a household level, holding all other covariates constant, the household head characteristics show that the odds of receiving international remittances are 10.8 times greater if the household head is female. The odd ratio for the age of the head of the household is 1.01. Thus, there is a 1% increase in the odds of receiving international remittances as the age of the household head increases by one year. Similarly, the household composition shows there is a 20% decrease in the odds of receiving international remittances as the number of males in the household (aged between 15 to 30 years) increase by one. However, there is a 12% increase in the odds of receiving international remittances if the household size increases by one. Contrasting to internal remittances, the odds of receiving international remittances is 14% higher for every additional acre of land.

At a village level only, land holding in acres is statistically significant. The odds ratio for land holding in acres is 0.53. Thus, there is a 47% decrease in the odds of receiving international remittances as the land holding in the village increases by one acre. Furthermore, at a district level, there is 57% and 40% increase in the odds of receiving international remittances as the loans in Rupees and savings in Rupees increases by one Rupee. Once controls for regional effects are introduced, the predicted probabilities of international remittances at a household level, village level and district level don't differ from the results discussed earlier. At a district level only loans and savings in rupees are not statistically significant when the regional and provincial effect is introduced. The provincial level result shows that, the odds of receiving international remittances are 4.63 times greater for the NWFP province than for the base category of Punjab province. Similarly, there is 90% and 74% decrease in the odds of receiving international remittances for Sindh and Balochistan provinces, respectively, compared to the base category of Punjab province.

Table 6.4 Maximum likelihood estimates for three-level logistic random-intercept model

Parameters	*Internal Remittances (without fixed effect) Odds ratios = $exp(Est)$*				*Internal Remittances (with fixed effect) Odds ratios = $exp(Est)$*			
	Est	*SE*	*OR*	*(95% CI)*	*Est*	*SE*	*OR*	*(95% CI)*
Fixed Part								
Household level								
β_1, [Constant]	-8.3***	(2.10)			-7.11	(1.74)		
α_1, [H Head sex]	2.42***	(0.09)	11.3	(9.50, 13.4)	2.38***	(0.09)	10.85	(9.14, 12.9)
α_2, [H Head age]	0.02***	(0.01)	1.02	(1.02, 1.03)	0.02***	(0.01)	1.02	(1.02, 1.03)
α_3, [Child age 0-10]	-0.01	(0.03)	0.99	(0.93, 1.06)	-0.01	(0.03)	0.99	(0.93, 1.06)
α_4, [Female 16-26]	0.17***	(0.04)	1.19	(1.09, 1.29)	0.17***	(0.04)	1.18	(1.09, 1.30)
α_5, [Male 15-30]	-0.2***	(0.05)	0.77	(0.70, 0.84)	-0.26***	(0.46)	0.77	(0.70, 0.84)
α_6, [H size]	0.001	(0.02)	1.00	(0.96, 1.05)	0.01***	(0.02)	1.00	(0.96, 1.05)
α_7, [Log Land[51]]	-0.2***	(0.04)	0.82	(0.76, 0.88)	-0.20***	(0.04)	0.82	(0.76, 0.90)
α_8, [Log Loan[52]]	0.01	(0.01)	1.01	(0.99, 1.02)	0.01	(0.01)	1.01	(0.99, 1.02)
α_9, [Log Saving]	-0.03**	(0.01)	0.97	(0.95, 1.00)	-0.03**	(0.01)	0.97	(0.95, 0.99)
α_{10}, [Log Loan Paid]	0.02*	(0.01)	1.02	(1.00, 1.04)	0.02*	(0.01)	1.02	(0.99, 1.04)
Village Averages								
γ_1, [Child age 0-10]	-0.01	(0.17)	1.00	(0.72, 1.37)	-0.01	(0.17)	1.00	(0.71, 1.37)
γ_2, [Female 16-26]	0.08	(0.23)	1.08	(0.70, 1.69)	0.07	(0.23)	1.08	(0.69, 1.68)
γ_3, [Male 15-30]	-0.38*	(0.22)	0.68	(0.44, 1.05)	-0.38*	(0.22)	0.68	(0.44, 1.05)
γ_4, [H size]	-0.03	(0.11)	0.97	(0.79, 1.19)	-0.03	(0.11)	0.97	(0.79, 1.20)
γ_5[Log Land]	0.21*	(0.11)	1.23	(0.99, 1.54)	0.21*	(0.11)	1.24	(0.99, 1.54)
γ_6, [Log Loan]	0.01	(0.03)	1.00	(0.95, 1.06)	0.01	(0.03)	1.00	(0.95, 1.06)
γ_7, [Log Saving]	-0.06	(0.05)	0.95	(0.86, 1.04)	-0.06	(0.05)	0.95	(0.86, 1.04)
γ_8, [Log Loan Paid]	0.01	(0.06)	1.00	(0.90, 1.12)	0.01	(0.06)	1.01	(0.90, 1.12)
District Averages								
δ_1,[Child age 0-10]	-0.44	(0.75)	0.64	(0.15, 2.81)	-0.42	(0.64)	0.66	(0.19, 2.32)
δ_2,[Female 16-26]	0.68	(0.95)	1.96	(0.31, 12.5)	0.72	(0.80)	2.06	(0.43, 9.80)
δ_3,[Male 15-30]	-2.7***	(0.94)	0.07	(0.01, 0.42)	-1.85**	(0.81)	0.16	(0.03, 0.77)
δ_4 , [H size]	0.38	(0.47)	1.46	(0.59, 3.65)	0.35	(0.40)	1.42	(0.66, 3.06)
δ_5, [Log Land]	-0.7***	(0.26)	0.48	(0.29, 0.80)	-0.50*	(0.30)	0.61	(0.34, 1.08)
δ_6, [Log Loan]	0.20***	(0.07)	1.22	(1.07, 1.40)	0.01	(0.07)	1.01	(0.89, 1.15)
δ_7, [Log Saving]	0.08**	(0.11)	1.08	(0.90, 1.35)	-0.09	(0.11)	1.00	(0.73, 1.14)
δ_8 ,[Log Loan Paid]	0.35**	(0.17)	1.42	(1.02, 1.97)	0.08	(0.17)	1.08	(0.78, 1.50)
Provinces (base Punjab)								
φ_{Sindh}					-1.51***	(0.26)	0.22	(0.13, 0.36)
φ_{Khyber} Pukhtoonkhwa					0.84***	(0.30)	2.30	(1.30, 4.10)
$\varphi_{Balochistan}$					-0.63*	(0.37)	0.53	(0.26, 1.10)
Region (base Urban)								
θ_{Rural}					0.32	(0.26)	1.37	(0.83, 2.28)
Random Part								
$\psi^{(2)}_{village,district}$(stage2)	0.36**	(0.07)			0.36**	(0.07)		
$\psi^{(3)}_{district}$(stage3)	0.62**	(0.12)			0.33**	(0.08)		
Log Likelihood	3843.6							
$\rho_{village,district}$	0.23**				0.17**			
$\rho_{district}$	0.15**				0.08**			
$OR_{village,district}$			1.26**				1.19**	
$OR_{district}$			1.16**				1.08**	

[51] Land holding in acres.

[52] Loan, saving and loan paid are in Rupees.

Table 6.5 Maximum likelihood estimates for three-level logistic random-intercept model

Parameters	*International Remittances (without fixed effect) Odds ratios = $exp(Est)$*				*International Remittances (with fixed effect) Odds ratios = $exp(Est)$*			
	Est	*SE*	*OR*	*(95% CI)*	*Est*	*SE*	*OR*	*95% CI)*
Fixed Part								
Households level								
β_1, [Constant]	-8.85***	(3.07)			-7.55***	(2.80)		
α_1, [H Head sex]	2.39***	(0.12)	10.88	(8.53, 13.8)	2.33***	(0.12)	10.31	(8.10, 13.1)
α_2, [H Head age]	0.01***	(0.01)	1.01	(1.01, 1.02)	0.01***	(0.01)	1.01	(1.01, 1.02)
α_3, [Child age 0-10]	-0.05	(0.05)	0.95	(0.86, 1.05)	-0.05	(0.05)	0.95	(0.86, 1.05)
α_4, [Female 16-26]	0.06	(0.06)	1.06	(0.94, 1.20)	0.06	(0.06)	1.06	(0.94, 1.20)
α_5, [Male 15-30]	-0.23***	(0.06)	0.80	(0.70, 0.90)	-0.23***	(0.06)	0.80	(0.71, 0.90)
α_6, [H size]	0.11***	(0.03)	1.12	(1.05, 1.20)	0.11***	(0.03)	1.12	(1.05, 1.20)
α_7, [Log Land[53]]	0.14**	(0.06)	1.15	(1.02, 1.30)	0.14**	(0.06)	1.15	(1.02, 1.30)
α_8, [Log Loan[54]]	-0.10***	(0.01)	1.00	(0.90, 0.93)	-0.09***	(0.01)	0.91	(0.88, 0.93)
α_9, [Log Saving]	0.08***	(0.01	1.10	(1.05, 1.11)	0.08***	(0.01)	1.08	(1.05, 1.11)
α_{10}, [Log Loan Paid]	0.04*	(0.02)	1.04	(0.99, 1.08)	0.03	(0.02)	1.03	(0.99, 1.08)
Village Averages								
γ_1, [Child age 0-10]	0.12	(0.26)	1.13	(0.68, 1.86)	0.12	(0.26)	1.13	(0.68, 1.86)
γ_2, [Female 16-26]	-0.11	(0.34)	0.89	(0.46, 1.75)	-0.09	(0.34)	0.91	(0.47, 1.79)
γ_3, [Male 15-30]	0.37	(0.33)	1.45	(0.76, 2.79)	0.37	(0.33)	1.44	(0.75, 2.76)
γ_4, [H size]	-0.16	(0.17)	0.85	(0.62, 1.18)	-0.15	(0.17)	0.86	(0.62, 1.19)
γ_5[Log Land]	-0.64***	(0.20)	0.53	(0.35, 0.79)	-0.63***	(0.21)	0.53	(0.35, 0.79)
γ_6, [Log Loan]	-0.01	(0.05)	0.99	(0.90, 1.09)	-0.01	(0.05)	0.99	(0.90, 1.09)
γ_7, [Log Saving]	-0.02	(0.06)	0.98	(0.87, 1.11)	-0.01	(0.06)	0.99	(0.88, 1.13)
γ_8, [Log Loan Paid]	-0.08	(0.10)	0.92	(0.75, 1.12)	-0.06	(0.10)	0.93	(0.77, 1.15)
District Averages								
δ_1,[Child age 0-10]	-0.05	(1.14)	0.95	(0.10, 8.84)	0.23	(1.04)	1.25	(0.16, 9.69)
δ_2,[Female 16-26]	0.11	(1.42)	1.12	(0.07, 18.14)	-0.27	(1.27)	0.76	(0.06, 9.25)
δ_3,[Male 15-30]	-0.04	(1.43)	0.97	(0.06, 15.9)	0.94	(1.31)	2.56	(0.20, 33.5)
δ_4 , [H size]	0.02	(0.71)	1.02	(0.26, 4.08)	-0.07	(0.64)	0.93	(0.27, 3.26)
δ_5, [Log Land]	-0.62	(0.43)	0.54	(0.23, 1.25)	0.20	(0.53)	1.22	(0.43, 3.45)
δ_6, [Log Loan]	0.45***	(0.11)	1.57	(1.26, 1.95)	0.12	(0.12)	1.12	(0.89, 1.42)
δ_7, [Log Saving]	0.33**	(0.16)	1.40	(1.01, 1.93)	0.02	(0.18)	1.03	(0.72, 1.46)
δ_8 ,[Log Loan Paid]	-0.51*	(0.28)	0.60	(0.35, 1.04)	-0.92***	(0.30)	0.40	(0.22, 0.72)
Provinces (base Punjab)								
φ_{Sindh}					-2.27***	(0.45)	0.10	(0.04, 0.25)
φ_{Khyber} Pukhtoonkhwa					1.53***	(0.52)	4.63	(1.67, 12.8)
$\varphi_{Balochistan}$					-1.02*	(0.59)	0.36	(0.12, 1.14)
Region (base Urban)								
θ_{Rural}					-0.32	(0.44)	0.73	(0.31, 1.73)
Random Part								
$\psi^{(2)}_{village,district}$(stage2)	0.76**	(0.15)			0.75**	(0.15)		
$\psi^{(3)}_{district}$(stage3)	1.37**	(0.30)			0.913**	(0.22)		
Log Likelihood	-1876.52				-1855.01			
$\rho_{village,district}$	0.39**				0.25**			
$\rho_{district}$	0.34**				0.18**			
$OR_{village,district}$			1.48**				1.28**	
$OR_{district}$			1.40**				1.20**	

[53] Land holding in acres.

[54] Loan, saving and loan paid are in Rupees.

