Impact of Temporary External Migration & Remittances on Child Health Outcomes in Punjab

Mydda Aslam

Research Supervisor: Rabia Arif

Thesis submitted to the Faculty of the Graduate School of the Lahore School of Economics, in partial fulfillment of the requirements for the degree of M.Phil. Economics
2017

ABSTRACT

Temporary migration in developing countries like Pakistan is generally in response to the income constraint faced by the households. In an attempt to relax the resource constraint, migrants tend to remit back to their families of origin. This study attempts to look at the impact of temporary external migration and remittances on the health outcomes of children as measured by height-for-age z scores (HAZ) and weight-for-age z scores (WAZ) in Punjab. Early growth indicators of children under five years of age are the focus of this study. Further, we test for the presence of intra household resource allocation bias where boys get preferential treatment in term of health care as compared to girls. The data has been taken from Multiple Indicator Cluster Survey (MICS) 2011, Bureau of Emigration and Overseas Employment and State Bank of Pakistan. The study employs an Instrumental Variable Approach with Two Stage Least Square and Instrumental Variable Approach estimated through Treatment Effect Model. Historic migration rates and number of banks in each district is used as an IV for external migration and remittances from overseas. Our results suggest significant and positive impact of external migration and remittances on both the indicators of child health outcomes (Height for Age z-scores and Weight for Age z-scores). Further this study confirms the presence of increased bargaining power of women in households headed by females where there is an increased spousal control over the allocation of resources. In Pakistan, mostly the households are headed by male members and their absence due to migration gives the female spouse a greater command over decision making process resulting in a greater share of resources being spent on girls relative to boys.

Keywords: External migration, Child Health, Health Outcomes, Resource Allocation Bias, Treatment Effect Model, Bargaining power.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Ms. Rabia Arif (Assistant Professor at Lahore School of Economics) for her guidance and support throughout the entire thesis process and for providing me with constant feedback. I would also like to thank Dr. Azam Chaudhry (Dean of Lahore School's Economics Faculty) for his continuous guidance; Dr. Theresa Thompson Chaudhry (Assistant Professor at Lahore School of Economics) for her valuable comments during the presentations. Lastly, I would like to thank my parents, family and my husband for their continuous support and encouragement.

ABBREVIATIONS

HAZ	Height-for-Age
WAZ	Weight-for-Age
MICS	Multiple Indicator Cluster Survey
WHO	World Health Organization
OLS	Ordinary Least Square
IV	Instrumental Variable
2SLS	Two Stage Least Square
FE	Fixed Effects
TEM	Treatment Effect Model

LIST OF TABLES

List of Figures

TABLE OF CONTENTS

Table of Contents

1. INTRODUCTION

Migration is a phenomenon that has varying impacts on individuals, families, economies and culture both in the host and destination country. The implications of migration on economies vary according to the prevailing socioeconomic conditions of host and destination countries. Generally, the income differentials that persist between developed and developing countries is a major reason for external migration. Pakistan is considered to be one of the populous countries in the world with rising labor force. Over the past several years, migration from Pakistan to other developing countries is aimed at seeking better economic opportunities and improving the lives of the families left behind. There are several push and pull factors that cause the overseas migration. In Pakistan, economic calamities and political turmoil is considered to be one of the push factors that cause external migration (PILDAT, 2008).

From a microeconomic perspective, effects of migration on households and communities can be complex. Generally individuals migrate because of economic constraints or lack of access to the credit markets in the home country. So migrating individuals tend to maintain economic interactions with the families left behind (Stark & Bloom,1985).These interactions are in terms of remittances which help families ease their credit constraint and to enhance the level of investment in the human capital of children left behind. Moreover, when parents migrate the time investment in raising children will also decrease which will affect their functioning throughout their lives (Chen,2006).

Human capital of children left behind is affected by migration in several different ways. Child's health and nutrition is one aspect of human capital which has gained a lot of attention. Lack of nutrition early in life during the developmental period can have severe consequences for the child in the long term. Several studies state that child's health can have implications for educational outcomes later in life for children in developing countries like Pakistan (Alderman et al.,2001).

Pakistan is a developing country where along with other social problems, child malnutrition and high infant mortality is widespread. Malnutrition among children has several health effects which include increased risk of illness and lower levels of cognitive development. Child malnutrition poses threat to physical and mental development at early age which consequently results in lower educational attainment later in life (Chirwa & Ngalawa,2006).Pakistan's performance regarding the child nutritional status is not satisfactory and the measures of nutritional status of children less than five years of age, stunting and wasting, have shown a deteriorating trend over the years(Arif et al.,2012).

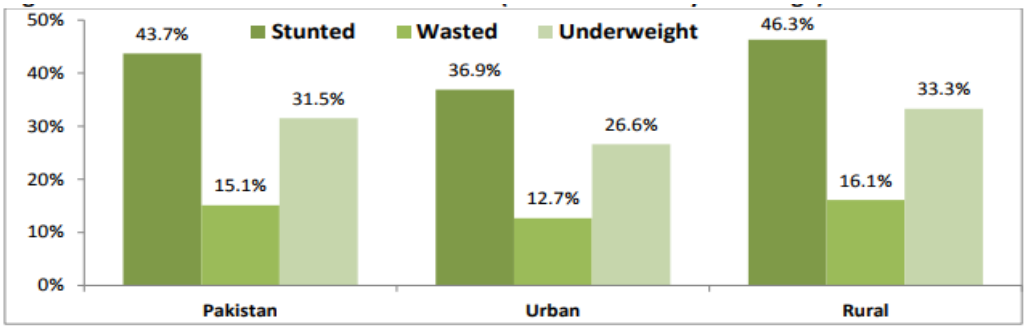
According to World Health Organization, stunting is characterized by impaired growth and development that children experience from under nutrition and repeated exposure to infections which then results in a lower height for age. Whereas wasting is a symptom of acute malnutrition due to insufficient food intake and high incidence of infectious diseases resulting in a lower weight for age for a particular child (WHO, 2010). In Pakistan, about 35% of child deaths are linked to malnutrition (UNICEF,2011).

The state of child health conditions in Pakistan have been at the periphery of developmental landscape. Pakistan has the eighth highest newborn death rate in the world where from 2001-2007, one in every ten children born died before reaching the age of five years (Afzal & Yusuf, 2013). Pakistan's performance in achieving MDGs related to health conditions of children is not satisfactory. In South Asia, Pakistan has highest mortality rate for children and women. According to the recent estimates, in under five category, 38 percent of children are underweight while 12 percent are severely underweight (Khan,2012).

In a developing country like Pakistan, the most significant social issue is the prevalence of child malnutrition. Child malnutrition is a key factor that leads to illness and death among young children and it's considered to be an important factor causing half of the deaths of children globally (Cheah et al., 2010). According to the report issued by UNICEF, 1200 children under five years of age die every day in Pakistan and more than a third of these deaths are related to malnutrition. Around 43% of the children

suffer from chronic malnutrition and more than 15% from acute malnutrition (UNICEF,2012). According to the National Nutrition survey held in 2011, indicators of malnutrition including stunting and wasting had worsened since 2001 survey.

Figure 1: Prevalence of Malnutrition of children (0-59) months in Pakistan



Source: National Nutrition Survey (2011)

Figure 1 shows the prevalence of malnutrition in Pakistan for children less than 5 years of age issued by National Nutrition Survey (2011). The figure clearly demonstrates the prevalence of stunting and wasting for both the rural and urban areas of Pakistan where stunting is higher in rural areas as compared to urban areas. Stunting reflects long term nutritional status of children and its adverse effects are expected to continue throughout life. The above figure shows that the around 46% of stunted children are residing in rural areas as compare 37% in urban areas. These figures clearly demonstrate that the children living in rural areas are more likely to be severely malnutritioned because of lack of availability of resources in those areas.

1.1 Objectives of the Study

The purpose of this study is to unveil the impact of temporary external migration and remittances separately on two indicators of child health outcomes (weight for height z-score and height for age z-score).There is a vast majority of evidence regarding the migrants remitting back to source country. These remittances help to ease the credit constraint of the households in the receiving country. Several studies confirm the fact that remittances received by the households are spent on consumption of goods and services along with human capital accumulation(Cox & Ureta,2003;Hanson & Woodruff,2003;Yang

,2004 ; McKenzie and Rapoport ,2005; Acosta,2006; Mansuri,2006; Arif & Chaudhry, 2011). The purpose of this study is to examine the impact of migration and remittances on one dimension of human capital i.e. child health outcomes. Further based on the recent work done in context of intra-household resource allocation where substantial male preference is persistent, this study tries to establish that whether in migrant and remittance recipient households, the persistence of intra-household resource allocation bias is reduced when households have more access to credit or whether the opportunity to migrate bring any extra benefits to girls in terms of health care in the origin households.

This paper is divided into five sections. After the introduction, the second section gives a brief review of the existing literature focusing on the impact of migration on indicators of child health outcomes. Third section discusses the theoretical framework of the study followed by the econometric model in the fourth section. Section five discusses the hypothesis of the study. Section six outlays the methodology and specification issues followed by the source and limitations of the data and in section seven quantification of each of the control variables are explained. In section eight, we present the basic descriptive statistics. Section nine consists of the main results followed by conclusion and policy recommendations in section ten.

1.2 Rationale of the study

There is not much research done focusing on the impact of migration and remittances on child health outcomes in Pakistan. The existing set of studies relating migration and child health have used different instrumental variables (IV's) to deal with the problem of endogenity inherent in this kind of analysis. Endogenity issue arises when the covariance (x, u) is not equal to zero where we assume that there are some unobserved variables that we cannot control for are in the error term that influences our outcome variable child health and our explanatory variable external migration. As the unobserved variables are now there they become correlated with external migration (McKenzie & Sasin, 2007).In order to deal with the problem of endogenity, this study will make use of Instrumental Variable Approach using IV's for external migration and remittances from overseas. This paper has used both of these

instrumental variables for the first time in context of migration and child health outcomes in Pakistan which we think are better than those IV's previously used in this kind of analysis. An important aspect of the voluntary act of migration is the monetary amount being remitted back to the host country. Pakistan is a developing country where households face a lot of credit constraint. So this study tries to explore the impact of remittances on recipient households in terms of investment done on child health outcomes. With the availability of monetary income, households experience ease on their credit constraint and tend to invest in human capital of their children.