From each regression we obtain the correlation coefficients for two randomly selected households from the same village and the same district (denoted $\rho(village, district)$) in terms of the probability of receiving remittances (internal or international) and the correlation coefficients for two randomly selected households residing in two different villages within the same district (denoted ρ (district)). See the rows fourth and third from the bottom in Tables 6.4 and 6.5.

We collect these data and for the benefit of discussion place them in Table 6.6. Note that we are referring to them as 'Intra-class' correlations. These correlation coefficients are obtained with and without regional fixed effects. Not surprisingly, intra-class correlation of the two randomly selected households from the same village and the same district are higher than intra-class correlations of the two randomly selected households of different villages from the same district. This relationship makes sense since, measurements from the same village are more correlated than from different villages which are less correlated. Also with regional fixed effects, the correlation is refined and thus it becomes smaller. It is worth mentioning that if the intra-class correlation (IC) approaches 0 then the grouping by villages (or districts) are of no use and multilevel modelling is unsuitable for analysis. If the IC approaches 1 then there is no variance to explain at the village or district level.

After discussing the overall results detailed in Tables 6.4 and 6.5, we explain the measures of internal and international remittance variations (for example, intra-class correlation) in Table 6.6. Such measures have been underused in the literature of remittances as compared with the more traditional measures of association or regression coefficient in the study of determinants of remittances.

Table 6.6 Intra-class correlations of the proportion of households receiving international and internal remittances and respective odds ratios

	Number of households	**Intra-class correlations** of two randomly selected households from the same village and obviously the same district	**Odds** of two randomly selected households from the same village and obviously the same district	**Intra-class correlations** of two randomly selected households from different villages within the same district	**Odds** of two randomly selected households from different villages within the same district	**Odds ratios** of two households pick from the same village and same district versus the two households pick from the different villages and same district
International Remittances						
Without regional effect	595	0.39	1.48	0.25	1.28	1.16
With regional effect	595	0.34	1.40	0.18	1.20	1.17
Internal remittances						
Without regional effect	1682	0.23	1.26	0.17	1.19	1.06
With regional effect	1682	0.15	1.16	0.08	1.08	1.07

In Table 6.6 the intra-class correlation (IC=0.39) without regional fixed effect of two randomly selected households from the same village and obviously the same district, showing that 39% of the total household differences in receiving international remittances occur at the village and district level and might be related to the village or district level factors or to the different composition of areas. By contrast, with regional effects the IC correlations is refined, and thus it reduces to 34%, a decrease of 5%, which further confirms our finding. Similarly, the IC correlations are 25% and 18% for the receipt of international remittance for two randomly selected households of different villages without and with regional effects, respectively. This latter IC correlation is substantially lower than the former one. It is institutive that households from the same area may be more similar to each other in relation to their socio-economic status, peer pressure, and sharing similar networks than to households from other areas. This related fact expresses itself as clustering of household migration status within area.

On the other hand, in this essay we also study the IC correlations for the internal remittances with and without regional effects. Firstly, without including a regional fixed effect, the IC correlation is 23% for the two randomly selected households from the same village. However, the IC correlation between two different villages is 17%. Secondly, with the inclusion of the regional fixed effect, the IC correlation results in a more refines estimate. The IC correlation for the intra-villages is 15% and it is 8% for the inter-villages. This proportion of the differences in internal and international remittances between households from distinctive villages and the same village may be attributable to the areas in which they reside. The more the migrant household residing within a neighbourhood are alike, as compared with households in other neighbourhoods, the more likely it is that the determinants of either internal or international remittances are directly related to the particular region or neighbourhood, which is the geographical segregation is taking place. It may be concluded from the IC correlation that the household propensity to receive remittances is statistically dependent on the area of the residence. These comparisons suggest that in the presence of controls for socioeconomic characteristics, the household probability of receiving internal rather than international remittances is less marked within regions.

Now the correlation coefficients can be used to compare the odds of a two households receiving remittances (internal or international) residing in the same village or in different villages. The aim of the odds is to translate the area level variances as in our case village and district level variances. In this study, we consider two different cases, one with weak variations between areas (inter-village), and the other with very strong variations (intra-village). This is called the odds (see the previous section for the formula). In Table 6.6 columns 4 and 6 show the odds for the two different scenarios explained above. For example, if the odds is equal to one, there would be no differences between the areas in the probability of receiving internal or international remittances. If there is an area level difference, the odds would be greater than one and the area of residence would be relevant for understanding variations of the household probability for receiving remittances.

In the estimation, if we ignore the regional effect, the odds of receiving international remittance is 1.48 for intra-village, which shows that the unexplained heterogeneity between areas increases by 1.48 times the household odds of receiving international remittances when randomly picking out two households from the same village. The odds of receiving international remittances is 1.28 for inter-village, which shows that the unexplained heterogeneity between areas increases by 1.28 times, when we randomly pick two households from different villages. As expected, the estimated odds of inter-villages are comparatively less than from the intra-village. With the introduction of the regional effects, the odds became more precise and concise. The intra-villages odds is 1.40, and inter-villages odds is 1.20. This means that between villages, odds variation is significantly low. The odds of same village receiving international remittance is greater than that of a different villages.

The odds' ratio (OR) for receiving international remittances is calculated by dividing the odds of an intra-village with the odds of an inter-village. Without the regional effect, the odds' ratio of two households from same village versus the two households from the different village is 1.16. With the regional effect, the odds' ratio between intra-village and inter-village is 1.17.

In the same way, we can derive the odds for internal remittances for intra-village and inter-village, with and without regional effects are in Table 6.6. For example, without regional effects the household odds of receiving internal remittances for intra-village is 1.26, whereas the odds of internal remittances for inter-village is 1.19. On the other hand, in the presence of controls for regional effects, the odds for receiving internal remittances for intra-village is 1.16 and for inter-villages is 1.08.

The odds' ratio (OR) for receiving internal remittances without the regional effect between two households from same village versus the two households from the different village is 1.06. With the regional effect, the odds' ratio between intra-village and inter-village is 1.07.

The results for both internal and international remittances in term of IC and odds indicate that households are at least more likely to receive international than internal remittances, once other factors are held constant. Not surprisingly, the internal remittances are less clustered within villages and more between villages than for international remittances, probably because of their differences in payoff and economic gains. These results, combined with the much larger magnitude of the intra-village correlation when compared to the inter-village correlation, suggests that residence in a particular village may be a more important determinant of receiving remittances in rural Pakistan rather than membership in a particular household.

It may be concluded that the role of community migrant networks is an important determinant in the household probability of receiving remittances. In Pakistan's rural areas communities create very close ties in terms of loyalties, rights and obligations through exchange of remittances and information. The migrant networks link migrants and non-migrants households to form a sustained migration system which further help to gain access to that system. There are competing views related to the impact of remittances on the origin areas; however, remittances serve as an equalizing phenomenon in disparity of wealth, improving living standards and stimulating community development.

Results of IC and odds support the notion that migrants remit less to households that are from different villages rather than the same village. This may be due to the networking, which is theorized to be associated with access to information within or outside the country regarding employment opportunities.

6.6 Conclusions

In this paper we have examined the determinants of international- and -internal remittances at the different level of clustering by using the multilevel logistic model in Pakistan. The results of

multilevel logistic model reveal that household level characteristics, such as, the age and gender of the household head, the number of males age between 15 and 30, the number of females age between 16 and 26, household size, landholding in acres and saving in Rupees are all significantly associated with international and internal remittances. Village level and district level characteristics, such as land holding in acres and males aged between 15 and 30 are also significantly associated with international and internal remittances. Khyber Pakhtunkhwa province is more likely to receive internal and international remittances when compared to the Punjab province. Similarly, Sindh and Balochistan provinces are less likely to receive both types of remittances when compared with the base category of Punjab province. The determinants of international remittances are somewhat different from the determinants of internal remittances. We find some key differences between the two competing choices that the presence of a female member in the household determines only internal remittances. However, land holding in acres is positively related to the international remittances and negatively related to the internal remittances. The household size is a more robust determinant of the international remittances rather than internal remittances.

It is worth noticing that the odds ratios are higher for international remittances than for internal remittances, which is not surprising. But the fact that the odds ratio of comparing two households from the same village within the same district are generally higher than the odds ratio of two households from different villages within the same district is in line with conventional wisdom. Households in closer proximity should have higher odds of receiving remittances. It suggests that inter-village variations are significant. The three-level variance-component model regression estimates discussed above suggest that household level characteristics, along with some village and districts level characteristics, are strongly associated with international and internal remittances. These results are useful to understand the importance of the village level network for information gathering and seeking insurance from each other.

CHAPTER SEVEN

(ESSAY FOUR)

Multiplier or spillover Effects of Remittances

7.1 Introduction

Social sciences have a long history of looking for social interaction effects. The interaction based model, which usually looks into the role of interactions in economic outcomes, has attracted the attention of researchers over the last two decades. Social interaction studies include both theoretical and empirical literature, and assume that individual attainment (in any sector of the economy) depends on the behavior or characteristics of community members (Brock and Durlauf, 2001). Glaeser, et al. (2003; 3) writes "the presence of positive spillovers or strategic complementarities creates a 'social multiplier' where aggregate coefficients will be greater than individual coefficients". Social multiplier models are based on an analysis that provides an explanation of group behaviour, which arises from the interactions across individuals. In economics such studies are largely based on the schooling performance, financial decision, criminal behaviour and neighbourhood decision. Such economic outcomes vary substantially across observationally similar groups (Graham, 2008). Usually, social multiplier models consider that each individual behaviour is a function of the characteristics or average behaviour of others in the group and then study what aggregate behaviours arise in the population. If the individual behaviour is affected by the group behaviour characteristics or both due to excess variation across the group, then we have a social multiplier. This excess variance (group-level heterogeneity) is

perhaps easy to be understood, but it is difficult to empirically identify (Durlauf and Tanaka, 2008). It is often referred in empirical literature as an identification problem. This major issue has been recognized in the field for many years, as noted by Manski (1993) with a prominent paper that highlights the difficulty in separating the endogenous effects from exogenous and correlated effects.

Consider for the purpose of this work district-level remittances, if (other things being equal) household level-remittances tend to vary with the average district-level remittances, we have an endogenous effect. However, if household level remittances vary with the socio-economic composition of the district we have an exogenous effect. Finally, if the household in the same district tends to receive remittances because it has the similar family background or norms when compared to others, then we have a correlated effect. Only endogenous effects generate the 'social multiplier'. However, the endogenous effect could be identified if attributes defining reference groups and those directly affecting outcomes are moderately related. A variance contrast method is used to segregate the above-mentioned effects.

It is believed that remittances, like many other economic activities, have social interaction, which is often labelled as a neighborhood or multiplier effects. In this chapter, we use the term 'multiplier effects'. However, despite the economic importance of multiplier effects, empirical evidence for such effects on remittances is yet to be fully understood. A handful of studies on the labor market provide evidence of multiplier effects in the workplace due to the knowledge spillover (Cornelissen, et al. 2013). Still it is unclear to what extent these findings can be extended to remittances.

The remittances literature tackles a variety of questions such as the following. How do remittances affect receiving households, which in turn affect economic activities in countries? Are they primarily uses for productive investment, or only used for consumption? Do remittances serve as insurance in bad economic conditions in-migrant sending communities? Is there any multiplier or spillover effect of remittances in receiving communities? In this chapter, we are interested in answering the last question, which hasn't captured the attention of researchers for a long time. We first review the overall magnitude of remittances multiplier or spill-over effects and then turn to what our research reveals about the motivation for migrant remittances and what effect they have on receiving households.

In this paper, we go beyond the existing literature to investigate multiplier effects triggered by remittances in rural households by using the data set of Household Integrated Economic Survey of 2007-08. Our unique data in the context of Pakistan allows us to compare the magnitude of multiplier effects across different districts in rural areas, while taking into account household-level characteristics along with previous measures of asset holding. It thus provides an opportunity to investigate whether the multiplier effects uncovered in existing literature are confined to the specific households or districts receiving remittances. At the same time, our comparison of the magnitude of multiplier effects across different districts of Pakistan provides new evidence on possibility of multiplier effects of remittances in rural areas. Our empirical analysis relies on the effect of remittances measured by the average remittances at district level to uncover the multiplier effect. This paper follows Graham's (2008) method for studying the presence and magnitude of a social multiplier based on conditional variance restrictions, which is due to district-level heterogeneity and/or sorting, which occurs when households sort across districts according to their wealth and preferences for public goods, social characteristics, and community opportunities.

Debate continues about the best strategies to deal with sorting (i.e. that the migrant households may sort into high migrant groups or districts in our case). We condition for an extensive set of fixed effects (for districts) and include district fixed effects to account for the potential sorting. Then, we incorporate the asset holding of households for potential sorting by ability to migrate and send remittances. Finally, Graham's (2008) method takes into account unexplained group-level heterogeneity as well as sorting to calculate the exact magnitude of the multiplier effect. Since the mean remittances at district-level are likely to be correlated with error term, we employ an instrumental variables strategy to isolate it.

Using annual average rainfall and the number of hospitals as an instrumental variable (IV), our estimates find a social multiplier of remittances, which is equal to approximately 1.12, suggesting sizable spillovers. Our result suggests that a social multiplier in terms of remittances contributes to the rural household of Pakistan.

The remainder of this chapter is structured as follows: Section 7.2 presents the data set. Section 7.3 discusses the descriptive statistics. Section 7.4 introduces the research methodology. Furthermore, section 7.5 analyses the determinants of internal and international remittances in Pakistan. The conclusion is presented in Section 7.6.

7.2 Data set

The rapid growth of remittances in Asia attracted the attention of the international policy circle, but the poor quality of earlier data poses a real challenge on the possibility of considering studies at the micro-level in receiving countries, especially in Pakistan. This research aims to address this data gap by providing an empirical analysis with a special focus on districts of Pakistan. We focus on Pakistan both because of data availability and because this is the source of the majority of remittances. In our data set remitting behaviour is measured as total remittances, inclusive of

zeroes for those that do not remit and the amount remitted for those who remit. There is already a rich literature, both theoretical and empirical, which explains the different key factors for the remitting behaviour along with the variety of household characteristics that attract remittances. Our selection of which household level characteristics to control for is motivated by these papers, but it should be noted that our intention in this paper in not to test which of these theories best fits in the context of Pakistan, but only to use these theories to help understand which characteristics might be associated with remittance multiplier or peer effects in rural Pakistan. With our data set we are able to control for a number of important household-level characteristics that the New Economics of Labour Migration (NELM) theory suggests should be associated with remitting behaviour. These include demographic characteristics of household head (age, sex, education and civil status), difference in household demographics (household size and dependants by sex) and household level wealth (dwelling, rooms, landholding, commercial building, savings and loans). Our data set includes Household Integrated Economic Survey (HIES) and Pakistan Social and Living Standard Measurement (PSLM) for the years 2007-08. The Federal Bureau of Statistics (FBS) in Pakistan collects survey data at Provincial levels and District levels through PSLM and HIES. The PSLM collects data on social indicators at District levels, whereas HIES collects data on social and economic indicators such as income and consumption at Provincial levels in alternative years. The (PSLM) survey provides the social and economic indicators at Provincial and District levels in Pakistan. This survey is part of the Millennium Development Goals (MDGs), which were initiated in July 2004 and is scheduled to be completed in June 2015. It consists of a sample size of 80,000 households at district level and 17,000 households at Provincial level. This is designed to provide population-based information of social and economic indicators under the direction of the United Nations (UN). There are 18 targets and 48 indicators,

and the Pakistan government is committed to achieving 16 targets and 37 indicators by 2015. Out of these 6 targets and 13 indicators are monitored through PSLM surveys.[55]

The sample design of the PSLM survey consists of urban and rural areas in Pakistan. The urban area consists of either a city or town, which is further divided into enumeration blocks. Each enumeration block consists of 200 to 250 households. Each enumeration block is further divided among three income categories - a high-income group, a middle-income group and a low income group. The remaining defunct Division forms a separate stratum. The population census organization published the list of villages in rural areas in 1998, which is used for rural frame. In rural areas, each District in Punjab, Sindh and NWFP Provinces form a stratum while the administrative defunct Division in Balochistan Province constitutes a stratum. The PSLM data collection is based on several rounds and registered information at both individual and household level on different aspects such as income, expenditure, education, health and access to basic services[56].

The data collection methodology is based on a two-stage stratified sample design. Stage one is based on Primary Sampling Units (PSUs) and stage two on Secondary Sampling Units (SSUs). The former includes enumeration blocks and villages in Urban and Rural areas respectively, which are selected with Probability Proportional to Size (PPS). The latter includes households which are selected (16 for rural areas and 12 for urban areas) using a systematic sampling technique with a random start. For district wise average earnings income and education levels, this paper utilizes micro data from the Pakistan Social and Living Standards Measurement survey

[55] The Millennium Development Goals (MDGs) can be grouped into 8 main following areas: MDG 1: Eradicate Extreme Poverty and Hunger, MDG 2: Achieve Universal Primary Education, MDG 3: Promote Gender Equality and Women's Empowerment, MDG 4: Reduce Child Mortality, MDG 5: Improve Maternal Health, MDG 6: Combat HIV/AIDS, Malaria and Other Diseases, MDG 7: Ensure Environmental Sustainability, and MDG 8: Develop Global Partnership for Development.

[56] For more detail see http://www.pbs.gov.pk.

(PSLM) 2004-05. It is the only socio-economic micro data that is representative at the provincial and district level. Moreover, the sample size of the district level data is also substantially larger than the provincial level data contained in micro data surveys such as the Household Income and Expenditure Survey (HIES) of Pakistan and the Labour Force Survey (LFS) of Pakistan. This has enabled researchers to draw socioeconomic information which is representative at lower administrative levels as well. The survey for 2007-08 provides district level welfare indicators for a sample size of about 7,200 households. It provides data on districts in all four provinces of Pakistan namely Punjab, Sindh, NWFP, and Balochistan. The Federally Administered Tribal Areas (FATA region) along the Afghan border in the north-west and Azad Kashmir are not included in the data. To analyse the spatial differences in district wise remittances in rural Pakistan, this chapter has utilized the district level data only.

In rural communities, information is also collected on a range of attributes such as employment, income, local infrastructure and provision of services, such as health and education. The probability of each household residing in different parts throughout the country differs. This sampling weight, used for different households, is weighted by a factor that is inversely proportional to their probability of selection in the survey sample.

The data set also provides information on transfer payments received and paid-out by households. For the transfer payments received, it includes remittances received by households within Pakistan (internal remittances) and remittances received by households outside of Pakistan (international remittances). For the transfer payments paid-out, it includes remittances paid-out by households within Pakistan and remittance's paid-out by households outside of Pakistan.

However, the data set does not include any information about the actual migrant. The only available information is the amount of remittances from a member to the family. The households that do not receive remittances are due to not having a member migrated or having a member migrated but not receiving remittances. The information on dwelling consists of type of dwelling,

occupancy status, rooms and electricity/gas/ telephone connection. Moreover, data identifies agricultural land, non-agricultural land, residential building and commercial building. Further information is collected by questions such as, did any members own or previously own any property? Is this property owned now? If yes, how much agriculture land is it in acres? Finally, agricultural activity includes information of a household's total operational land owned. The total land holding is further divided into two types *irrigated* and *rainfed* (*barani*) and also into *cultivated* and *uncultivable*. Information is also available on household borrowing, lending, net current savings, and the total value of sold/purchased gold, securities and dividends.

7.3 Descriptive statistics

The definition of household includes either a single person or more than one person, who live and eat together, under the same roof and have no usual place of residence elsewhere. Absent members of the household such as internal or international migrants are not considered members of the household. If these members are present in the household at the time of the survey, then their income is included as either internal or international remittances received.

The use of the home-country data is crucial for answering the questions of interest to this study. This survey can tell us which households have migrants, and which receive remittances, but cannot inform us which migrants have moved abroad, to which country, with their whole household, and whether they send remittances or not. Asking household members in home countries to report on the incomes, education and other characteristics of the migrant members is problematic for the household members to report such information.

In this data set, we construct comparable covariates to compare household income, remittances behavior, family composition and demographic characteristics, measured at the household level,

not at the individual level. All financial values are reported in the constant 2007-08 PKR (Pakistani Rupee).

Table 7.1 Households distribution by Provinces and Districts

Provinces	**Number of districts**	**Number of Households**
Punjab	35	2,888
Sindh	16	1,660
NWFP	24	1,355
Balochistan	6	1,297
Total	81	7,200

Table 7.2 Household head characteristics

Households Head Marital Status	Percent	Household head sex	Percent
Never Married	2.07	Male	95.92
Currently Married	92.83	Female	4.08
Widow/Widower	4.86	Household head attended school	Percent
Divorced	0.14	Not Attended School	50.57
Other	0.10	Attended School	48.36
Total	100%	Currently Attended School	1.07

We present summary statistics of Pakistan Integrated household survey by concentrating on remittances data. However, there is considerable heterogeneity between households in the data set. Table 7.1 summarizes the total number of households (7,200) in rural Pakistan across 81

districts, which are further divided into four provinces. Punjab province covers 35 districts with 2,888 households; Sindh province covers 16 districts with 1660 households; NWFP includes 24 districts, which cover 1,355 households, and finally Balochistan province includes 6 districts by surveying 1,297 households. Furthermore, the number of the households covered in each district can be found in the Appendix.

Table 7.2 summarizes the household head characteristics with respect to age, sex, education, and marital status. In our database, 90% of household heads are married, and 48% of the household heads attended school. The average age of the household head in years over the whole sample is 46 years, and 96% of the household head are males. Household head characteristics, especially in from the perspective of the New Economic of Labor Migration (NELM) are an important determinant for understanding remittance behavior.

We started by establishing prevalence and pattern of remittances by gender of the household head by provinces. We consider the key dimension of remittances behaviour that whether migrant chooses to remit at all or not, and the total amount remitted in rupees. Our data set records internal and international remittances that households receive from members working abroad. The descriptive statistics show a considerable variation across the provinces of Pakistan. Our data set reports differences in receiving an amount of remittances that arises from the gender of the household head. It is therefore, useful to begin by illustrating the differences in the incidence of remittances by the gender of the household head and provinces.

Table 7.3 shows the average distribution of internal and international remittances across the four provinces of Pakistan. In Punjab, on average household receives around 6,000 rupees as internal remittances and around 8,000 rupees as international remittances, while comparatively in NWFP (new name KPK) an average household receive 13,000 rupees as internal remittances and 16,000 rupees as international remittances, almost double that of Punjab province. Balochistan province

does receive on average a minimal amount of both types of remittances. Finally, Sindh province only receives internal remittances, which is also quite small on average, and it does not receive international remittances at all.

Table 7.3 Internal and international remittances (in thousand rupees) by Province

Province	Internal Remittances		International Remittances		Total Remittances	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Punjab	6.158	21.901	7.745	47.189	13.904	52.366
Sindh	0.343	5.752	0	0	0.343	5.752
NWFP	13.097	39.866	16.059	62.656	29.157	72.561
Balochistan	0.186	3.244	0.424	8.813	0.610	9.382
Total	5.048	22.866	6.205	40.981	11.253	47.164

Table 7.4 summarises the average internal and international remittances receive by household in each province by the gender of the household head (male versus female). Our data set shows that female-headed household receive a higher amount in remittances - both internal and international - than a counterpart male-headed household (thus confirming intra-household decision making power or may be that a female-headed household have migrants). The household head is the person, who takes the important decisions within the household such as employment, marriage, schooling, providing the needs of the households, and chooses between consumption and investment. Household heads whether male or female to be in a strong bargaining position within the household (Guzman, et al. 2008). The data set comprises of 7,200 households and is representative at the provincial and district level in rural areas. Although the survey is comprehensive in character and includes detailed information on household income and

consumption patterns it is not a specialized survey of migration. As such, it collects only basic information on household's level characteristics.

Table 7.4 Internal, international and total remittances (in thousand rupees) by the gender of the household head per provinces

Province		Internal Remittances		International Remittances		Total Remittances	
		Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Punjab	Male	4.950	19.853	6.461	44.990	11.411	49.928
	Female	25.476	38.192	28.282	71.044	53.758	71.208
Sindh	Male	0.316	5.652	0	0	0.316	5.652
	Female	4.000	13.856	0	0	4.000	13.856
NWFP	Male	10.965	37.684	15.261	63.526	26.227	72.313
	Female	38.218	54.072	25.462	50.606	63.681	66.621
Balochistan	Male	0.131	2.563	0.216	45.000	0.348	5.307
	Female	12.000	29.393	4.653	110.227	57.000	108.249

Neither does it contain comprehensive data on migrants; only migrants who remit (and whose remittances are declared by the receiving household) are captured by survey. The lack of data on migrants implies that we cannot observe the multiplier or spillover effects of remittances between remitters. However, we can observe the multiplier or spillover effects of remittances between remittance receiving households in different districts of Pakistan, since the data set does contain relatively good data on remittances, including those remitted in cash and in kind and the frequency with which remittances are received. Remittance- receiving households are defined as households receiving remittances from within Pakistan, from abroad, or from both.