2. LITERATURE REVIEW

Several studies have looked at the impact of external migration and remittances on child health outcomes. Most of these studies confirmed the idea that generally remittances ease the financial constraint of the households in the origin country by providing them access to credit where remittances act as a mechanism to smooth consumption pattern of the households but on the other hand due to the process of migration, the absence of parents generally leaves children with access burden and further the lack of monitoring makes children worse off. With the father's migrating, there is an excess burden on mother's within the household increasing work load for them and leaving less time to care for children leading to mother's unavailability.

2.1 Impact of Migration and Remittances on Child Health Outcomes

Several studies have looked at the impact of remittances on child's health using anthropometrics measures. Acosta et.al (2007) examined the relationship between remittances and child's health using anthropometric measures i.e. weight for age and height for age z-scores in Latin America. By employing multivariate analysis on children less than five years of age, they concluded that children in remittance recipient households are far better than children in non-recipient households.

International remittances are considered as an important source of relaxing income constraint of the migrant households. De & Ratha (2012) in a study used household data from Sri Lankan Integrated survey to see whether remittances reduce income constraint of the recipient households. Further they looked at two other important aspects i.e. health and education of children in recipient households and whether these households spend on durable asset and land. By using the matching estimator's technique, the study found that remittance income improved child's health outcomes i.e. weight, height and BMI but there is no such evidence that households use remittance income to buy durable assets.

In a research report on Albania and Macedonia, countries that are characterized by high emigration rate and remittance dependence, the authors examined the impact of migration on child health

status using survey data from households in both countries. For both countries, child health indicators (BMI, weight, height, stunting and obesity dummies) were regressed against the household's migration status, mother's migration and remittance receipts. The results of the study indicate that migration has positive effect on child health in Albania and it negatively affects child health in Macedonia. The difference in results could be due to the differences in destination countries to which they migrate (Albanian Centre for Socio-Economic Research, Impact of migration on child growth in Albania and Macedonia, 2013).

Ponce, Olivie & Onofa (2011) evaluates the impact of remittances on health outcomes in Ecuador. An instrumental variable approach is applied by using two IV's: a vector of variables that include two dummies for the source country (Spain and United States) and availability of banks and money transfer institutions. The results of the study indicate that remittances do not have a significant impact on child health outcomes but it does impact the health expenditures i.e. medicine expenditures which people make when they are sick. It indicates that remittances are used for emergency situations and not for preventive measures.

Mansuri (2006) in a study examined whether resource inflows due to migration allow households to provide better health care and nutrition to girls. Intra- household resource allocation shows gender differences in the allocation of resources whenever household face income shocks. Using Instrumental variable approach, the study concluded that migration has a substantial impact on child health outcomes (weight for age and height for age z-scores) for young girls.

Impact of migration both in terms of remittances and whether the family has a migrant member have an impact on child health outcomes. Hildebrandt et al. (2005) examined the impact of migration on two indicators of child health: infant mortality and birth weight. Using the instrumental variable approach where historic migration networks and pattern of development of railroad system are used as an

instrument for current level of migration, study concludes that migration from Mexico to United States improves child health outcomes resulting in lower infant mortality and higher birth weight.

Migration can effect child health in two ways; firstly by sending a migrant member, the household's expect to increase the level of income through remittances and secondly when parents migrate, children experience parental absence in terms of either mother, father or both migrating. Langworthy (2011) estimates the relationship between remittances and parental time on child health as measured by height for age and weight for age z-scores. The results indicate that both remittances and parental time have implications for child health. Parental absence has negative impact on child health which could only be compensated if migrants send significant amount of remittances back home.

Hamilton & Choi (2014) examined the relationship between migration and infant health in Mexico. Although the absence of the household head and other community members results in lowering the household income but on the other hand, the tendency of the migrants to remit can reduce this negative impact. Their study looked at the impact of migration on infant health using an additional measure of health i.e. macrosomia (heavy birth weight) in additional to the traditional measure of infant health, low birth weight. In order to explore the association between various dimensions of community-level migration, they link the community data from Mexican census, 2000 with the Mexican birth certificates for the year 2008 & 2009. Their study found that impact of migration on health differs depending on the dimension of migration and measures of health being used. The community remittances and return migration are associated with lower risk of low birth weight but they are associated with higher risk of macrosomia. On the contrary, out migration is linked with lower risk of macrosomia but higher risk of low birth weight.

The impact of migration on child health could be due to the benefits that accrue to migrants or it could be the result of positive health selection of migrants. By using binational data from Mexico and US, Hamilton & Choi performed selection analysis and concluded that infants born to Mexican immigrants

have birth weight lower than the infants born to US born mothers and their birth weight is lower as compare to their counterparts born in Mexico. They further confirmed the selection hypothesis by stating that Mexican migrants originate from areas that are advantaged in terms of infant health.

In a study done by Frank & Hummer (2002), they analyzed the relationship between U.S. migration experience and the risk of low birth weight by using ENADID 1997 which is large nationally representative data set of Mexican population. The main aim of the study is to understand that whether migration process affects the risk of low birth weight among children left behind. Their study incorporates low birth weight rather than infant mortality as a measure of health because of the lack of data on infant deaths. By applying logistic regression analysis, their study concludes that having membership in migrant household reduces the risk of low birth weight.

UNICEF considers infant mortality as one of the indicators which determines the degree of socio economic development within a country. Narazani (2013) in a study examines the role of migration in reducing infant mortality in Albania. Albania went through a major reduction in infant mortality in the last two decades. Using the Albanian Demographic and Health Survey (2008-09), the study looked at the impact of migration on fertility decisions and infant mortality. The results suggest that migration has no significant impact on fertility decisions but in case of infant mortality, estimation shows that migrant households have lower levels of infant mortality than non-migrant households.

Several studies have looked at the impact of migration on health and infant mortality where the change in economic resources and investment patterns improve the recipient household socioeconomic conditions. Kanaiaupuni & Donato (1998) examined the relationship between migration and infant mortality by using the data collected from 25 Mexican communities. The results indicate that as migration grew initially, absorbing large number of community members, infant mortality worsened but this effect reversed as migration advanced in origin communities. With migrants remitting $10,000 , infant mortality improved. Another study by Lopez-Cordova (2006) estimates the relationship between

remittances and child health in Mexico and concludes that a 1% increase in the recipient households income share reduce the level of infant mortality by 1.2 per thousand.

Apart from the male migration, female migration can also have significant impact on child's health. SSENGONZI et al. (2002) in a study examined the relationship between migration and child health where mothers are migrants. They looked at the impact on child health in terms of parental absence and not in terms of remittances. Further they not only looked at the rural-urban migration but dimensions of internal migration. Using the Logistic regression analysis, they examined whether the migration status of the mothers improve the survival chances of children (0-5) years of age. Results indicate that only urban-urban migration is significantly related to child survival when compared with rural-urban migration. On the other hand, migration status only explains a small part of the variation in child survival where other factors including parental education, household size, place of delivery etc. significantly contributed to child survival.

In a cross sectional survey in rural china, Jia et al. (2010) compared the health related quality of life of children left behind without having constant parental guardians with those of their counterparts. They examined 640 children aged between 6 to 14 years using stratified two stage cluster survey. They assessed health related quality of life in 606 participants using pediatric quality of life inventory. Pediatric quality of life inventory is a survey instrument which measures the physical, emotional, social and school functioning of children and is reported as the best instrument for measuring health related quality of life. The results indicate that children left behind report poor health related quality of life than their counterparts due to psychological dysfunctioning.

There are no theories which specifically focus on the impact of migration and parental absence on child well-being but if we look at the psychological effects, attachment theory is assumed to play its role. Attachment theory basically focuses on the significance of a having a receptive and sensitive caregiver. Generally mothers are assumed to have both of these characteristics but other family members can also

play this role. In the absence of such a caregiver, children experience distress which is evidently visible in younger children in form of anxiety, anger and sadness. Whereas in case of older children, detachment for a longer period of time results in weakening the bond between the child and the care giver. This theory highlights the importance of attachment and emotional bonding which plays a significant role in child's development over the years (Dillon & Walsh, 2012).

The impact of father's absence due to migration on child health is not studied much in literature. But on the other hand, several studies looked at the impact of father's migration on child health in terms of remittances. Father's migration can have both positive and negative effects on child health. Schmeer (2009) in a study utilizes longitudinal data from Mexico to assess the impact of father's migration on child's illness in rural households. Mexico has a high rate of migration and father's absence which is particularly associated with migration. Moreover, rural Mexico provides a setting where child illness is associated with serious health problems. The study estimates the relationship between father's absence and child illness using state and individual level fixed effects. The sample chosen for the study includes children aged (0-5) years and the measures used for child illness includes any illness and diarrhea .Both the state and individual level fixed effects support the findings that odds of children being ill are higher when parents are absent in the household.

Parental migration is often associated with mother, father or both migrating in search of better job opportunities leaving their children in care of others. Mostly this phenomenon of parental migration is seen in terms of parents remitting back to the country of origin but little has been discussed in terms of its impact on children left behind. Adhikari et al. (2012) studies the impact of parental migration on the physical health of children left behind. The study uses data from 2007 survey of migration and health form Kanchanaburi, Thailand and a total of 11,241 children were included in the survey with one or both parents migrating. Both bivariate and multivariate analysis indicates that having a single parent migrated is associated with higher likelihood of illness than with both or no parent migrating.