Table 7.5 Summary Statistics

Variable	Household not receives remittances(observations 6243[57])		Household receives only internal remittances(observations 640)		Household receives only international remittances(observations 288)		Household receives both internal and international remittances(observations 29)	
	MEAN	STD. DEV.	MEAN	STD. DEV.	MEAN	STD. DEV.	MEAN	STD. DEV.
Household Head Characteristics								
Household head sex (1 if male; 2 otherwise)	1.02	0.12	1.20	0.40	1.22	0.42	1.21	0.41
Household head age	45.43	13.15	50.50	14.75	50.94	15.33	58.66	12.95
Household head married (Dummy 1 if married; 0 otherwise)	0.94	0.25	0.89	0.32	0.89	0.31	0.90	0.30
Household head attended school (Dummy 1 if Attended School; 0 otherwise)	0.49	0.50	0.44	0.50	0.50	0.50	0.59	0.50
Household head can write (Dummy 1 if can write; 2 otherwise)	1.48	0.50	1.50	0.50	1.45	0.50	1.34	0.48
Household level Characteristics								
Household size	7.26	3.26	7.23	4.19	8.94	5.20	10.03	4.96
Number of children age 0 to 14 years	3.15	2.25	3.06	2.61	3.75	3.47	4	3.30
Number of female age 15 to 30 years	0.99	0.95	1.31	1.23	1.55	1.29	2.21	1.18
Number of male age 15 to 30 years	0.93	1.17	0.77	1.01	1.18	1.09	1.31	1.23
Internal remittances in thousand Rupees	-	-	54.216	54.855	-	-	-	-
International remittances in thousand Rupees	-	-	-	-	142.419	140.931	-	-
Both internal plus international remittances in thousand Rupees	-	-	-	-	-	-	183.151	147.261
Household own house (Dummy 1 if own house; 0 otherwise)	0.81	0.39	0.90	0.29	0.92	0.27	0.90	0.31
Household has 3 or less than 3 rooms (Dummy 1 if has 3 rooms; 0 otherwise)	0.19	0.39	0.23	0.42	0.302	0.46	0.35	0.50
Household has 4 or more than 4 rooms (Dummy 1 if has 4 rooms; 0 otherwise)	0.16	0.37	0.23	0.42	0.48	0.50	0.48	0.51
Household has gas connection (Dummy 1 if has gas; 0 otherwise)	0.07	0.26	0.06	0.24	0.10	0.30	0.07	0.26
Household has telephone connection (Dummy 1 if has telephone; 0 otherwise)	0.12	0.32	0.15	0.36	0.35	0.48	0.41	0.50
Household has electricity connection (Dummy 1 if has electricity; 0 otherwise)	0.79	0.41	0.89	0.31	0.95	0.21	0.93	0.26

[57] Note: N=7200 households; 6243 households do not receive any type of remittances, 640 households receive only internal remittances, 288 households receive only international remittances, and 29 households receive both internal and international remittances.

Household own commercial building (Dummy 1 if own building; 0 otherwise)	0.02	0.14	0.01	0.12	0.06	0.23	0.14	0.35
Household own non-agricultural land (Dummy 1 if own land ; 0 otherwise)	0.03	0.17	0.03	0.18	0.07	0.25	0.07	0.26
Household own agricultural land in acres	1.22	13.55	1.16	14.84	0.61	2.37	0.97	2.33
Savings last year in thousand Rupees	10.480	58.456	20.000	185.466	28.675	73.893	20.931	47.382
Loan borrowed last year in thousand Rupees	2.012	16.918	4.234	27.776	13.215	102.157	1.206	5.615
District Level Averages								
Household head age	45.91	2.89	47.54	2.93	48.12	2.76	48.82	3.14
Household size	7.33	1.01	7.16	0.96	7.94	1.54	7.76	1.42
Number of children age 0 to 14 years	3.17	0.65	3.05	0.66	3.45	1.05	3.32	1.01
Number of female age 15 to 30 years	1.03	0.18	1.10	0.19	1.19	0.21	1.22	0.24
Number of male age 15 to 30 years	0.93	0.28	0.82	0.23	1.02	0.28	0.95	0.25
Internal remittances in thousand Rupees	3.997	6.043	13.572	14.585	8.547	8.593	8.289	4.546
International remittances in thousand Rupees	4.923	10.905	8.392	11.916	27.724	21.240	20.122	19.187
Household own agricultural land in acres	1.23	1.52	0.96	1.51	0.85	1.30	0.52	0.61
Savings last year in thousand Rupees	11.332	13.934	16.891	15.140	17.365	17.179	18.257	18.997
Loan borrowed last year in thousand Rupee	2.410	3.526	4.570	5.063	3.656	4.069	3.068	3.480

We make a distinction between remittances received from Pakistan (internal remittances) and remittances received from abroad (international remittances) as both differ both in frequency and amount. Of the 7,200 households included in the sample, 86.5% of households do not receive any type of remittances: 9% of households receive internal remittances, 4% receive remittances from abroad, and 0.5 percent receives both remittances. Altogether, 13.5% of households receive some form of remittances. Due to very small sample of household receiving remittances; in our analysis, we will consider only remittance receiving households irrespective of internal or international remittances. Since previous literature suggests that internal and international remittances differ both in frequency and amount (Guzman, et al., 2008), Table 7.5 descriptive statistics do not suggest any striking differences between the two types of household.

7.4 Empirical Strategy and Identification

The interaction based model has been studied by Manski (2000, 2003), Brock and Durlauf (2001a, 2001b), Moffitt (2001), Graham and Hahn (2005), and Graham (2008); and the list should contain many more. There are formally two approaches in interaction based models to uncover social interaction (Durlauf and Tanaka, 2008). The first approach is the linear-in-means framework, which presumes a linear relationship between the group characteristics (the credit goes to Manski for being the first to introduce this concept to the fullest). In econometrics, this approach estimates social interaction effects through changes in the linear expectation of individual outcomes when group level variables are included in the conditioning set. The second approach is the variance contrast framework which uses intragroup variation in behavior to infer social interactions (the second approach, originally proposed by Glaeser, et al. (1996) and developed into a full inferential procedure by Graham (2008). In econometrics, this approach estimates social interaction effects, which will induce intragroup dependences in behavior that affect sample variances for intragroup outcomes.

The cross-sectional data is always subject to potentially severe biases in direction that are not obvious a priori. Reverse causation is a major concern because it is difficult to separate the cross-sectional relationship between remittances and average remittances but the instrumental variable approach could separate that correlation (Yang, 2011). There is also a concern with identification in empirical research, especially when using cross-section data, because of the possibility that the group versus individual influences is likely correlated. The necessary condition for identification needs only one individual variable whose group level average is not an element of the individual behavior equation, and this average can be used for instrument. In this paper, we use household level data, which has an important advantage to the extent that the parameters of the household model are identified. On the technical note, our paper follows the empirical estimation that is used in the Graham (2008) seminal approach (variance contrast framework) by achieving identification through covariance restrictions on errors.

In this section, we present our empirical strategy. Let R_{id} denote outcome of household i in district d, which in our context indicates the level of remittances in thousand Rupees. The household and the district (region of residence for households) define the reference group. Moreover, let X_{id} and W_{id}, respectively, denote a household's level characteristics and household level wealth. The basic regression model used in this paper is thus

$$R_{id} = \alpha_d + X_{id}\,\alpha_1 + W_{id}\alpha_2 + \bar{X}_{(-i)d}\,\alpha_3 + \bar{W}_{(-i)d}\,\alpha_4 + (\gamma_0 - 1)\bar{R}_{(-i)d} + \epsilon_{id}$$

Where $\bar{X}_{(-i)d}$ and $\bar{W}_{(-i)d}$ are district level variables calculated as the average household level characteristics and average household level wealth for the group of individual households of district d where the household *i* indexes, but excluding from the average the value of the *ith* household (-*i*). The estimated coefficient of interest is γ_0 (known as social interaction), or the response of household i to a change in the average remittances ($\bar{R}_{(-i)d}$) of the district; which is the indirect response to the remittances. The terms α_d represent district-level heterogeneity and

ε_{id} represents random household-level heterogeneity. The terms α_d and ε_{di} are the random latent variables unobserved by the econometrician. Positive social interaction will result if $\gamma_0 > 1$. By imposing restrictions on the conditional distribution of $\bar{R}_{(-i)d}$ given district level instruments (annual average rain fall, number of public hospitals) will help in the identification of γ_0. We have normalized the total remittances at household level by their sample mean and standard deviation. Next, we generate the district-level mean remittances from the normalized total remittances at the household level. Similarly, we create household level remittance variable containing the deviation from the mean district-level remittances.

Our interest is in the inter-district differences in remittances, but intra-district variances are also important in this context. The intra-district and inter-district remittance dispersion is measured by the residual variance of the household level normal remittances with OLS regression on district fixed effects and other relevant covariates. Then we calculate the mean district residual that help in derivation of intra and inter districts squares of remittances. Typically, the residual is viewed as unexplained, but in our case, it may vary substantially intra-and inter-districts. This variance decomposition explains not only average differences between districts but also differences in the heterogeneity of districts. A study by Western and Bloome (2009) argues that least-square regression residuals are uncorrelated with covariates (x_i) by construction, so the variance of dependent variable (y_i) equals the sum of the residual variance and the variance of predicted values for y_i. Furthermore, residual variance may reflect measurement error rather than social process and residuals are very useful for detecting omitted variables.

Following Graham (2208), we work with mean of remittances in district, and manipulate the data in term of within-district (R_d^w) and between-district (R_d^B) deviation from the respective mean with the cross-district mean. In other word, within-district (R_d^w) is simply the within district sample variance of remittances, while between-district (R_d^B) is the square deviation of group average

remittances in the sample. This allows to address issue of selection in our analysis. We work with the inter-district (R_d^w) and intra-district (R_d^B) remittance data to quantify the social interaction. We next introduce the two step GMM model. First, the within-district (R_d^w) remittances is regressed on the extensive set of covariates including instrumental variables and district fixed effects. Second, the inter district (R_d^B) remittances is regressed on the instrumental variables for intra-district remittances (R_d^w) along with other control variables. In our estimation, R_d^w is instrumented with annual average rain fall and the number of hospitals in each district, and the outcome variable R_d^B is employed to calculate the social multiplier or spillover effect between-districts as the following:

$$\gamma_0^2 = (\beta_1[R_d^B])^2.$$

Social multiplier will result in

$$\gamma_0 = \sqrt{\gamma_0^2}\,.$$

In this study, we take the advantage of the variance contrast approach to empirically identify a social interaction to avoid the reflection problem. The reflection problem arises when data on outcomes do not reveal whether group behavior actually affects individual behavior or group behavior is simply the aggregation of individual behaviors (Manski, 2000; Brock and Durlauf, 2001a, 2001b). As mentioned, we identify the role of social interactions using annual average rainfall and the number of public hospitals in each district. We expect that the mean rainfall and hospital numbers be correlated with the mean level of remittances in districts and uncorrelated with the household level remittances. Another general concern in social interaction models is the choice of group and group size in each district. The eighty one districts are covered in four provinces of Pakistan, and each district contains four randomly surveyed villages. Furthermore, each village covers 32 households in an equal number. The method used in the survey for defining group size in rural areas of approximately equal densities is not problematic for identification and for spurious correlation. By defining “neighbor" as 16 households is

sufficiently small that spurious correlation between the loosely related neighbor should be minimized as an econometric issue (Towe and Lawley; 2013). Another advantage for formation of groups in our data set is to view groups as the social groups to which any household may belong.

Our empirical analysis includes the variables that control for the contextual interactions and correlated effects which assist to isolate the influence of the endogenous interactions in remittances. The following discussion will sum up the intuition behind our selection of key variables used in social multiplier estimation. The number of variables is measured at the district-level, which is required for empirical identification, controlling for contextual interactions that may drive common behaviour within districts. We control for contextual interaction using socio-demographic indicators such as, mean household head characteristics, mean household-level characteristics and mean household-level wealth characteristics. Our analysis further includes the household wealth holding such as; household owned house, household owned commercial building, household owned non-commercial land and household owned agriculture land-holding in acres. These variables capture potential sorting of households into different types of districts and proxy for many unobservable factors such as resources available to household members to migrate (i.e. to afford the cost of migration). Additionally, we also include loans in Rupees and savings in Rupees in our empirical estimation. To the extent that the prevalence of loans in the district can be thought of as a correlated effect that is the districts with more loans are more likely to experience higher remittances, because the types of the households with loans are correlated. Further the savings will also serve as the proxy for households to counter any natural calamities but further it serves as to cover any associated cost of migration.

We include a measure of the mean wealth at the district level as a control for the exogenous influence of shocks to employment that are common within districts. We are not sure about the causality of wealth in explaining remittances a priori how the measure of wealth will interact in

this model - whether a lower wealth has a negative impact on the likelihood of remittances or a higher wealth leads to an increase in remittances.

7.4.1 Instrumental variables

A potential concern is that due to peer effect (or externality) the mean remittance at the *district* level is correlated with the *household* level remittances, which are our outcome variable, leading to biased estimates. To address this concern we need instrumental variables, which are expected to correlate with mean remittance at the district level but uncorrelated with individual household level remittances. We try several instruments. For example, the average rainfall at the district level is expected to be positively and significantly correlated with the district remittances in Pakistan. The rainfall and other community shocks, such as the total number of public/private schools, and the number of hospitals in each district may affect the community/district level mean remittances, but is unlikely to affect individual level remittances which may depend on individual level shock.

The main threat to the validity of these instrumental variables for mean remittances is the possibility that the unobserved persistent adverse economic conditions were a factor determining remittances both historically and contemporaneously. Another potential threat to the validity of the instrument is the development of infrastructure (another unobservable), which may affect current mean remittances through the channel other than current migration rates (such as foods supply and delivery of government services). Similarly, historical remittances may have influenced the level of current development in the districts, the industrial structure, governance, and other infrastructure, all of which may also influence remittances (McKenzie and Rapoport 2007). To investigate this, we also look at the correlation between the mean remittances and the average level of district growth rate, and the agricultural share of production in a district.

Taken together, the results from Table 7.1 provide support for the exogeneity restriction required for our instruments. Our results are robust to using these instruments for mean remittances,

suggesting that this possible threat is not a concern in our data. These two variables affect the mean remittances, but have no other direct impact on the decision of the sender of the remittances. The growth rate of the district is used as an additional instrument. These all-instrumental variables are used to form a test of over-identification for the instruments and test displayed in table C.4 in appendix.

7.5 Results and Discussions

We use the survey data to explore the multiplier or spillover effects of remittances in rural Pakistan, as a function of household head characteristics, household characteristics, and household wealth, which the New Economics of Labour Migration (NELM) suggests, should matter. All regression includes districts fixed effect. The research related to the impact of remittances on productive investment already proved that remittances lead to investment in the regions where capital is scarce. This supports the existence of interdependency of interaction, and it seems reasonable to expect to find a social multiplier in the level of remittances in the 81 districts of Pakistan. We have estimated five different social multipliers at different levels of aggregation. The estimated multiplier rises nominally with the level of aggregation, confirming the importance of additional control in the estimation. We use the approach developed by Graham (2008) to the variances of district level average remittance outcomes to identify the social multiplier. Scheinkman (2008; 6) defined social multiplier as "the measure of the ratio of the effect on the average action caused by a change in the parameter to the effect on the average action that would occur if the individual agents ignored the change in the action of their peers".

In the first stage regression results, the Kleibergen—Paap under-identification LM and Wald tests fail to reject their null hypotheses at the 95% level, suggesting that even for over-identification with the order condition, the instruments may be inadequate to identify the equation. The Anderson-Rubin Wald test and Stock-Wright LM test readily reject their null hypothesis and

indicate that the endogenous regressors are relevant. Table 7.6 reports estimates of γ_0^2 using the remittances data. We focus on the column 1 remittance results (the column 5 results are equally similar, although less identified). The estimate of γ_0^2 in this case is approximately equal to 1.25, suggesting a social multiplier of 1.12.[58] The no social interaction null is rejected at the 5% level. The γ_0^2 parameter is identified in our estimation. The first stage F-statistics is over 30, which suggest that weak instrument is not a concern.

Column 1 results of γ_0^2 suggests that multiplier effect of remittances receiving households contributed to the district development of Pakistan. To get a rough idea of the implied social multiplier under randomly distributed remittances to districts a 1 standard deviation change in remittances is given by $(\gamma_0 - 1)/\sqrt{D}$.[59] The effect on a household of a 1 standard deviation change in remittances relative to a 1 standard deviation change in its own remittances across districts of 40 to 90 households corresponds to relative changes in remittances of 0.02 to 0.01, respectively. This explains that the average spillover of remittances between districts 40 to 90 is between 1 to 2 %. Glaeser, et al. (2003) estimated a social multiplier of 8.16 for crime and 4.47 for homicides and doubts that these high estimates are due to a correlation between demographics and the unobservable element. Similarly, the estimated social multiplier will result in very large value, if there is significant sorting on the basis of unobservable characteristics (Glaeser, et al. 2003), but our modest results are in line with the estimation result provided by Graham (2008) for social multiplier for math data with 1.9. Our paper has a brief analysis of the social multiplier effect of remittances in rural Pakistan and the data is sufficient to support the idea that a social multiplier exists.

58 Social Multiplier can be calculated by $\gamma_0 = \sqrt{\gamma_0^2} = \sqrt{1.25} = 1.12$

59 Where D stand for the size of the district; let assume that each district size is changes from 40 to 90 households; $(1.12 - 1)/\sqrt{40} = 0.02$ and $(1.12 - 1)/\sqrt{90} = 0.01$; see Graham (2008) for more detailed discussion.

Table 7.6 GMM Estimate of γ^2 for normalised remittances

	1	2	3	4	5
	Remittances	*Remittances*	*Remittances*	*Remittances*	*Remittances*
γ^2	1.245	1.325	1.285	1.217	1.300
	(0.041)	(0.087)	(0.073)	(0.076)	(0.155)
Household Head Sex (1 if male; 2 otherwise)	-0.032	-0.030	-0.020	-0.051	-0.083
	(0.039)	(0.056)	(0.050)	(0.051)	(0.090)
Household Head Age	0.007	0.009	0.008	0.002	0.002
	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)
Household Head Married (Dummy 1 if married; 0 otherwise)	-0.063	-0.083	-0.073	-0.082	-0.122
	(0.025)	(0.037)	(0.029)	(0.045)	(0.090)
Household Head Attended School (Dummy 1 for School; 0 otherwise)	-0.133	-0.206	-0.170	-0.089	-0.147
	(0.142)	(0.200)	(0.171)	(0.123)	(0.193)
Household Size	-	0.022	0.021	0.014	0.021
		(0.015)	(0.011)	(0.009)	(0.015)
Number of Children age 0 to 14 years	-	-0.004	-0.006	-0.007	-0.010
		(0.012)	(0.010)	(0.007)	(0.011)
Number of Female age 15 to 30 years	-	-0.005	-0.006	-0.006	-0.010
		(0.014)	(0.012)	(0.009)	(0.014)
Number of Male age 15 to 30 years	-	0.011	-0.013	-0.008	-0.011
		(0.025)	(0.020)	(0.015)	(0.019)
Household Own House (Dummy 1 if own house; 0 otherwise)	-	0.009	0.003	-0.006	-0.003
		(0.011)	(0.011)	(0.010)	(0.014)
Household Own log of agricultural land in acres	-	-	-0.019	-0.015	-0.029
			(0.044)	(0.035)	(0.058)
Log of savings last year in Rupees	-	-	-0.005	-0.003	-0.001
			(0.011)	(0.009)	(0.013)
Log of loan borrowed last year in Rupees	-	-	0.021	0.014	0.021
			(0.007)	(0.007)	(0.016)
Mean of Household Head Age	-	-	-	-0.026	-0.017
				(0.013)	(0.021)
Mean of Household Size	-	-	-	0.120	0.081
				(0.052)	(0.083)
Mean of Number of Children age 0 to 14 years	-	-	-	-0.052	-0.020
				(0.046)	(0.073)
Mean of Number of Female age 15 to 30 years	-	-	-	-0.104	-0.010
				(0.068)	(0.080)
Mean of Number of Male age 15 to 30 years	-	-	-	-0.217	-0.167
				(0.102)	(0.163)
Mean of Household Own log of agricultural land in acres	-	-	-	-	0.050
					(0.032)
Mean of Log of savings last year in Rupees	-	-	-	-	-0.013
					(0.015)
Mean of Log of loan borrowed last year in Rupee	-	-	-	-	-0.020
					(0.018)
$F_{(df1,df2)}$	$34.83_{(1,7081)}$	$13.77_{(1,7071)}$	$15.13_{(1,7071)}$	$8.11_{(1,7060)}$	$3.76_{(1,7057)}$
$p-value\ \ H_0:\gamma^2=1$	(0.000)	(0.000)	(0.000)	(0.000)	(0.053)
$F_{(df1,df2)}\ 1st-Stage$	$14.92_{(2,7080)}$	$5.86_{(2,7070)}$	$6.71_{(2,7065)}$	$3.55_{(2,7059)}$	$1.59_{(1,7056)}$
$(p-value)$	(0.000)	(0.003)	(0.001)	(0.029)	(0.204)
Number of Districts	81	81	81	81	81
District Fixed Effects	Yes	Yes	Yes	Yes	Yes

7.6 Conclusions

There exists strong empirical evidence of the magnitude of the social multiplier, particularly in the areas of peer group effects in education and neighbourhood effects while successfully confronting the several basic identification and estimation problems such as Graham (2008) but with limited application in the areas of migration and remittances. The econometric result might suffer from a sorting bias in our case. It may be due to remittance receiving household's being located in more affluent districts and the multiplier effects being overestimated. We address this bias by controlling for rich information on household level characteristics and by including district-specific effects. Secondly, in this paper, we have applied Graham's (2008) recently devised method which allows us to overcome the group's unobservable variables and self-selection. Our identification strategy uses instrumental variables. However, annual average rainfall and the number of hospital in a district do not have any obvious effects on the remitter. Given these facts, annual average rainfall and the number of hospitals in a districts provide us with a convincing instrument to identify the effect of a social multiplier in rural districts of Pakistan. Our research is considered to be the starting point and should be regarded as an important example of how the social interactions model could be applied to remittances.

The heterogeneous nature of districts in Pakistan might give rise to efficiency because non-remittance receiving households benefit from the social interaction with remittance receiving households. The positive multiplier effects require that households which receive remittances will improve the overall condition of other households, which do not receive remittances and effects will propagate throughout the district by resulting in multiplier effects of the exogenous change. However, our results suggest that there are multiplier or spillover effects, as implied by a Glaeser, et al. (2003), Graham (2008), and Maurin and Moschion (2009). Furthermore, the results from our regression imply a consistent social multiplier with the previous research.

Appendix:

Table C.1 List of Instrument variables at district level

AARF	Annual Average rainfall in each district
PD	Population density in each district
AAGR	Average annual growth rate of each district
Area	Area of District in Sq.Kms
SSD	District-wise Ranking of Social Sector of Pakistan
TPubS	Total Number of Public Schools in each district
PPubS	Total Number of Public Primary Schools in each district
MPubS	Number of Public Middle Schools in each district
HPubS	Number of Public High Schools in each district
HSPubS	Total Number of Public Higher Sec. Schools in each district
TPvtS	Total Number of Private Schools in each district
PPvtS	Total Number of Private Primary Schools in each district
MPvtS	Total Number of Private Middle Schools in each district
HPvtS	Total Number of Private High Schools in each district
HSPvtS	Number of Private Higher Sec. Schools in each district
HOSP	Number of Hospital in each district
DISP	Number of Dispensary in each district
RHC	Rural Health Centre in each district
BHU	Basic Health Unit in each district
TB_LC	TB Clinic and Leprosy Centre in each district
MCHC	Mother & Child Health Centre in each district
DPR	Dependency Ratio in each district
LR	Literacy Rate (age 10+) of each district
NPER	Net Primary Enrolment Rate of each district

Table C.2 Number of household in each District

S.No.	***DISTRICTS***	NUMBER OF HOUSEHOLDS IN EACH DISTRICT	S.No.	***DISTRICTS***	NUMBER OF HOUSEHOLDS IN EACH DISTRICT
	PUNJAB		42	SHIKARPUR	102
1	ISLAMABAD	112	43	LARKANA	98
2	ATTOCK	108	44	DADU	154
3	RAWALPINDI	60	45	HYDERABAD	97
4	JHELUM	51	46	BADIN	118
5	CHAKWAL	49	47	THATTA	83
6	SARGODHA	92	48	SANGHAR	116
7	BHAKAR	103	49	MPKHAS	161
8	KHUSHAB	44	50	THARPARKAR	61
9	MIANWALI	46	51	KARACHI	20
10	FAISALABAD	147		**NWFP**	
11	TTSINGH	93	52	SWAT	80
12	JHANG	140	53	UPPERDIR	49
13	GUJRANWALA	95	54	LOWERD	54
14	GUJRAT	88	55	CHITRAL	30
15	SIALKOT	95	56	SHANGLA	52
16	HAIFZABAD	51	57	MALAKAND	52
17	MBAHUDDIN	42	58	BONAIR	38
18	NAROWAL	42	59	CHARSADA	37
19	LAHORE	32	60	NOWSHERA	41
20	KASUR	63	61	PESHAWAR	83
21	OKARA	72	62	KOHAT	40
22	SHEIKHUPURA	157	63	KARAK	45
23	VEHARI	110	64	HANGU	28
24	SAHIWAL	69	65	TANK	48
25	MULTAN	113	66	DIKHAN	102
26	KHANEWAL	52	67	MANSHERA	101
27	PPATTAIN	34	68	ABBOTABAD	52
28	LODHRAN	54	69	HARIPUR	52
29	DGKHAN	108	70	BATAGRAM	51
30	RAJAANPUR	63	71	KOHISTAN	55
31	LAYYA	54	72	MARDAN	84
32	MURAFFARG	107	73	SWABI	34
33	BAHAWALPUR	101	74	BANNU	93
34	BAHAWALN	98	75	LAKKIM	54
35	RYKHAN	143		**BALOCHISTAN**	
	SINDH		76	QUETTA	241
36	KHAIRPUR	115	77	SIBBI	174
37	SUKKAR	55	78	KALAT	293
38	NAWABSHAH	114	79	MAKRAN	184
39	NOWSHEROF	109	80	ZHOB	232
40	GHOTKI	107	81	NASEERABAD	173
41	JACCOBABAD	150			