Robson et al. (2008) investigated the impact of parental absence on nutritional status of children left behind who are younger than 7 years of age in some rural places in china. Their study basically highlights a very important aspect of a country like China which is growing very rapidly but it ignores the basic principle of family life. Using two stage stratified cluster and random sampling technique, authors constructed a food frequency questionnaire which provides long term nutritional information of the children. Several anthropometric measures including weight for age z-scores and height for age z-scores are used in the analysis. Results of the study suggest that the nutritional intake of children left behind is relatively low and they have poor nutritional status than children living with their parents.

The existence of large rural urban differentials in child mortality in several developing countries is an incentive for rural families to migrate to urban areas in order to reduce the level of infant mortality and to improve their child's health. Brockerhoff (1994) in a study estimates the relationship between maternal rural urban migration and the survival chances of children under two years of age using the Demographic and Health Surveys in 17 countries in 1970s and 1980s.The results indicate that children whose mothers have migrated have higher levels of infant mortality than children of women who stayed back in the village. Another implication of the study is that children who are born to migrant mothers already settled in urban areas have better survival chances and lower infant mortality than non-migrant children in rural areas.

The impacts of migration at different levels can have varying consequences for child health. A study explores the relationship between U.S. migration and infant mortality outcomes that are measured at individual, community and household level. Using multi-level regression models, the migration of mother in a household is associated with lower odds of infant mortality in both rural and urban Mexico. At household level, migration has mixed effect on infant mortality but community level migration have no relationship with infant mortality in urban places but in rural areas, community level migration is associated with lower levels of infant mortality (Hamilton, Villarreal & Hummer,2009).

3. THEORETICAL FRAMEWORK

Impact of migration on child wellbeing can be identified through many potential channels. The Grossman's Model of Health Production Function provides a framework for how age, education, health status and income influence the production of health through the demand for health capital. Grossman's model is based on the idea that how consumer's allocate their resources to produce health. According to this model, health of a particular child i at a time t can be represented as:

$$H_i = F(M_i , K_i , T_i , B_i , \varepsilon_i) \quad (1)$$

Where M_i represents the nutritional and medical inputs into the health of the child *i*, T_i shows time inputs of the parent, K_i is the parental health knowledge, B_i is the genetic endowment and ε_i is the random health shock. In Grossman's model, health is considered both as an investment and consumption good. The impact of migration on child health could be seen as changes in M, either by changing diets or access to health care or changes in K when migrating parents gain more knowledge when abroad(Stillman,2009).The changes in M could only be brought if the income level changes for a household. The availability of financial resources could not be directly incorporated into the production function but can only be seen by changing either M or T. Changes in income will relax the financial constraint of the household and will help in purchasing better and more nutritious inputs (Hildebrandt & McKenzie, 2005).

4. ECONOMETRIC MODEL

In order to assess the impact of migration and remittances on child health, Grossman's Model of Health Production Function provides a basic framework in order to gauge the impact of age, parental education, health status and income of the households that might influence the production of health through the demand for health capital. Following the Grossman's Model, we can derive an econometric model relating the child's health with the migration status of households. A simple version of equation (1) where the health of a particular child i at a time t can be represented as:

$$\mathbf{CH_{it}}=\mathbf{X_{it}}\boldsymbol{\beta_t}+\mu_t$$

Where $\mathbf{CH_{it}}$ are the child health variables i.e. HAZ and WAZ. The vector $\mathbf{X_{it}}$ includes all the control variables which might influence the health of the child. These control variables include individual characteristics of the child, maternal characteristics, health inputs, household characteristics, health environment, parental health knowledge, household's asset composition and locational/geographical characteristics. Child's individual characteristics include the age and gender of the child. Both of these variables helps in determine the health status of a child. Pakistan is a developing country where there is a presence of gender disparity among boys and girls, so the gender dummy has also been incorporated into the analysis in order to see which gender's health is being mostly compromised or benefited by migration of the household member.

Maternal characteristics are an important indicator that impacts the health of the child. Educated mothers can have better knowledge of the child rearing practices which helps them in raising healthier children (Glewwe,1999). Along with the mother's education, information regarding mother's marital status has also been included into the analysis. Family disruptions like divorced mothers or households with solo female heads can have an impact on the child's health. So such

variables have been added into the analysis to see the impact of such family composition on the health of the child (Hamilton & Choi, 2015). Majority of the literature has talked about child health being influenced by household characteristics which include the father's education, households total income, the total number of household member's, the number of younger children in a household and the number of children dead in a particular household. As MICS doesn't provide any information regarding the father's education, so we have used household head's education as a proxy for father's education. The household income is likely to have an impact on child health status as it intitutively suggests that family's income is a proxy for household available resources and higher income is likely to result in more expenditure devoted to health inputs and consequently improved health outcomes. The relationship between household income and child health is also termed as "income gradient". The literature has found an ambiguous relationship between child health and family income primarily because of the causal link between the two. Kuehnle (2014) finds a significant positive relationship between income and child health by employing an instrumental variable technique to cater to the causal link and endogeneity between household income and child health even after controlling for maternal education. Our dataset has no question that inquires directly regarding the total household income, so we have used the wealth score and household's asset composition as a proxy for household income. The wealth score is being constructed using Principal component analysis using information on consumer durables, dwelling characteristics and all other factors that might determine the household's wealth status (MICS, 2011). The number of children under five years of age and the total number of children surviving might actually acts as a constraint on the household's present resources so both of these variables have been included into the analysis.

Health inputs which are being provided to the child at the time of delivery or at an early age acts as important indicators for the health of the child later in life. Health inputs which include whether the child has been delivered by a doctor, whether he/she has been breastfed by the

mother or has received all the vaccines have been incorporated into the model. The purpose of adding these health inputs into the analysis is to see the impact of these early life health inputs on child's health later in life (McKenzie, 2004).

In order to assess the knowledge of household members regarding health, we have incorporated few variables into our analysis that directly gives us idea about how conscious the individuals are regarding health related issues. This health related knowledge of the parents is linked to the health of their children as parents are the prime care takers. Our data suggests that only 31% of the households are aware of HIV/AIDS and very few people are aware of basic health necessities like treating water before making it available for drinking ((Chaudhry & Afzal, 2012).The health related knowledge is beneficial for the child's health but such knowledge is not acquired directly through education of the household members but it could substantially raise awareness regarding child health and nutrition (Glewwe, 1999).

Locational or geographical factors play an important role in child health so they are incorporated into the analysis. We have added urban dummy into the analysis to see the impact on child health if the households are located in urban areas. This locality factor is important because households located in urban area or city has more access to health facilities like hospitals or child health clinics where accessibility is not an issue in case of emergency. Moreover, urban areas are better equipped with basic health facilities as compared to rural areas. So households located in urban areas are generally better off in terms of providing basic health facilities to children.

Household income is an important indicator which helps to ease the credit constraint of the household members. Income earned by individuals is used for consumption purposes as well as on expenditures that are required to be done in case of emergency situation. Our dataset does not

provide any information regarding the income earned by the households so we have added asset composition of the households as well as wealth scores that act as proxy for household income (Chaudhry & Afzal, 2012).

After incorporating all of the variables discussed above, following equations can be estimated:

$$CH_{ghi}=\beta o + \beta_1 C_{ghi} + \beta_2 M_{ghi} + \beta_3 HI_{ghi} + \beta_4 X_{hi} + \beta_5 V_{hi} + \beta_6 W_{hi} + \beta_7 U_{hi} + \beta_8 EM_{ghi} + \mu_{ghi} \quad \textbf{(i)}$$

$$CH_{ghi}=\beta o + \beta_1 C_{ghi} + \beta_2 M_{ghi} + \beta_3 HI_{ghi} + \beta_4 X_{hi} + \beta_5 V_{hi} + \beta_6 W_{hi} + \beta_7 U_{hi} + \beta_8 R_{ghi} + \mu_{ghi} \quad \textbf{(ii)}$$

$$CH_{ghi}=\beta o + \beta_1 C_{ghi} + \beta_2 M_{ghi} + \beta_3 HI_{ghi} + \beta_4 X_{hi} + \beta_5 V_{hi} + \beta_6 W_{hi} + \beta_7 U_{hi} + \beta_8 EM_{ghi} + \mu_{ghi} \quad \textbf{(iii)}$$

$$CH_{ghi}=\beta o + \beta_1 C_{ghi} + \beta_2 M_{ghi} + \beta_3 HI_{ghi} + \beta_4 X_{hi} + \beta_5 V_{hi} + \beta_6 W_{hi} + \beta_7 U_{hi} + \beta_8 R_{ghi} + \mu_{ghi} \quad \textbf{(iv)}$$

The above equations incorporate all the factors that might influence the child health**.** We have incorporated all the controls in all equations. Equation (i) looks at the impact on child health when we have an external migrant in the household. Equation (ii) looks at the impact of remittances on indicators of child health. Equation (iii) & (iv) looks at the impact of migration and remittances on two indicators of child health separately for boys and girls age (0-59) months. For this purpose, we have divided the dataset for boys and girls and then run the regression separately for two groups in order to see whether migration and remittances affect male child differently as compared to female child in a migrant household.

$\mathbf{CH_{ghi}}$ looks at the health of child g in household h living in a district i. $\mathbf{C_{ghi}}$ is a vector of child characteristics, $\mathbf{M_{ghi}}$ is a vector of maternal characteristics, $\mathbf{HI_{ghi}}$ is a vector of health inputs, $\mathbf{X_{hi}}$ is a vector of household characteristics, $\mathbf{V_{hi}}$ is a vector of health environment prevalent within a

household, $\mathbf{W_{hi}}$ is a vector of parental health knowledge, $\mathbf{U_{hi}}$ is a vector of household's asset composition.