Table C.3 Household distribution between provinces

Variable	*Observation*	*Mean*	*Std. Dev.*	*Min*	*Max*
Household	7200	3600.5	20178.6	1	7200
Village	580	297.95	170.17	1	580
District	81	43.48	24.75	1	81
Province	4	2.15	1.14	1	4
Weight	7200	1364.07	53.19	53.189	20084.78
			Punjab		
Household	2888	1444.5	833.84	1	2888
Village	244	121.95	72.90	1	244
District	35	18.27	10.47	1	35
Weight	2888	2082.99	1214.83	310.99	20084.78
			Sindh		
Household	1660	3718.5	479.35	2889	4548
Village	130	306.92	37.42	245	374
District	16	43.18	4.23	36	51
weight	1660	1108.24	584.36	208.16	3592.34
			NWFP		
Household	1355	5226	391.30	4549	5903
Village	118	433.90	34.62	375	492
District	24	64.13	7.04	52	75
weight	1355	1055.16	435.47	104.53	2112.94
			Balochistan		
Household	1297	6552	374.56	5904	7200
Village	88	536.34	25.37	493	580
District	6	78.39	1.67	76	81
weight	1297	413.44	270.90	53.19	1270.41

Table C.4 GMM Estimates of γ^2 for normalised remittances

	Within District Remittance	Between District Remittances	*Within District Remittance*	Between District Remittances	*Within District Remittance*	Between District Remittances	*Within District Remittance*	Between District Remittances	*Within District Remittance*	Between District Remittances
	1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage
γ^2	-	1.245 (0.041)	-	1.325 (0.087)	-	1.285 (0.073)	-	1.217 (0.076)	-	1.300 (0.155)
Within District Remittance	-	1.549 (0.103)	-	1.756 (0.232)	-	1.652 (0.188)	-	1.480 (0.185)	-	1.690 (0.403)
Annual Average Rain fall	0.001 (0.000)	-	0.001 (0.000)	-	0.001 (0.000)	-	0.001 (0.000)	-	0.000 (0.000)	-
Number of Hospital	0.009 (0.005)	-	0.005 (0.005)	-	0.005 (0.005)	-	0.008 (0.005)	-	0.007 (0.005)	-
Household Head Sex (1 if male; 2 otherwise)	0.093 (0.060)	-0.032 (0.039)	0.072 (0.069)	-0.030 (0.056)	0.068 (0.067)	-0.020 (0.050)	0.191 (0.056)	-0.051 (0.051)	0.186 (0.057)	-0.083 (0.090)
Household Head Age	-0.014 (0.004)	0.007 (0.003)	-0.013 (0.004)	0.009 (0.004)	-0.014 (0.004)	0.008 (0.003)	-0.002 (0.006)	0.002 (0.003)	-0.002 (0.006)	0.002 (0.004)
Household Head Age Sq.	0.000 (0.000)	-0.001 (0.001)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Household Head Married (Dummy 1 if married; 0 otherwise)	0.108 (0.039)	-0.063 (0.025)	0.102 (0.038)	-0.083 (0.037)	0.102 (0.037)	-0.073 (0.029)	0.200 (0.049)	-0.082 (0.045)	0.200 (0.048)	-0.122 (0.090)
Household Head Attended School (Dummy 1 if Attended School; 0 otherwise)	0.423 (0.250)	-0.133 (0.142)	0.385 (0.240)	-0.206 (0.200)	0.390 (0.238)	-0.170 (0.171)	0.282 (0.235)	-0.089 (0.123)	0.282 (0.234)	-0.147 (0.193)
Household Size			-0.031 (0.016)	0.022 (0.015)	-0.034 (0.016)	0.021 (0.011)	-0.034 (0.015)	0.014 (0.009)	-0.034 (0.015)	0.021 (0.015)
Number of Children age 0 to 14 years			0.013 (0.015)	-0.004 (0.012)	0.018 (0.014)	-0.006 (0.010)	0.017 (0.014)	-0.007 (0.007)	0.017 (0.014)	-0.010 (0.011)
Number of Female age 15 to 30 years			0.006 (0.016)	-0.005 (0.014)	0.008 (0.017)	-0.006 (0.012)	0.014 (0.015)	-0.006 (0.009)	0.014 (0.015)	-0.010 (0.014)
Number of Male age 15 to 30 years			0.100 (0.035)	0.011 (0.025)	0.014 (0.034)	-0.013 (0.020)	0.014 (0.033)	-0.008 (0.015)	0.014 (0.033)	-0.011 (0.019)
Household Own House (Dummy 1 if own house; 0 otherwise)			-0.008 (0.014)	0.009 (0.011)	-0.002 (0.016)	0.003 (0.011)	0.026 (0.020)	-0.006 (0.010)	0.025 (0.020)	-0.003 (0.014)
Household has 3 or less than 3 rooms (Dummy 1 if has 3 rooms; 0 otherwise)			0.175 (0.080)	-0.090 (0.080)	0.162 (0.081)	-0.064 (0.059)	0.156 (0.081)	-0.050 (0.050)	0.156 (0.080)	-0.083 (0.090)
Household has 4 or more than 4 rooms (Dummy 1 if has 4 rooms; 0 otherwise)			0.251 (0.074)	-0.122 (0.080)	0.229 (0.071)	-0.081 (0.061)	0.222 (0.074)	-0.071 (0.049)	0.224 (0.078)	-0.118 (0.104)
Household has gas connection (Dummy 1 if has gas; 0 otherwise)			0.041 (0.025)	-0.040 (0.020)	0.046 (0.026)	-0.041 (0.016)	0.085 (0.032)	-0.046 (0.021)	0.082 (0.032)	-0.062 (0.040)
Household has telephone connection (Dummy 1 if has telephone; 0 otherwise)			0.370 (0.149)	-0.244 (0.148)	0.366 (0.151)	-0.206 (0.107)	0.367 (0.150)	-0.141 (0.098)	0.361 (0.148)	-0.215 (0.182)

Household has electricity connection (Dummy 1 if has electricity; 0 otherwise)			0.024 (0.013)	-0.005 (0.015)	0.022 (0.014)	-0.002 (0.012)	0.004 (0.015)	-0.020 (0.010)	-0.003 (0.012)	-0.015 (0.009)
Household Own Commercial building (Dummy 1 if own building; 0 otherwise)					0.198 (0.133)	-0.141 (0.102)	0.197 (0.134)	-0.109 (0.02)	0.192 (0.133)	-0.147 (0.129)
Household Own non-agricultural land (Dummy 1 if own land ; 0 otherwise)					0.155 (0.180)	-0.045 (0.114)	0.149 (0.181)	-0.033 (0.085)	0.153 (0.181)	-0.069 (0.123)
Household Own log of agricultural land in acres					0.037 (0.064)	-0.019 (0.044)	0.033 (0.067)	-0.015 (0.035)	0.035 (0.071)	-0.029 (0.058)
Log of savings last year in Rupees					0.007 (0.016)	-0.005 (0.011)	0.001 (0.018)	-0.003 (0.009)	-0.001 (0.019)	-0.001 (0.013)
Log of loan borrowed last year in Rupees					-0.022 (0.012)	0.021 (0.007)	-0.027 (0.014)	0.014 (0.007)	-0.030 (0.014)	0.021 (0.016)
Mean of Household Head Age							-0.065 (0.021)	-0.026 (0.013)	-0.060 (0.023)	-0.017 (0.021)
Mean of Household Head Age Sq.							0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)
Mean of Household Size							0.351 (0.165)	0.120 (0.052)	0.304 (0.226)	0.081 (0.083)
Mean of Number of Children age 0 to 14 years							-0.322 (0.142)	-0.052 (0.046)	-0.277 (0.205)	-0.020 (0.073)
Mean of Number of Female age 15 to 30 years							-0.330 (0.224)	-0.104 (0.068)	-0.327 (0.236)	-0.010 (0.080)
Mean of Number of Male age 15 to 30 years							-0.562 (0.212)	-0.217 (0.102)	-0.489 (0.298)	-0.167 (0.163)
Mean of Household Own log of agricultural land in acres									-0.011 (0.045)	0.050 (0.032)
Mean of Log of savings last year in Rupees									0.007 (0.019)	-0.013 (0.015)
Mean of Log of loan borrowed last year in Rupee									0.022 (0.016)	-0.020 (0.018)
$F_{(df1,df2)}$ $p-value\ \ H_0: \gamma^2 = 1$	-	$34.83_{(1,7081)}$ (0.000)	-	$13.77_{(1,7071)}$ (0.000)	-	$15.13_{(1,7071)}$ (0.000)	-	$8.11_{(1,7060)}$ (0.000)	-	$3.76_{(1,7057)}$ (0.053)
$F_{(df1,df2)}\ 1st-Stage$ $(p-value)$	$14.92_{(2,7080)}$ (0.000)	$14.92_{(2,7080)}$ (0.000)	$5.86_{(2,7070)}$ (0.003)	$5.86_{(2,7070)}$ (0.003)	$6.71_{(2,7065)}$ (0.001)	$6.71_{(2,7065)}$ (0.001)	$3.55_{(2,7059)}$ (0.029)	$3.55_{(2,7059)}$ (0.029)	$1.59_{(1,7056)}$ (0.204)	$1.59_{(1,7056)}$ (0.204)
Number of Districts	81	81	81	81	81	81	81	81	81	81
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

CHAPTER EIGHT

CONCLUSION

The chapters in this thesis have studied the determinants of internal and international migration and the role of remittances. We investigated remittances at the different level of spatial aggregation and their multiplier effect. An important lacuna within studies of migration and remittances for Pakistan is the absence of high-quality data. Our study fills this gap by utilising household surveys, which are main data sources, used in migration and remittances research for other countries. The chapters in the first part of this thesis rely on data from household surveys collected by official International Food Policy Research Institute (IFPRI). Although the study includes questions on migration and remittances it was not designed to deal specifically with migration and remittances issues. The latter chapters rely on data from household surveys conducted by Pakistan Bureau of Statistics (FBS) as part of the United Nation 'Millennium Development Goals' (MDGs). A major item on the agenda of the United Nation is the poverty reduction strategy as well as development plans at the district-level. However, it also contains rich information on remittances that enables us to study the contribution of remittances at the district-level in Pakistan.

This final chapter of the thesis contains three sections. The first section provides a brief summary of the key findings from each of the four essays and highlights the contributions that each study provides to the current literature. The policy implications that arise from these findings are also discussed in this section. The second section outlines the limitations of the four essays, while the last section discusses some suggestions for further research in this area.

8.1 Major findings and policy implications

8.1.1 Chapter four

Using discrete choice models Chapter four investigates migration as a whole and then looks at the more disaggregate choice. Pakistan is an ideal site to study the migration and remittances due to its overall significance for many beneficiaries. Pakistan's rural economies are being transformed as non-migrants household integrate with migrants household in Pakistan and overseas. Household head and household level variables, including wealth, are expected to influence migration decisions via their effect on migration cost. The household level wealth provides the opportunity cost to households of allocating their members to migrate. We are not aware of any research in Pakistan that tests the effects of household wealth on internal-and-international migration. This is surprisingly in the light of interest at the household level in interaction between post-and pre-migration wealth and internal-and-international migration. We find evidence at the district-level that pre-migration landholding and migration may be substitutes to each other. Mora and Taylor (2006) argue that household head, family and wealth, as well as district-level variables are important for propensity to migrate, whether internal or international. Not including any these variables in the analysis is likely to result in a biased estimate of migration parameters.

Our migration as a whole includes a heterogeneous mixture of migration to internal and international destinations. Our results show that despite this heterogeneity, most household characteristics, pre-and-post migration wealth and regional characteristics are significant in explaining the movement of household members out of districts. Household head years of completed schooling and age capture life cycle and experience. We did not detect household head characteristics to significantly explain the migration process. Household heads are less likely to migrate than non-migrant household heads, which is consistent with the hypothesis that

household heads have farm specific and other management responsibilities, and thus a high opportunity cost of migrating. Children aged below 11 and females aged 12-30 reduce the probability of migration approximately 2% each member. This reflects the dependency argument. On the other hand, migration is positively associated with the household size. This is consistent with the household risk diversification strategy. Our results show that an additional household member raises the probability of migration by 3%. Interestingly, the number of male older than 12 years in the family is not significantly related to migration propensities when we control for all other variables in the model.

As the household pre-migration landholdings in acres decreases, the probability of migration increases. This is what we would expect if the household pre-migration landholdings reduce the demand for farm specific labour in rural setting or maybe to cover the cost related to migration through selling landholdings. Controlling for these sources of wealth, our variables of pre-migration money borrowed from informal sector and money borrowed from formal sector lower significantly the probability of migration. This finding may suggest that households need for raising loan through formal and informal sector is not supported by our results. As migration involves a risk of not returning and not paying off the loans, having an outstanding loan adversely affects the probability of migration, possibly because of the local lenders insistence to pay off the loan before taking up outside employment. Similarly, the post-migration landholdings in acres is not significantly related to migration, while it assumes now a positive relationship. Contrary to earlier findings, pre-migration money borrowed from formal sector, also assumes positive sign and is statistically significant. Thus, our results leave room for the possibility that the effect of loan on migration is ambiguous. The districts fixed effects show that the probability of migration is lower for poorer districts. The propensity to migrate is 13.7% lower for the poorest district of Badin than the base category of Faisalabad district. On the other hand, Dir district shows a 13.8% higher probability of migration than that of base category.

Multinomial logit results related to the alternative choice of migration reveal that the impacts of these covariates are not uniform across two distinct destinations of migration—internal and—international. The presence of children and females reduces the odds of internal migration by 11% and 20%, respectively. Interestingly, Multinomial odds of males are 19% higher to migrate internally. Household size significantly and positively explains internal migration. Pre-migration landholdings have a significant negative effect on internal migration. The propensity of internal migration decreases significantly with pre-migration money borrowed from informal sector. There is no significant evidence of post-migration initial wealth on internal migration. Only Badin district has a significant negative effect on internal migration than the relatively prosperous base category of Faisalabad district.

There is striking difference in the association between male and female for internal and international migration. Contrary to earlier findings, male and female are not statistically significant for international migration. However, household head education assumes positive correlation for international migration. Like internal migrants, international migrants are statistically positively related with household size and negatively with children. Pre-migration landholdings decrease significantly with an increase in international migration. The odds of international migration increase by 11% with an acre reduction in landholding. This is consistent with many past studies. This no doubt reflects the greater costs and risks for international migration. After controlling regional effects, contrary to internal migration, there is evidence that the districts Attock and Dir contribute substantially and significantly to international migration.

The wealth variables are for 1986 (or initial wealth), the year in which migration decisions are modelled in our analysis and they are predetermined variables. A significant proportion of household landholdings may be inherited to the households' decades earlier. It may still be argued that these variables (landholdings, money borrowed from formal and informal sectors etc.) are not truly exogenous that current migration are correlated with past migrations decision. To

address this concern, we generated the pre-migration and post-migration initial wealth variables by interacting migration and initial wealth variables. Secondly, they may be correlated with migration choices over time but that can be modelled utterly using panel data.

The other concern may be the initial wealth variables are correlated with other explanatory variables in the model. To investigate this possibility, we estimated the model without the initial wealth variables and our results do not change substantially. The omitted variables may be correlated with the observed covariates in the model, and this may lead to bias econometric results. We included the time fixed effects, and district fixed effects to control for unobserved regional and time differences that might affect migration decisions. All things being equal, we find that international migration probabilities tend to be higher in the district of Attock and Dir, and internal migration probabilities tend to be lower in the Dir district than in the Faisalabad (base) district. Only the Dir district dummy variable is significant in explaining internal migration. Similarly, the Attock and Dir districts are significant in explaining international migration only. We find that internal migrant households are not very different from the international migrant households, but wealth and districts (region) are discriminating factors.

The premise of this chapter is that the household, wealth, and community characteristics of migrants household are different than of those who stay behind. The present chapter includes two novel extensions of past empirical migration research. First, it takes into account both alternative destinations internal and international migration, versus non-migrant households, and pre-and post-migration wealth into a common empirical framework. To best of our knowledge, it is the first study for Pakistan at the household level considering both types of migration. Second, it includes both household-and district-level variables in the analysis along the lines of the New Economic of Labour Migration (NELM) theory, which states that migration (whether internal or international) decisions take place within the household. Past research on migration and remittances has had a country focus, and findings largely have been anecdotal (Mora and Taylor;

2006). The internal and international migration should be taken into account in a single study, otherwise; it may be that one looks at only one part of the story. Considering one form of migration without the other may result in a partial and unbalanced interpretation (King and Skeldon; 2010). Our aim in this chapter is not to test the validity of the one type of migration, but simply seek to examine how internal and international systems can be separated.

More importantly, we see that the selling of land is a fairly significant way of financing migration. This is consistent with other authors' findings, and the conventional wisdom. The insight of this analysis can be useful in making public policies. Government should facilitate greater movement of labour by reducing the cost of migration. The rural credit market should also be developed so that people can get affordable loans without having to sell land, which are vital assets for survival in rural areas. The other sets of government policy failure in rural areas of Pakistan include numerous development constraints directly linked with inadequate infrastructure, tenancy agreement (sharecropping versus fixed rent tenancy), undeveloped financial markets, non-existence of insurance markets, non-involvement of the private sector and targeted intervention by the state.

8.1.2 Chapter five

Continuing with the same data set as in the previous section, but making use of the remittances information, we estimate the determinants of remittances in rural Pakistan. The data panel contains information on 927 households over five years. However, it has one limitation that it does not distinguish between internal versus international remittances. By using support information on the migration status – internal or international—we could have distinguished between the sources of remittances; however, we have not done so. The International Monetary Fund (IMF) defines remittances as:

"*Personal transfers that consist of all current transfers in cash or in kind made or received by resident households to or from other non-resident households*".

The motivation behind using the Box-Cox double hurdle model in remittance studies is that there is a large cluster of zeroes denoting households receiving no remittances. In particular, the return on migration whether internal or international is given by the level of remittances, if one wishes to model remittances, they have to be aware of the large number of zeroes in the data. Due to the presence of zeros the Ordinary Least Square (OLS) estimator yields inconsistent estimates, hence we need to consider an alternative estimation approach. Next, we need to recognize the fact that some migrants may not remit at all, and it is only those who decide to remit that choose an optimal amount to remit.

The empirical results of the first hurdle determine the probability of receiving remittances using a binary dependent variable (D=1 if the household receives remittances and 0 otherwise), whereas the second hurdle shows the continuous choice of the amount of remittances (R^T, conditional for those household that receive remittances). The explanatory variables considered both for participation and the level equation in the analysis of remittance behaviours include household head characteristics (age, years of education), household level characteristics (number of children aged less than 11 years, the presence of males and females and household size), and the wealth status of the household (landholding in acres, money received from sale assets, and money borrowed from formal and informal sources). Further, it includes the future migration status of the household members (travelling outside and within a country), and the regional fixed effect.

Our results for household head age and education in participation to receive remittances are not significant. However, for level of remittances it is significant and positive. It is interesting to note that household head education and age (in years) appear to affect the level of remittances, unlike the participation results. Similarly, the variable capturing the dependence argument, as well as the ties between the migrant and the household, is the presence of children aged less than 11 years.

We find that presence of children in the household matters only for the participation to receive remittances, but for level of remittances it is not a significant determinant. Surprisingly, number of males is insignificant for the participation equation.

Interestingly, for both hurdles participation and level of remittances, the positive coefficient of the members traveling abroad (international migrants) and traveling in a country (internal migrants), and the negative coefficient of its squared, confirm that the extent of remittance increases at a decreasing rate. Moreover, the money loaned (in thousand rupees) positively affects only the amount of remittances, and not participation. This suggests that remittances also serve as an insurance mechanism for other households in rural Pakistan. Our model did not capture any wealth effect on the incidence and the amount of remittances received by a household. The fixed effects for region also capture the key differences in participation and level of remittances. The district Attock and Dir is only significant for the first hurdle 'likelihood to remit', whereas, the district Dir and Badin are only significant for the second hurdle 'level of remittances'. In the first hurdle the district Attock coefficient is positively, and the district Dir coefficient is negatively, related to the reference category (Faisalabad district). Similarly, for the second hurdle the district Badin coefficient is negatively, and the district Dir coefficient is positively, related to the reference category.

Household head age and household size significantly affect remittances decision and household head age seems to be an important determinant of remittances. Conditional upon participation, it is possible to identify that household head age and household size significantly affect remittances decision and household head age seems to be an important determinant of remittances. Our results clearly differentiate between the probability to remit, and the level of remittances received by the household. It is noted that there exist opposing effects of probability to receive remittances and the level of remittances at a district-level. A combination of household level observed

characteristics and regional variables are key to explaining the remittance behaviours in rural Pakistan.

Although there is extensive research on the issue of migration and remittances only a few of them is focused on this aspect in Pakistan by examining micro-level, which comes in the world top ten remittance receiving countries. The major part of the existing literature on remittances mainly concentrates on migrant transfer of remittances to Mexico, India, Philippine and China. Our analysis focuses on the remittances of migrants from traditional labour-exporting country. In addition to remittances received by the household in their country of origin, the data set allows us to check for the implication of remittances for further internal and international migration in rural areas. We fill this gap in the literature by analysing the determinants of remittances by employing the double-hurdle that determine the decision of migrant to remit and the level of remittances. There was a tendency in previous studies to adopt more restrictive models for binary or censored dependent variables to assess the determinants of remittances (Sinning 2011).

These results imply that migration motives are in line with the risk diversification strategy of the rural households for receiving remittances to their origin countries (Stark and Taylor 1989). It may be concluded that migration affects household income through remittances and also helps reallocation of the labour supply.

8.1.3 Chapter six

The chapter six examines whether the household propensity to receive internal and external remittances varies with household heterogeneity – observed and unobserved – in terms of their area of residence (village and district) by utilizing the multilevel modelling. We use the data from the Pakistan Household Integrated Economic Survey (HIES) of 2001-02, in which households are nested within villages and villages within district. The multilevel model is helpful to investigate links between individual, household, and community characteristics in determining remittances

(Massey, 1990). The econometric regression that we estimate relies on a five-level hierarchical model; however, of these five levels we postulate that only three have unobserved random heterogeneity. Hence, we name the model a 3-level nested model.

The main motivation is to find out whether the remittance pattern can be explained only by household characteristics, or also by heterogeneity at the community level, such as the village or district-levels. From the random unexplained heterogeneity at district and village level, we derive the intra class correlation (IC) of two selected random households between intra-and-inter-village, and their respective odds. The Intra-class correlation (IC) is the proportion of the variation in the remittances that occurs at the area level.

We first find that there are significant differences between determinants of internal and international remittances at different level of spatial aggregation. The determinants of internal remittances at the household level with regional fixed effects show that the household head age and gender, and the female and household size, all exert positive and significant effects, whereas adult male household members (aged 15-30 years), landholding and saving exert negative and significant effects. This is consistent with conventional wisdom. If there are more male members at home, or the household owns significant land, then the need for sending remittances back home is reduced. On the other hand, at the village level, again the presence of males in the household is significant and negative, whereas, average landholdings is positive and significant. This implies that households are in more need of additional resources to afford inputs and other expenditure related to raising the productivity of the land. However, at district-level only landholding is statistically significant, but negatively related to the internal remittances.

The determinants of international remittances at the household, village, and district-level with regional fixed effects explain some key differences, in contrast with earlier findings. The determinants of international remittances at household level show that the household age and gender, household size, landholdings and saving all exert positive and significant effect. Contrary

to earlier findings, landholdings and international remittances share a positive relationship. The village level only the landholding is significant and negative. Generally speaking, the effects of household characteristics tend to vary between internal and international remittances, and they too get further modified when we introduce regional fixed effects.

We also study the village and district-level unobservable heterogeneities. For this purpose we calculate the intra class correlation (IC) and odds of two randomly selected household's prospects of receiving internal and international remittances, in two distinct cases – in one, two households are located in same village within the same district (intra-village), and in the other, they are located in two different villages within the same districts (inter-district). Both cases are computed relative to how households located in different district (kind of an outside option). It is worth noticing that the intra-village IC and odds are higher for international remittances (IC: 0.34 and odds: 1.40) than the internal remittances (IC: 0.15 and odds: 1.16). The inter-village IC and odds are also higher for international remittances (IC: 0.18 and odds: 1.20) than the internal remittances (IC: 0.08 and odds: 1.08). The magnitude of inter-village IC and odds are lower than the intra-village for both cases—international and internal remittances. We then employ odds to compute the odds ratio, which allow us to compare within village between village variations. The ratio of intra-class correlation are (0.34/0.18) with an odd ratio of (1.40/1.20) for international remittances and (0.15/0.08) versus (1.16/1.08) for internal remittances. These results are useful to understand the importance of the village level network for information gathering and seeking insurance from each other, and also suggests that residence in a particular village may be a more important determinant of receiving remittances in rural Pakistan rather than membership in a particular household. It is, however, clear that intra-village variations are significant, and the occurrence of migration is more widespread in same villages than the different villages in Pakistan.

The results for both internal and international remittances in term of IC and OR indicate that households are at least more likely to receive international than internal remittances, once other factors are held constant. Not surprisingly, the internal remittances are less clustered within villages and more between villages than for international remittances, probably because of their differences in payoff and economic gains.

It may be concluded that the role of community migrant networks is an important determinant in the household probability of receiving remittances. In Pakistan's rural areas communities create very close ties in terms of loyalties, rights and obligations through exchange of remittances and information. The migrant networks link migrant and non-migrant households to form a sustained migration system, which further helps to gain access to that system, and our results, support the conventional wisdom.