$\mathbf{EM_{ghi}}$ is introduced to incorporate the effect of external migration which is a dummy variable equals to 1 if we have an external migrant within the household and $\mathbf{R_{ghi}}$ stands for remittances from overseas which is a continuous variable and captures the impact of monetary amount of remittances received by households.

We have incorporated all the above mentioned variables along with external migration and remittances from overseas into our analysis. The external migration variable is going to have a dual impact on child health where migration of one or more family members or in case of parental migration where father, mother or both have migrated disrupts the family life and would have negative impact on child health. On the other hand, migrant families are receiving monetary benefits when migrating members send remittances from abroad. We have incorporated both of these effects along with the impact of monetary amount of remittances received by households. Our analysis will take into account all of these factors while determining the impact of migration and remittances on child health. MICS (2011) does not provide any information regarding which family member has migrated and to which city or country. So our analysis does not incorporate the effect of parental absence from the household and its consequences on child health.

Our analysis incorporates two measures of child health which are deviation of child's long term and current nutritional status from the household mean values as measured by standardized z-scores for height for age(HAZ) and weight for age (WAZ) for children 0 to 59 months of age. Height for Age is a measure of linear growth whereas the Weight for Age is a measure of acute and chronic malnutrition. As identified by our dataset, the height for age and weight for age variables are expressed in the form of z-scores and are recommended by World Health Organization (WHO) and National Center for Health Statistics

(NCHS). For the purpose of standardized analysis, these z-scores represent comparison of sampled children with the reference population of same age and gender (de Onis & Blossner,2003).

5. HYPOTHESES

The study aims to test the proposition that child health as estimated through height for age z-scores and weight for age z-scores is significantly related to migration and remittances received from overseas. For measuring child health outcomes, several measures have been discussed in literature. Robson et al.(1974), World Bank (2006), Albanian Centre for Socio-Economic Research, Tirana (2013), Acosta et al. (2007),De & Ratha (2012), Ponce & Olivié (2011) and several other studies have used these measures of child health while estimating the impact of migration and remittances on child health. So we have incorporated these two measures of child health for our analysis.

HYPOTHESIS 1: EXTERNAL MIGRATION HAS AN IMPACT ON THE CHILD'S HEALTH IN PUNJAB HOLDING ALL OTHER VARIABLES CONSTANT

a) ***External Migration has an impact on Height for Age z-score in Punjab holding all other variables constant.***

External Migration is a binary variable taking value of 1 if we have an external migrant in the household. Our outcome variable of interest here is height for age which is a continuous variable. Height for age is expressed in the form of z-scores and is recommended by World Health Organization (WHO) and National Center for Health Statistics (NCHS). We estimated the following equation

$$\mathbf{HAZ_{ghi}=\beta o + \beta_1 C_{ghi} + \beta_2 M_{ghi} + \beta_3 HI_{ghi} + \beta_4 X_{hi} + \beta_5 V_{hi} + \beta_6 W_{hi} + \beta_7 U_{hi} + \beta_8 EM_{ghi} + \mu_{ghi}} \qquad \textbf{(iv)}$$

$\mathbf{HAZ_{ghi}}$ looks at the height for age of a child g in household h living in a district i. $\mathbf{C_{ghi}}$ is a vector of child characteristics, $\mathbf{M_{ghi}}$ is a vector of maternal characteristics, $\mathbf{HI_{ghi}}$ is a vector of health inputs, $\mathbf{X_{hi}}$ is a vector of household characteristics, $\mathbf{V_{hi}}$ is a vector of health environment prevalent within a household, $\mathbf{W_{hi}}$ is a vector of parental health knowledge, $\mathbf{U_{hi}}$ is a vector of household's asset composition. $\mathbf{EM_{ghi}}$stands for external migration which is our main variable of interest where it takes a value of 1 if we have an external migrant within the household.

b) External Migration has an impact on Weight for Age z-score in Punjab holding all other variables constant.

To test the above mentioned hypothesis, we have used another measure of child heath i.e. weight for age. External Migration is a binary variable taking value of 1 if we have an external migrant in the household. Our outcome variable of interest here is weight for age which is a continuous variable. Weight for age is expressed in the form of z-scores and is recommended by World Health Organization (WHO) and National Center for Health Statistics (NCHS). The above mentioned equation (iv) is estimated for this hypothesis. We have only changed the outcome variable

$$\mathbf{WAZ_{ghi}}=\beta o + \beta_1 C_{ghi} + \beta_2 M_{ghi} + \beta_3 HI_{ghi} + \beta_4 X_{hi} + \beta_5 V_{hi} + \beta_6 W_{hi} + \beta_7 U_{hi} + \beta_8 EM_{ghi} + \mu_{ghi} \quad \textbf{(v)}$$

$\mathbf{WAZ_{ghi}}$ looks at the weight for age of a child g in household h living in a district i. All other control variables are the same as mentioned in equation (iv)

HYPOTHESIS 2: REMITTANCES FROM OVERSEAS HAS AN IMPACT ON THE CHILD'S HEALTH IN PUNJAB HOLDING ALL OTHER VARIABLES CONSTANT

a) Remittances from Overseas have an impact on Height for Age z-score in Punjab holding all other variables constant.

We have incorporated remittance amount received from overseas as our main independent variable in the following equation. The basic purpose of incorporating remittances into the analysis is to see the direct monetary impact on the households receiving that amount and how much of the money is being spent on child's health. Remittance amount received from overseas is a continuous variable.

$$\mathbf{HAZ_{ghi}}=\beta o + \beta_1 C_{ghi} + \beta_2 M_{ghi} + \beta_3 HI_{ghi} + \beta_4 X_{hi} + \beta_5 V_{hi} + \beta_6 W_{hi} + \beta_7 U_{hi} + \beta_8 R_{ghi} + \mu_{ghi} \quad \textbf{(vi)}$$

$\mathbf{HAZ_{ghi}}$ is height for age of a child g in household h living in a district i.

b) Remittances from Overseas have an impact on Weight for Age z-score in Punjab holding all other variables constant.

We have estimated equation (vi) using the similar set of controls. Here the outcome variable is weight for age z-scores

$$WAZ_{ghi}=\beta o + \beta_1 C_{ghi} + \beta_2 M_{ghi} + \beta_3 HI_{ghi} + \beta_4 X_{hi} + \beta_5 V_{hi} + \beta_6 W_{hi} + \beta_7 U_{hi} + \beta_8 R_{ghi} + \mu_{ghi} \quad \textbf{(vii)}$$

WAZ_{ghi} is weight for age of a child g in household h living in a district i.

HYPOTHESIS 3: MIGRATION AND INFLOW OF REMITTANCES AFFECTS THE MALE CHILD DIFFERENTLY AS COMPARED TO THE FEMALE CHILD IN A HOUSEHOLD

a) The effect of having an external migrant in household significantly affects the health (height for Age) of the male child more than as compared to the girls

b) The effect of having an external migrant in household significantly affects the health (weight for Age) of the male child more than as compared to the girls

Migration and remittances can positively or negatively influence the health of the children left behind. Two mechanisms work in opposite direction in households where we have migrants. Firstly, migration can increase the household income resulting in availability of more resources for the children of migrants left behind in the home country. The remittance amount helps in easing the income constraint on the households which enable them to make investments in terms of human capital. Secondly, when any member of the household migrates, that may generate a short term reduction in the current income linked to migration costs such as travel, resettlement and unearned income (Koechlin,2007) .Moreover migration generally disrupts family life putting emotional stress on the children left behind . With migration of either of the parent, children are left with less supervision and are forced to take up more household work (Ponce & Olivié , 2011) .

External migration is a phenomenon where household members tend to migrate to foreign countries in search of better employment opportunities. Pakistan as a developing country mostly experiences gulf migration where unskilled workers migrate to other parts of the world where they can earn more income. Such migration could be classified as economically motivated migration (Carballo & Mboup,2005).

5.1 METHODOLOGY & SPECIFICATION ISSUES

For the purpose of estimation, simple econometric modeling techniques like OLS will be considered. OLS will be used to perform regression by considering child health outcomes as main variable of interest in the regression with migration status & remittances received from overseas as main independent variables. The use of OLS as a modeling choice will lead to biased results because of several reasons. While testing the above mentioned hypothesis relating migration to child health outcomes, an important question that tends to arise; differences occurring in child health outcomes between migrant and non-migrant families can entirely be attributed to the process of migration or there might be some external factors that are affecting both the child health outcomes and migration. Several externalities like bad economic conditions, disease outbreaks or crop failure in the home country might trigger both the process of migration along with worsening the prevalent health conditions of the children (Hildebrandt et al., 2005).

Firstly, there appears the problem of omitted variable bias because of the presence of several child and household characteristics that are not observable. So in order to reduce some of the bias caused by omitted variables, we have incorporated several child related, mother related, household related, demographic and socio economic factors that are related to the health of the child.

Secondly, there is possibility of endogenity where the observed variables are correlated with the error term. In order to deal with the problem of endogenity, this study will make use of Instrumental Variable Approach. A strong instrument can deal with the problem of endogenity, omitted variable bias and measurement error. The direct cause of bias in OLS is violation of independence assumption where the explanatory variable (migration or remittances) is not independent of the error term. We assume that there are some unobserved variables that we cannot control for are in the error term that influences our outcome variable i.e. child health and our explanatory variable external migration. As the unobserved variables are now there in the error term, they become correlated with migration. So the Covariance (x, u) is not equal

to zero. An instrument is needed which is correlated with migration of household member but uncorrelated with health decision of their children.

Thirdly, when migrant families are compared with the non-migrant families, the migrant households do not act as a random sample. This is due to the presence of distinct differences between the income levels of both the groups. In order to deal with this problem, wealth score and households asset composition are added into the analysis. The household's asset composition do not depend on the current income level and is independent of the process of migration (Chaudhry & Arif, 2010).Due to all these reasons, OLS will give us biased estimates. Adding controls does not address all these issues; therefore the study employs an IV approach.

5.1.1 Instrumental Variables

For this study, we are proposing two IVs for external migration and remittances. The IV should follow the exclusion restriction where it should be correlated with the endogenous variable but uncorrelated with the error term, Cov(x, e) =0. An instrument is needed which is correlated with migration of the household member but uncorrelated with health decision of their children. Different studies have employed several different instrumental variables to deal with the problem of endogenity.

Mansuri (2006b, c) & Acosta (2006) have used migration networks and migration history at the village or household level as instruments for migration. They proposed that that these variables have a positive impact on migration but no effect on income, schooling or nutrition of children back home. While measuring the impact of migration on child health, Mansuri (2006) used household composition as an instrument for current migration.

Munshi (2003) used rainfall in Mexican villages as an instrument for migration. In a study on the impact of community level migration on birth weight in Mexico, Hamilton & Choi (2014) used state historic migration rates as an instrument for contemporary community migration. Langworthy (2011) used a dummy variable indicating whether the mother was originally from the community and the proportion of households surveyed within a community who received remittances as an instrument for remittances. Ponce, Olivie & Onofa (2011) used two instrumental variables for remittances. Firstly, they

used a dummy variable equals to 1 if parish has any bank or money transfer institution. Secondly, they include two dummies for source country (Spain and United States).Vyborny & Jamil (2013) used Remittance Kinship or Baradri IV for both the remittance and parental absence. Hildebrandt et al. (2005) while estimating the impact of migration on child health used historic state level migration networks as an instrumental variable for current migration.

While examining the impact of remittances on income changes in Philippine households, Yang (2005) used rainfall shocks as an instrumental variable for remittances. While in an another study, Yang (2006) exploits the natural experiment of 1997 Asian financial crises where appreciation of migrant's currency against Philippine peso leads to an increase in the amount of remittances sent from abroad. Civilize & Frenk (2009) used the distance between each household locality and its closest western union as an instrument for remittances. Antón (2010) in a study on the impact of remittances on nutritional status of children in Ecuador used two set of instruments: the number of Western Union offices per 100,000 people at province level as an IV for remittances and proportion of households with migrants by province in 2003 as a proxy for migration networks abroad.

5.1.2 Instrumental Variables for our study

In the light of above mentioned studies, we have used two set of instruments for our endogenous variables: External Migration and Remittances. Firstly, Historic Migration rates will be used as an IV for external migration (Chaudhry & Arif,2001; Hildebrandt et al.,2005).Historic migration rates will be highly correlated with the current migration because past migration patterns facilitate current migration. At the same time, historic migration rates are uncorrelated with the child health indicators. The data on historic migration networks for Punjab (1980-2000) are used for calculating historic migration rates at district level. These historic migration rates works as an IV for current migration at a district level. But our analysis requires the variation to be at household level. So we have interacted the historic migration rates with adult male members of the household in order to obtain variation at the household level (Mansuri,2006). The justification for interacting adult male members of households with our historic

migration rates is that households with more adult males will have less issues pertaining to the security and this will in turn facilitate the process of migration for those households.

Secondly, we will be using number of banks in each district as an IV for remittances. The presence of banks or other money transfer institutions in a particular area indicates that the probability of receiving remittances in that area will be high (Ponce, Olivie & Onofa 2011).

5.1.3 Treatment Effect Model

We have used another model to estimate the effect of migration on child health measures. The main reason for using treatment model is that our endogenous variable i.e. external migration (whether you have an external migrant in the household or not) is a dummy variable. With binary endogenous variable, IV approach might not give efficient estimates (Khandker et al., 2009). The standard IV 2SLS approach is applicable to situations with linear and continuous treatment and outcome but in case of binary endogenous variable, IV 2SLS estimates are obtained at a greater efficiency loss (Deb & Seck,2009).Treatment regression estimates the effect of binary endogenous variable on the outcome of interest conditional on a set of exogenous variables (Bartram, 2014). The model estimates two regressions simultaneously where a probit-type treatment equation is estimated for the endogenous dummy and linear or probit regression is estimated for the outcome variable. Very few studies have used Heckman's Treatment effect model relating migration to happiness and several indicators of human development (Bartram 2014, Deb & Seck, 2009).

5.2 Data

The study aims to carry out a cross sectional analysis using District based Multiple Indicator Cluster Survey (MICS) 2011. The study focuses on the impact of external migration and remittances on indicators of child health using two child health indicators i-e z-scores of Weight for Age and Height for Age[1]. These measures of child health are already being generated by MICS (2011) according to NCHA and WHO standards. The Multiple Indicator Cluster Survey (MICS) database has been used because it considers factors that are relevant to the study however it is limited in scope as it is only confined to Punjab. MICS is a household level dataset which covers all 36 districts of Punjab including 9 divisions and 150 tehsils comprising of 95,238 households. Further, in chosen households, all women aged 15-49 years and children under five years of age (0-59) months were selected for interviews. MICS (2011) dataset is extensive in nature covering both rural and urban areas. The dataset has a large sample size and it comprises of wide range of socioeconomics indicators and provides information regarding the nutritional status of the households.

This study incorporates two instrumental variables i.e. historic migration rates and number of banks in each 36 districts of Punjab. For the purpose of calculating historic migration rates, we have taken the data from Bureau of Emigration and Overseas Employment in Pakistan (BEOE). Historic migration data covers a period of 31 years from 1981-2011. The historic migration rates are calculated by dividing the number of individuals migrated from a particular district by number of individuals in that particular district(Chaudhry & Arif,2011).The second Instrumental variable we used in our analysis is for remittance amount received from overseas. We have used number of banks in each district as an IV for remittances received from overseas. The data on number of banks in each district is taken from State

[1]Acosta et.al (2007), De & Ratha (2012) & Ponce, Olivie & Onofa (2011) uses anthropometrics measures to account for child health which essentially includes the z-scores for height for age and weight for age

Bank of Pakistan. We have only accounted for those 25 banks which are registered under the State Bank's Pakistan Remittance Initiative (PRI)[2].

The data on all other variables are part of MICS (2011) questionnaire. Questions relating to whether a household has an external migrant and amount of remittances received by each household is all part of MICS questionnaire. Information related to all the control variables which includes child's characteristics, maternal characteristics, household's characteristics etc. are all part of MICS survey. Our two outcome variables as identified by our dataset height for age and weight for age are expressed in the form of z-scores and are recommended by World Health Organization (WHO) and National Center for Health Statistics (NCHS).

The variables used in this study are the ones that are primarily supported by literature on migration and child health outcomes. Several studies have incorporated the impact of several socioeconomic characteristics that impact the child's health and nutritional outcomes. In a study done by Haddad & Hoddinott (1994) on the impact of women's income on the anthropometric status of children in Cote d'Ivoire found that child's age, income earned by females within a household, access to medical facilities and mother's age and education level have significant impact on child's height for age and weight for age. While studying the impact of family structure on child's health, Desai (1992) found that child's age, parental education both mother and father's education, number of siblings and household's wealth composition has significant impact on the child's height for age. A study done by Handa (1999) relating maternal education and child height in Jamaica found child's age, mother's education and the household income as important variables having a significant impact on child's height for age.

[2] Pakistan Remittance Initiative (PRI) is established in 2009 and it's a joint initiative taken by State Bank of Pakistan, Ministry of Overseas Pakistanis and Ministry of Finance. The purpose of such an initiative is to provide for an ownership structure in Pakistan for remittance facilitation. Its purpose is to facilitate faster, cheaper and efficient flow of remittances

Inclusion of different variables used for the purpose of analysis is also dependent on its availability in MICS 2011 dataset. Within the set of controls; the health environment vector includes all the initiatives taken at the household level in terms of water availability for hand washing; water filter as well as water treatment. The equation also controls for locational factors. The set of household characteristics include number of individuals living in the household. For maternal characteristics, the paper includes mother's marital status and education of the mother within the household and number of surviving and dead children. There are multiple household level as well as community level characteristics that can have a substantial impact on the child health status through various channels. Most studies which estimate the health production function tend to include household and community level characteristics as potential controls in the health production function equation. Along with other factors, household income is likely to have an impact on child health because it acts as a proxy for resources available at household level. .The literature has found an ambiguous relationship between child health and family income primarily because of the causal link between the two. Kuehnle (2014) finds a significant positive relationship between income and child health by employing an instrumental variable technique to cater to for the causal link and endogenity between household income and child health even after controlling for maternal education.

5.2.1 DESCRIPTIVE STATISTICS

Table 1: Nutritional status of children in Punjab (0-59 months)

DEPENDENT VARIABLES	Obs	Mean	Std. Dev.	Moderate (-2 to -2.99 SD)	Severe (<-3 SD)
Height for Age z-score	61629	-1.45521	1.526028	34.70%	14.30%
Weight for Age z-score	61629	-1.48519	1.19759	31.20%	10.13%

Source: Based on author's calculation

Using MICS 2011 for Punjab, Table 1 demonstrates the mean z-scores for two variables; Height for Age(HAZ) and Weight for Age(WAZ)[3]. Height for Age is a measure of linear growth whereas the Weight for Age is a measure of acute and chronic malnutrition. These mean z-scores for Height-for-Age variable indicates that on average, a child less than 5 years of age in Punjab is 1.45 standard deviations below the median for a child of the same gender and age from the reference population. About 35% of children in our sample are moderately stunted whereas 14% of children are severely stunted i.e., below -3 SD of the reference population (WHO,2010). Stunting is an indication of chronic malnutrition due to lack of nutrition for a considerably long time and it also indicates the persistence of chronic illness. The mean score Weight-for-Age variable in the sample is 1.48 which means that on average a child is 1.48 standard deviations less than an average child of the same sex and age from the reference population. Around 31% of children are moderately underweight and 10% are severely underweight which is less than HAZ estimates.[4]

[3] Z-score values for height-for-age and weight-for-age are used in the analysis. Children's height and weight are standardized according to the following formula: $Z = (x - \mu)/\sigma$, where x is the raw score and μ and σ are the mean and standard deviation, respectively (World Health Organization, 2010). If we take an example of WAZ of a child, it's actually the difference between the weight of the child and the median weight of the reference population of the same age and sex, divided by the standard deviation (SD) of the weight of same group of children: $\text{WAZ} = \frac{\text{Wi}-\text{Wr}}{\text{SD}}$ (Arif et al, 2012)

[4] For more accurate results, we are following WHO z-scores technique where z-scores that fall within an improbable range of standard deviations are flagged and dropped from the analysis. The flagged ranges are HAZ < –6 and HAZ > 6, and WAZ < –6 and WAZ > 5 (World Health Organization, 2010).