The findings of the chapter provide important implications by suggesting that in addition to household characteristics, remittances may also be influenced by the community structure such as landholding, savings and loans. These interconnections among households and community-level factors determine remittances at each level. Most work on migration and remittances is based on the single level of analysis; however, less work has been done on interrelationships between levels. This analysis includes community characteristics that condition the effect of household variables to the remitter's decision.

This study provides evidence on how much random unexplained heterogeneity in remittances is explained at the village and district-level in Pakistan. Despite the massive migration from Pakistan that resulted in immense remittances the research is rather limited on how it has affected either rural migrant-sending communities or remittance-receiving communities.

The determinants of international remittances are somewhat different from the determinants of internal remittances. In general regional policies, infrastructure and village networks all play important roles in both fostering migration and encouraging remittances. What we see is that the

decision to send remittances is a complex one. Not only do the household characteristics matter, but the village and district-level heterogeneities also play some role. There are competing views related to the impact of remittances on the origin areas; however, remittances serve as an equalizing phenomenon in disparity of wealth, improving living standards and stimulating community development.

8.1.4 Chapter seven

In fourth chapter, we go beyond the existing literature to investigate multiplier effects triggered by remittances in rural Pakistan. We use the recent Household Integrated Economic Survey (HIES) for the period 2007-08. The research in the area of migration still lacks consensus on whether the migrant is drawn from rich households or from relatively poor households. In the literature the theory that states that migrants come from rich household, is known as the positive selection hypothesis, whereas the alternative theory is known as the negative selection hypothesis. However, whether the literature confirms the positive or negative selection hypothesis, most researchers have found that remittances are a poor-friendly mechanism that improves life conditions through indirect multiplier effects (Kapur and McHale, 2003; Borjas, 1987).

According to the multiplier or peer effects model, individual behaviour is a function of the characteristics or average behaviour of others in the group. The presence of multiplier or peer effects creates a "social multiplier" where aggregate coefficients will be greater than individual coefficients (Glaeser et al. 2003). Other multiplier effects in different areas have been found by a large body of recent work, which includes spillover effects of residential foreclosures (Towe and Lawley, 2013), peer effects in criminal behaviour (Drago and Galbiati, 2012), lower-achieving pupils (Duflo et al. 2011), peer behaviour in education (De Giorgi, et al. 2010), soft fruit pickers (Bandiera et al. 2009), grocery scanners (Mas and Moretti, 2009), neighbour labour-force

participation (Maurin and Moschion, 2009), peer effects in the workplace (Guryan et al. 2009), educational achievement among pupils (Graham, 2008), and playing partners abilities (Falk and Ichino, 2006). These seem to confirm spillover effects in a number of different areas. While taking into account of household level characteristics and wealth status, our unique data in the context of Pakistan allows us to compare the magnitude of multiplier effects across the different districts in rural areas to investigate whether the multiplier effects uncovered in the existing literature can be extended to this specific case.

Past empirical literature provides ample evidence on the direct impact of remittances on investment, consumption, and reduction in poverty in receiving communities. If remittances result in reducing inequality, then there is no doubt about the indirect effect of remittances in the origin communities. It may be concluded that remittances has an ability to produce the multiplier or peer effects (De Haas, 2007).

This kind of study suffers from two types of the problems. One is sorting, where migrant households may sort into a high migrant group (or district in our case), and another one is that the mean remittances at the district-level may be correlated with the error term. To address these issues, we control for an extensive set of fixed effects for districts, and asset holdings of household to account for potential sorting. Secondly, we use Graham's (2008) noble 'variance contrast approach' that helps in derivation of intra-and Inter-district square of remittances. This method takes into account unexplained district-level heterogeneity to quantify a more accurate magnitude of the multiplier.

Following Graham (2208), we work with mean of remittances in district, and manipulate the data in term of within-district (R_d^w) and between-district (R_d^B) deviation from the respective mean with the cross-district mean. In other word, within-district (R_d^w) is simply the within district sample variance of remittances, while between-district (R_d^B) is the square deviation of group average

remittances in the sample. This allows addressing issue of selection in our analysis. We employ a two-step GMM model. First, the within-district (R_d^w) remittances is regressed on the extensive set of covariates including instrumental variables and district fixed effects. Second, the inter-district (R_d^B) remittances is regressed on the instrumental variables for intra-district remittances (R_d^w) along with other control variables. In our estimation, R_d^w is instrumented with annual average rain fall and the number of hospitals in each district, and the outcome variable R_d^B is employed to calculate the social multiplier or spillover effect between-districts.

The estimate of social interaction (γ_0^2) in this case is approximately equal to 1.25, suggesting a social multiplier of 1.12.[60] The no social interaction null is rejected at the 5% level. The γ_0^2 parameter is identified in our estimation. The first stage F-statistics is over 30, which suggest that a weak instrument is not a concern. Our result suggests that a social multiplier in terms of remittances has contributed to the development of rural households of Pakistan. The heterogeneous nature of districts in Pakistan might give rise to efficiency because non-remittance receiving households benefit from social interaction with remittance receiving households. The positive multiplier effects indicate that households which receive remittances will improve the overall condition of other households, which do not receive remittances and effects will propagate throughout the district by resulting in multiplier effects of the exogenous change.

This study contributes to the existing literature by analysing the variation in remittance outcomes across districts or across subgroups of households within the districts. Our research is considered to be the starting point and should be regarded as an important example of how the social interactions' model could be applied to remittances.

60 Social Multiplier can be calculated by $\gamma_0 = \sqrt{\gamma_0^2} = \sqrt{1.25} = 1.12$

The findings of the chapter provide important policy implications by suggesting the appropriate steps that need to be taken not only at the district-level but also at the national level to divert remittances into more productive uses. The Government of Pakistan has already taken a positive step by setting up the Pakistan Remittance Initiative (PRI) in 2009 to formulate a comprehensive strategy aimed at greater commitment of the financial sector towards remittance services and efficiency of payment system infrastructure. Now the big challenge for PRI is to support initiatives and enhance savings and/or investments in projects, which promote development in rural districts. Even though we have identified a positive social multiplier in rural Pakistan, more need to be done to enhance the constructive link between Diaspora and development through the productive use of remittances.

There is a need for vocational and technical training institutes in rural areas to foster labour skills and knowledge to meet international labour standards. Furthermore, government should explore more legal channels to promote international migration in order to direct financial resource home countries in the form of in-kind and in-cash transfers. However, the scope and effect of such targeted policies are fundamentally limited. The contribution of remittances to the receiving community's development depends on the institutional environment, political trust, the law and order situation, the consistency of economic policies and stable investment climate and whether or not social protection is offered to people. This seems quite limited in context of Pakistan.

According to the alternative view by De Haas (2007: 26) "to a considerable extent, migration and remittances are a response to failing markets, institutions, nepotism and lack of meritocratic incentive structures, which tend to exclude non-elite groups from upward social and economic mobility". However, if government improves the provision of basic services for poor, this will result in substantial proportion of remittances for investment, instead of being spent on solely basic need.

8.2 Limitations of the research

This section outlines the limitations of each of the chapters, which support the need for future research opportunities discussed in the next section.

The rapid growth of remittances in Asia attracted the attention of the international policy circle, but the poor quality of earlier data poses a real challenge on the possibility of considering studies at the micro-level in receiving countries, especially in Pakistan. This research aims to address this data gap by providing an empirical analysis with a special focus on districts of Pakistan. We focus on Pakistan both because of data availability and because this is the source of the majority of remittances. There are several limitations of the study. First is the time period of the study. Although the data set is detailed, it relates to a time period that might be useful for policy formulation now, as the Pakistani economy has changed significantly and the flow of international migration has increased in recent years. The second problem is that the data was not rich enough to find migrant-specific information, though the household level information is very detailed. There is always a concern of reverse causality between migration and wealth. This means that migration variable may be predetermined and may be correlated with both past migration and the current wealth of household. In our analysis, we addressed this concern by including a measure of migration-wealth interaction in the year 0, to generate post-migration initial wealth variables and pre-migration initial wealth variables.

We use the cross-sectional data for the chapter six and seven. The definition of household includes either a single person or more than one person, who live and eat together, under the same roof and have no usual place of residence elsewhere. Absent members of the household such as internal or international migrants are not considered members of the household. If these members are present in the household at the time of the survey, then their income is included as either internal or international remittances received. Also, the data set does not include any information about the actual migrant. The only available information is the amount of remittances from a

member to the family. The households that do not receive remittances are due to not having a member migrated or having a member migrated but not receiving remittances.

The cross-sectional data is always subject to potentially severe biases in direction that are not obvious a priori. However, we use an extensive set of control variables to address this concern and also validated our results by incorporating fixed and random effects in chapter six. In chapter seven, it is difficult to separate the cross-sectional relationship between remittances and average remittances but the instrumental variable approach could separate that correlation (Yang, 2011). There is also a concern with identification in empirical research, especially when using cross-section data, because of the possibility that the group versus individual influences is likely correlated. The necessary condition for identification needs only one individual variable whose group level average is not an element of the individual behavior equation, and this average can be used for instrument. Furthermore, our paper follows the empirical estimation that is used in the Graham (2008) seminal approach (variance contrast framework) by achieving identification through covariance restrictions on errors.

8.3 Future areas of research

The chapters contained in this thesis suggest a number of areas of research that might be undertaken in the future. It is expected that chapter four and five will encourage further work in several directions. First, future research with even larger sample of Asian countries such as India, Bangladesh, Sri Lanka and Pakistan with more recent panel data may confirm or refute our findings. Given the differences in size and extent of remittances inflows in rural Pakistan may not inferable to developing countries. The further work should include and compare both types of migration (internal and international) in a single study and contrast the relative importance of each in understanding the determinants of migration. It would be more interesting to explore the role of internal migration in international migration. It may be possible that internal migration result in international migration. Finally, it would be more interesting to have a data with

complete migrant-specific information, wealth status prior to migration, cost of migration and sources to finance it.

The findings of the chapter six reinforce the argument of the Massey (1990) that multilevel model is helpful to investigate links between individual, household, and community characteristics in determining remittances. The essay shows that how importance it is to includes regional level variables and measuring the extent of unexplained heterogeneity. Therefore, from methodological viewpoint, the analysis used in the chapter can be extended to assess the role of remittances among South Asian countries. Further research should present more cross-country evidence using state level data. Finally, our results highlight the importance of village and district-level information in the analysis of this kind of studies. The future surveys should include the extensive set of information at each hierarchical level such as; infrastructure, major economic activity in the area, basic needs facilities, and financial sector. For such data it is important that statistical model fitting takes account of these hierarchies, since failure to do so can result in inefficient and/or inconsistent parameter estimates. This is true for both observed variable models and latent variable models (Goldstein and McDonald; 1988).

It would be interesting to observe the social interaction between migrants that how the decision of sending money to their home countries effects the behaviour of peers. Is there a pressure or peer effect that derives other migrants to remit home? The lack of data on migrants implies that we cannot observe the multiplier or spillover effects of remittances between remitters. However, we can observe the multiplier or spillover effects of remittances between remittance receiving households in different districts of Pakistan, since the data set does contain relatively good data on remittances, including those remitted in cash and in kind and the frequency with which remittances are received.

The United Nation 'Millennium Development Goals' (MDGs) will expire at the end of 2015. A major item on the agenda of the United Nation is the poverty reduction strategy as well as

development plans. Although the MDGs did not contain any target setting on migration and development. It is anticipated that the United Nations development agenda (post-2015) will set clear targets and mobilize global action to improve not only the quality of the migration process, but also enables researchers to benefit from the new data sources on both countries of origin and destination. However, the Migration Policy Institute (MPI) and the International Organization for Migration (IOM) highlights three areas that require specific attention for the United Nations development agenda (post-2015): (1) fostering partnerships to promote development, (2) promoting and protecting migrants' rights and well-being, and (3) reducing the costs and risks of human mobility.

This thesis has merely outlined the broad contours of migration and remittances in Pakistan. It has drawn on available data and analysis, as well as to provide new evidence in some instances. There is a need for more in-depth and focused policy-oriented research on diverse aspects of migration and remittances. Some of the themes and issues identified here – such as the importance of migration cost, and the gap between internal and international migration – indicate that there is much scope for multi-disciplinary approaches such as multilevel model and variance contrast approaches to understand issues of migration and remittances in fullest. It is also possible to extend existing findings and conclusions drawn with richer data set by further work. It may be concluded that the thesis considers a long time-1986-2008--, to study migration and remittances for Pakistan. Household level certain variables seem to be robust over time. Financing migration is important in rural areas. There is a need for reduction in social cost of migration. Village and community-level variables are equally important in the studies of migration and remittances. There is an evidence of multiplier effects of remittances in rural areas. There is a policy implication for government to strengthen community development in migration base areas to maximize the benefit of remittances.

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