5.2.2 Table 2: SUMMARY STATISTICS OF ALL THE VARIABLES

DEPENDENT VARIABLES	**Mean**	**Std. Dev.**	**Obs**
Height for Age z-score	-1.45521	1.526028	61629
Weight for Age z-score	-1.48519	1.19759	61629
INDEPENDENT VARIABLES			
Migration	0.152213	0.359231	61624
External Migration	0.06299	0.242947	61629
Remittances from Overseas	477021.7	1606746	3194
Child's Characteristics			
Age of Child in Months	29.05751	17.11174	61629
Childs Gender (female=0,male=1)	0.510782	0.499888	61629
Number of children in HH	2.091029	1.074415	61629
Maternal Characteristics			
Mother's Education – Primary	0.190495	0.392695	61629
Mother's Education – Middle	0.100667	0.30089	61629
Mother's Education – Secondary	0.129225	0.335451	61629
Mother's Marital Status	0.977478	0.148375	61629
Children Surviving	3.413158	1.927253	61301
Children Dead	0.309342	0.74524	61301
Health Inputs			
Child Delivered by Doctor	0.277451	0.447744	61629
Child Ever Breastfeed	0.963327	0.187959	61626
Child Receive BCG Vaccination	0.8724	0.333652	21246
Child Receive Polio Vaccination	0.992397	0.086866	21307
Child Receive Measles Vaccination	0.644645	0.478632	21010
Household's Characteristics			
Number of Household Members	7.916435	3.728972	61629
Household Head Sex(female=0,male=1)	0.934836	0.246817	61629
Household Head Education – Primary	0.180808	0.384862	61629
Household Head Education – Middle	0.138506	0.345433	61629
Household Head Education – Secondary	0.188921	0.391449	61629
Household Head Education – Higher	0.105454	0.30714	61629
Locational Factors:			
Districts	16.65896	10.16479	61629
Urban	0.382093	0.485903	61629
Health Environment			
Water Availability for Hand washing	0.971372	0.16676	59767
Treat water before drinking	0.05542	0.228801	61602
Water Filter	0.016258	0.126467	61508

INDEPENDENT VARIABLES	Mean	Std. Dev.	Obs
Parental Health Knowledge & Disease Environment			
Has Heard of AIDS	0.306417	0.461009	61041
Had Cough and Fever for last three weeks	0.027507	0.163556	61112
Diagnosed as having Tuberculosis	0.001489	0.038563	61104
Diagnosed as having Hepatitis	0.002881	0.053593	61101
Household's Asset Composition			
Household owns Home	0.862451	0.344429	61629
HH Member Own land	0.312013	0.463319	61600
Household has Electricity	0.950736	0.216421	61627
Household has Gas	0.317249	0.465409	61592
Household owns Television	0.63687	0.480906	61595
Household owns Air Conditioner	0.057947	0.233645	61591
Household owns Washing Machine	0.531502	0.499011	61584
Household owns Motorcycle	0.368116	0.482297	61573
Household owns Car	0.044144	0.205418	61548
Household owns Bicycle	0.351586	0.477469	61527
Household owns Air Cooler	0.93573	0.245235	61615
Wealth Score	-0.05227	0.992903	61629
Wealth Index 1	0.190511	0.392707	61629
Wealth Index 2	0.21021	0.407461	61629
Wealth Index3	0.225787	0.418103	61629
Wealth Index 4	0.189635	0.392015	61629

Source: Based on author's calculations

Table 2 presents the summary statistics of all the control variables which includes child's characteristics, maternal characteristics, household's characteristics, health inputs, health environment within a household, Parental knowledge and awareness about health conditions, household's asset composition and locational factors.

Childs characteristics suggest that about 51% of the children in our dataset are males; the average age of a child in our dataset is around 29 months. The data suggests that on average each household has 2 children. Maternal characteristics include mother's education, marital status, and number of surviving and dead children. The summary statistics show that about 19% of the mothers are educated up to primary level, 10% are up to middle level and 12% of the mothers in our dataset are educated up to secondary

level. Mother's education is an important variable that can affect child's health as education promotes awareness among individuals .Hamilton and Choi (2014) estimated the relationship between migration and infant health in Mexico and the along with other important variables control for the maternal characteristics. About 97% of the women in our dataset are married.

According to the Grossman's health production function, health status of the child is related to the inputs(both medical and nutritional) that a child receives under pre and postnatal care, the type of environment being provided to the child, health knowledge of the parents, time inputs of the parents , random health shocks and the biological endowments. Under the health inputs that child receives in the postnatal care which directly effects the child health outcomes, our data suggests that about 27% of the children are delivered by a doctor, 96% of children under the age of two are being breastfeed, 87% receives BCG vaccination, 99% receives Polio vaccination and 64% of the children are given measles vaccination. Under parental health knowledge and disease environment, about 31% of the households have AIDS awareness, only 2% can recall to have cough and fever in the last three weeks, 0.1% are diagnosed as having tuberculosis and only 0.3% are diagnosed with hepatitis which indicates the presence of good environment for the households. The health environment being present in a household indicates the health measures taken by individuals. Our data suggests that about 97% of the households have water availability for hand washing, but very few households use water treatment measures to make water safer for drinking purposes. Only 0.2% households have water filter facility.

The household characteristics indicate that on average, each household has 8 members. Moreover, 93% of the households have male household head. About 18% of household heads are educated up to primary and secondary level, 14 % have education up to middle and around 11% of the household heads are educated up to higher level. On average about 38% of the households belong to the urban area.

Apart from all other factors, household income has a direct effect on child's health and nutrition. With the increase in the family income, parents tend to spend more on child's health. Our dataset does not incorporate the income variable so in order to capture the income effect, we have looked at the composition of assets the household owns which includes the ownership of house and land, presence of electricity and gas and whether the household owns consumption goods like television, air conditioner, washing machine, motorcycle, car bicycle and air cooler. The results suggest that a large number of households have these consumption goods which indicate a better standard of living. Further we have included wealth index which is divided into five quintiles. About 19% of the households lie in the highest quintile of the wealth index, 19% lie in the lowest quintile, 21% lie in the second quintile and 23% of the households lie in the 3rd quintile of the wealth index. Our data suggests that 15% of the households have a migrant and only 6% have an external migrant. The average remittance amount received by the household is Rs 4,77021.

5.2.3 TABLE 3: SUMMARY STATISTICS-COMPARING MIGRANT AND NON-MIGRANT HOUSEHOLDS

	Migrant		Remittance		External Migrant	
DEPENDENT VARIABLES	With	Without	Recipient	Non Recipient	With	Without
Height for Age Zscore	-1.27286	-1.4879	-1.2728	-1.292545	-1.08079	-1.4879
Weight for Age Zscore	-1.29705	-1.51895	-1.28884	-1.361189	-1.09385	-1.51895
INDEPENDENT VARIABLES						
Child's Characteristics						
Age of Child in Months	28.26066	29.20073	28.24977	28.31711	28.63189	29.20073
Childs Gender (female=0,male=1)	0.506077	0.511619	0.503415	0.5139082	0.512365	0.511619
Number of children in HH	2.284222	2.056408	2.26988	2.354659	2.360639	2.056408
Maternal Characteristics						
Mother's Education_Primary	0.212793	0.18649	0.218069	0.1794159	0.192169	0.18649
Mother's Education_Middle	0.121962	0.096853	0.119088	0.1453408	0.153529	0.096853
Mother's Education_Secondary	0.178038	0.120454	0.181467	0.1529903	0.244204	0.120454
Mother's Marital Status	0.977932	0.977414	0.979121	0.9700974	0.976043	0.977414
Children Surviving	2.971913	3.49237	2.95788	3.044787	2.747727	3.49237
Children Dead	0.217196	0.325906	0.213582	0.2435269	0.140816	0.325906
Health Inputs						
Child Delivered by Doctor	0.321748	0.269486	0.327362	0.298331	0.393096	0.269486
Child Ever Breastfeed	0.959595	0.963994	0.960562	0.9568846	0.956723	0.963994
Child Receive BCG Vaccination	0.893777	0.868783	0.898398	0.8730512	0.912968	0.868783
Child Receive Polio Vaccination	0.990241	0.99276	0.989852	0.9933333	0.988686	0.99276
Child Receive Measles Vaccination	0.679196	0.638852	0.68225	0.6711409	0.726872	0.638852
Household's Characteristics						
Number of Household Members	8.830384	7.752469	8.707308	9.40751	9.326378	7.752469
Household Head Sex(female=0,male=1)	0.696482	0.977624	0.666323	0.8365786	0.714838	0.977624
Household Head Education_Primary	0.179744	0.181016	0.185333	0.1488178	0.165636	0.181016
Household Head Education_Middle	0.126439	0.140686	0.128109	0.1244784	0.139619	0.140686
Household Head Education_Secondary	0.186034	0.1894	0.18108	0.2023644	0.228491	0.1894
Household Head Education_Higher	0.098827	0.106653	0.09228	0.1258693	0.126739	0.106653
Locational Factors:						
Districts	17.93838	16.42968	18.11806	17.14047	17.19165	16.42968
Urban	0.272281	0.40175	0.26408	0.3087622	0.34441	0.40175
Health Environment						
Water Availability for Handwashing	0.976518	0.970438	0.978493	0.963467	0.991015	0.970438
Treat water before drinking	0.059407	0.054691	0.055835	0.0730181	0.098428	0.054691
Water Filter	0.024242	0.014826	0.022214	0.0326843	0.044364	0.014826
Parental Health Knowledge & Disease Environment						
Has Heard of AIDS	0.024242	0.29346	0.378533	0.3745608	0.51607	0.29346
Had Cough and Fever for last three weeks	0.37869	0.028182	0.022494	0.0315568	0.02026	0.028182
Diagnosed as having Tuberculosis	0.023763	0.001583	0.00091	0.0014015	0.001298	0.001583
Diagnosed as having Hepatitis	0.000968	0.002896	0.002601	0.0035014	0.002856	0.002896

	Migrant		Remittance		External Migrant	
INDEPENDENT VARIABLES	With	Without	Recipient	Non Recipient	With	Without
Household's Asset Composition						
Household owns Home	0.002795	0.850835	0.929888	0.9095967	0.950026	0.850835
HH Member Own land	0.430095	0.290819	0.429492	0.4254875	0.464829	0.290819
Household has Electricity	0.971002	0.947092	0.973192	0.9554937	0.992272	0.947092
Household has Gas	0.271107	0.325501	0.261128	0.3247387	0.399845	0.325501
Household owns Television	0.729358	0.620231	0.734847	0.6945024	0.843557	0.620231
Household owns Air Conditioner	0.078145	0.054285	0.075396	0.0869263	0.15018	0.054285
Household owns Washing Machine	0.636538	0.512603	0.63498	0.6299652	0.835352	0.512603
Household owns MotorCycle	0.422002	0.358418	0.413775	0.4554318	0.541516	0.358418
Household owns Car	0.062073	0.040888	0.060735	0.0737135	0.100516	0.040888
Household owns Bicycle	0.358424	0.350353	0.356304	0.3619247	0.335572	0.350353
Household owns AirCooler	0.96119	0.931152	0.963393	0.9443672	0.983771	0.931152
Wealth Score	0.150771	-0.08888	0.14824	0.1322744	0.641331	-0.08888
Wealth Index 1	0.168017	0.194568	0.170898	0.1557719	0.069552	0.194568
Wealth Index 2	0.234861	0.205804	0.236371	0.2197497	0.178774	0.205804
Wealth Index3	0.266311	0.218532	0.268334	0.2600834	0.326378	0.218532
Wealth Index 4	0.219403	0.184213	0.215363	0.2294854	0.392581	0.184213

Source: Based on authors calculation's

Table 3 includes the summary statistics of all the variables included where for the purpose of analysis, migrant and non-migrant households are compared. Similarly, remittance recipient households are compared with non-remittance recipient households.

The mean z-scores for Height-for-Age variable indicates that on average in a migrant household, a child less than 5 years of age in Punjab is 1.27 standard deviations below the median for a child of the same gender and age from the reference population . But in a non-migrant household, the mean HAZ is 1.49 standard deviations below the median from the reference population. These scores indicate that HAZ for children under 5 years of age in migrant households are better than non-migrant households. Whereas the mean z-score for Weight-for-Age variable in the migrant household is 1.3 which means that on average a child is 1.3 standard deviations less than an average child of the same sex and age from the reference population and as compared to non-migrant household where WAZ is 1.52. Almost similar statistics can be seen for remittance recipient and non-recipient households and households with and without external migrants.

The mean values for age of child in our sample for both the migrant and non-migrant households indicates that on average a child is 28 or 29 months old. The child's gender dummy is equal to 1 if the child is a male. In both migrant and non-migrant households, 51% of children are males. Similar analysis holds true for remittance recipient and non-recipient households and households with and without external migrants. On average there is no significant difference between the number of children a household has in all type of households.

The mother's education variable is sub divided into three categories i.e. primary, middle and secondary education. On average, 21% of mother's in migrant households are educated up to primary level as compared to 18% in non-migrant households. 21% mothers are educated in remittance recipient households compared to 17% in non-remittance recipient households. The similar analysis holds true for households with and without external migrant. Around 12% of the mothers are educated up to middle in a migrant household as compared to 9% in a non-migrant household. Similarly, the mean values for mother's education up to secondary level shows that 17% of the women with a migrant are educated up to secondary level as compared 12% in a non-migrant household. Around 97% of the women in our analysis are married and this holds true for both the migrant and non-migrant households. On average, the number of children surviving is similar for both migrant and non-migrant households. But on the other hand, the number of children dead is lesser in a migrant household as compared to non-migrant households. This provides an important insight where households with a migrant have better resources and access to health facilities, which leads to a higher survival rate among children.

Our dataset suggests that, 32% of the children in a migrant household are delivered by a doctor as compared to 27% of the children in a non-migrant household being delivered by a doctor. 89% of children in the households with a migrant receive BCG vaccination and 67% receive measles vaccination as compared to 64% in a non-migrant household. The percentage of children being breastfeed and who receive polio vaccination is similar for both the migrant and non-migrant households.

The descriptive statistics for household characteristics shows that on average the number of household members in both migrant and non-migrant households is similar. The household head's gender

is equal to 1 if it's male. The mean value shows that on average, 70% of the households are headed by males in a migrant household as compared to 98% in a non-migrant household. This statistic provides justification for the absence of male household members from a migrant household. Similar statistic can be seen for remittance recipient and non-recipient households and households with and without external migrant. Household head's education shows that in non-migrant households, the percentage of household head's receiving primary, middle, secondary and higher education is higher as compared to household head's in a migrant household. This is due to the fact that in migrant household's; mostly the male members have migrated, so those houses are headed by females. Our analysis covers both the rural and urban areas of Punjab where in rural areas female education is not given much priority. So this statistic provides an insight into the situation where migrant households are headed by females due to the migration of male member and have lesser percentage of female household head being educated up to primary, middle, secondary or higher education.

The statistics shows that there are more households having a migrant in rural areas as compared to urban areas. 27% of the households are from urban areas which have a migrant as compared to 40% of the households which do not have a migrant. The descriptives on the health environment shows no significant differences between migrant and non-migrant households. On average in both migrant and non-migrant households, the percentage of households who have water availability for hand washing, those who treat water before drinking and those who have availability of water filter is almost the same.

The household's asset composition shows the percentage of ownership of different assets in both migrant and non-migrant households. On average, the statistics shows that migrant households have a better asset composition as compared to the non-migrant households. Households with a migrant have higher percentage of durable goods such as television, air conditioner, washing machine, motorcycle etc. as compared to non-migrant households. This higher percentage of ownership of assets in migrant families shows an increased standard of living in households having a migrant.

As a proxy for income, wealth index have been added into the analysis. Wealth index have been divided into 4 quintiles. The statistics shows that about 16% of the migrant households belong to the lowest wealth quintile as compared to 19% of the non-migrant households. Around 23% and 26% of the migrant households belong to second and third quintile and 22% of the migrant households belong to the highest quintile as compared to 18% of the non-migrant households.

6. ANALYSIS

6.1 ESTIMATING IMPACT OF HISTORIC MIGRATION RATES ON EXTERNAL MIGRATION-FIRST STAGE RESULTS

Table 4: OLS Regression: Historic Migration Rates on External Migration – FIRST STAGE RESULTS

Dependent Variable External Migration=1 if there is an external migrant in the house	OLS(1)	OLS(2)	OLS(3)
Average Historic Migration Rates*No. of Adult males in HH	0.00143*** (6.21e-05)	0.00137*** (6.21e-05)	0.00140*** (6.21e-05)
Child Controls	Yes	Yes	Yes
Mother Controls	Yes	Yes	Yes
HH Controls	Yes	No	No
Wealth score	No	Yes	No
Wealth Quintiles	No	No	Yes
Observations	61,629	61,629	61,629
R-squared	0.139	0.126	0.125

Note: The sample comprises children 0-59 months of age with anthropometric data. Standard errors appear in parenthesis.
Asterisks denote the level of significance parentheses *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 4 presents the results for the first stage regression where external migration is regressed on historic migration rates interacted with the number of adult males in a particular household. Before estimating the relationship between current migration and child health measures, these first stage results are estimated. The current migration rates should be positively related to historic migration networks on regional level, because the historic migration networks facilitate current migration. The regional historic migration networks facilitate the process of decision making of households in those particular regions because of the realization of gains from migration networks. The migration process increases the household income which helps in improving the living standard of migrant households.

The first stage results in table 4 shows the relationship between external migration and historic migration rates where external migration is a dummy variable equals to 1 if we have an external migrant in the household and historic migration rates are found by dividing the number of individuals migrated from a particular district by number of individuals in that particular district. Moreover, for variation at the household level we have interacted the historic migration rates with the number of adult males in a household. The above table shows simple OLS results with three different types of specifications. In OLS(1), we have added the asset composition of the households along with all other control variables , OLS(2) shows the specification with wealth score whereas in OLS(3) we have added wealth indices which basically helps in identifying migrant and non-migrant households as non-random samples. The purpose of adding the asset composition or wealth indices is to incorporate the effect of social status and wealth into the analysis.

We have added all the relevant variables in the regression which might influence the decision to migrate. These variables include number of household members, household head sex, education of the household head, mother's education etc. Our results show that historic migration rates are positively related to having a migrant in the household. All three specifications show the same result where our instrumental variable is significantly and positively related to the binary dependent variable. The results are significant at 10%, 5% and 1% levels of significance. The control variables added in the analysis also shows the expected results. The number of children under 5 in the household and the decision to migrate are positively related which means that if the number of children increases; there is greater chance for migration because of the necessity to increase household income in order to cater to the needs of the increasing household members. The household head's age is negatively related to having a migrant in the household, as the household head age increases, there is a decreasing chance of having a migrant within the household. If the household head is a male, then the probability of having a migrant decreases. This is due to the fact that household head is responsible for the decision making within a household. So if the head is a male, his probability of migration will decrease. The education of the household head is an

important variable and is discussed widely in the literature. According to the literature, higher education is positively related with the decision to migrate because of better opportunities abroad. The results show that if the household head has attained higher education, his probability of migration will decrease and this is due to the availability of job opportunities within the home country. The results show a negative relationship between different levels of household head's education and external migration which means that if the household head is having primary education, there is less probability of a household having an external migrant. This might be due to the fact that at lower levels of education, households might not be aware of the benefits of sending a migrant abroad so there is a lesser probability of having an external migrant in that household.

As the number of household members increase, the probability of sending migrants abroad falls. This might be due to the fact that with more members within the household, there are more earning hands available which reduces the household's willingness to send any member abroad. The earning opportunities are mostly available in the urban areas or abroad and people from the rural areas are most likely to migrate to either urban regions or abroad where job opportunities are available. The urban dummy is negatively related to the household's decision to migrate which shows that if a person lives in the urban area, there is less chance for him to migrate because of the availability of job opportunities in urban areas whereas if a person belongs to rural area, his chance of migration is high.

The main purpose of sending household members abroad is to earn higher income which improves the standard of living in the home country. Our results show that the households with an external migrant have access to better facilities like ownership of house and agricultural land. This might be due to the stream of income coming from abroad which led these households to have better standard of living. These households tend to spend less on inferior goods like cycle,

motorcycle and more on goods like television, refrigerator, and air conditioner etc. Wealth indices are positively related to the migration decision. Households in the lower and upper wealth quintiles are positively influenced by the migration decision because of the increasing household income due to the migration. (See Appendix, Table 2)

6.2 ESTIMATING THE RELATIONSHIP BETWEEN NUMBER OF BANKS IN EACH DISTRICT & REMITTANCES FROM OVERSEAS -FIRST STAGE RESULTS

Table 5: OLS Regression: No. of Banks in each district on Remittances from Overseas–First Stage Result

Dependent Variable Remittances Received from Overseas	OLS(1)	OLS(2)	OLS(3)
No. of Banks in each district*No. of Adult males	12.11*	14.81**	14.09**
	(7.129)	(7.128)	(7.077)
Child Controls	Yes	Yes	Yes
Mother Controls	Yes	Yes	Yes
Household Controls	Yes	No	No
Wealth score	No	Yes	No
Wealth Quintiles	No	No	Yes
Observations	3,152	3,194	3,194
R-squared	0.031	0.012	0.022

Note: The sample comprises children 0-59 months of age with anthropometric data. Standard errors appear in parenthesis.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 5 shows the results for first stage regression where number of banks in a particular district are regressed on the amount of remittances received from abroad. In order to estimate the relationship between the amount of remittances received from abroad and the child health, first stage results are estimated. The amount of remittances received from abroad should be positively and significantly related to the number of banks present in each district because the presence of banks in a particular district facilitates the process of sending remittances. The banks function as a formal channel for facilitating transactions. The number of banks present in each district acts an IV for remittances because if the households have accessibility to channels of transmission, it will facilitate the process of sending remittances from abroad.

The first stage results reported in the above table shows the relationship between number of banks present in each district and the remittances received from abroad where remittances is a monetary amount received from overseas whereas we have taken those 25 banks which are registered under the State Bank's Pakistan Remittance Initiative (PRI). The total number of banks covers government, private, foreign and Islamic banks. The above table shows simple OLS results with three different types of specifications. In OLS(1), we have added the asset composition of the households along with all other control variables , OLS(2) shows the specification with wealth score whereas in OLS(3) we have added wealth indices which basically helps in identifying migrant and non-migrant households as non-random samples. The purpose of adding the asset composition or wealth indices is to incorporate the effect of social status and wealth into the analysis.

The results show that number of banks present in each district is positively related to the remittances received from abroad. All three specifications show the same result where the instrumental variable is significantly and positively related to the endogenous variable. The results are significant at 1% & 5% levels of significance. The number of children within the household is positively related to the amount of remittances received from abroad. This might be due to the increasing needs of children within the household where migrants remit back to the home country. The education of the household head is highly significant and positively related to the remittances received from abroad. As discussed earlier, the level of education obtained by the household members and the return to education in the form of monetary amount are correlated with each other. At higher levels of education of the household head, the probability of getting reward in terms of monetary amount is high consequently leading the migrant member to remit back a higher amount of income. So the individuals with higher levels of education are most likely to remit back to home country. Even at the lower levels of education, the variable is highly significant which means that even migrants with the primary level of education have a higher probability of remitting back to home country. This might be the gulf migration where migrants are mostly unskilled

labor workers and such migration increase the relative wage of the workers increasing their probability of remitting back to home country.

Households in rural areas are most likely to have external migrants with higher chances of remitting back. Our results show that mostly the rural migrants are the ones remitting back to the home country. The asset composition shows those households which have necessities like car, refrigerator etc. are more likely to remit back to home country. (See Appendix, Table 3)

Testing for Endogenity of Instruments

In order to check the endogenity of the variables, we have used the Durbin-Wu-Hausman (DWH) test. The DWH test checks the endogenity of the suspected variable and establishes if an instrumental variable strategy is required or not. Our two endogenous variables, external migration and remittances from overseas fail the exogenity test and are therefore instrumented.

Another standard test for the instrumental variable estimation is over identification test. We have performed Hansen J-test of over identification to check whether our endogenous variable is over identified i.e. the numbers of instruments are greater than the number of endogenous variables. The J-test determines if the instrumental variables used in the analysis are valid i.e. they are uncorrelated with the error term. The result of our Hansen J-test suggests that our equations are exactly identified.

Further, the F-statistic for both the instruments is greater than 10 suggesting that set of instrumental variables used for the endogenous covariates are highly relevant.

7. RESULTS

7.1 ESTIMATING THE IMPACT OF EXTERNAL MIGRATION ON CHILD HEALTH OUTCOMES

7.1.1 Table 6A: OLS Regression: Height for Age (HFA) & Weight for Age (WFA)

DEPENDENT VARIABLES	Height for Age Zscore				Weight for Age Zscore			
	OLS(1)	t-stat	OLS(2)	t-stat	OLS(1)	t-stat	OLS(2)	t-stat
INDEPENDENT VARIABLES								
External Migration	0.204074***	3.89	0.084029	1.59	0.228853***	5.62	0.1190428***	2.91
Child's Characteristics	Yes		Yes		Yes		Yes	
Maternal Characteristics	Yes		Yes		Yes		Yes	
Health Inputs	Yes		Yes		Yes		Yes	
Household's Characteristics	Yes		Yes		Yes		Yes	
Health Environment	Yes		Yes		Yes		Yes	
Parental Health Knowledge & Disease Environment	Yes		Yes		Yes		Yes	
Household's Asset Composition	No		Yes		No		Yes	
Locational Factors	Yes		Yes		Yes		Yes	
R2	0.0998		0.1122		0.0804		0.0981	
F	75.57		62.02		59.57		53.38	
N	19787		19669		19787		19669	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

7.1.2 Table 6B: IV-2SLS Regression: Height for Age (HFA) & Weight for Age(WFA)

DEPENDENT VARIABLES	Height for Age Zscore						Weight for Age Zscore					
	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z	IV 2SLS(1)	z	IV 2SLS(2	z	IV 2SLS with District FE	z
INDEPENDENT VARIABLES												
External Migration	0.7262626	1.22	0.0510796	0.08	4.072799	0.63	1.595376***	3.38	1.18107**	2.36	6.311995	0.97
Child's Characteristics	Yes		Yes		Yes		Yes		Yes		Yes	
Maternal Characteristics	Yes		Yes		Yes		Yes		Yes		Yes	
Health Inputs	Yes		Yes		Yes		Yes		Yes		Yes	
Household's Characteristics	Yes		Yes		Yes		Yes		Yes		Yes	
Health Environment	Yes		Yes		Yes		Yes		Yes		Yes	
Parental Health Knowledge & Disease Environment	Yes		Yes		Yes		Yes		Yes		Yes	
Household's Asset Composition	No		Yes		No		No		Yes		No	
Wealth Quintiles	No		No		Yes		No		No		Yes	
Locational Factors	Yes		Yes		Yes		Yes		Yes		Yes	
R2	0.0959		0.1131		0.0372		0.0959		0.1131		0.0118	
N	19787		19669		19787		19787		19669		19787	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

7.1.3 Table 6C: IV-Treatment Effect Model: Height for Age (HFA) & Weight for Age (WFA)

DEPENDENT VARIABLES	Height for Age Zscore				Weight for Age Zscore			
	IV-TEM(1)	z	IV-TEM(2)	z	IV-TEM(1)	z	IV-TEM(2)	z
INDEPENDENT VARIABLES								
External Migration	1.581821***	15.35	0.9820404***	5.6	1.28308***	16.88	0.7949048***	6.88
Child's Characteristics	Yes		Yes		Yes		Yes	
Maternal Characteristics	Yes		Yes		Yes		Yes	
Health Inputs	Yes		Yes		Yes		Yes	
Household's Characteristics	Yes		Yes		Yes		Yes	
Health Environment	Yes		Yes		Yes		Yes	
Parental Health Knowledge & Disease Environn	Yes		Yes		Yes		Yes	
Household's Asset Composition	No		Yes		No		Yes	
Locational Factors	Yes		Yes		Yes		Yes	
Wald chi	2387.5		2502.17		1944.41		2152.84	
N	19669		19669		19669		19669	
chi square	111.28		16.28		136.24		23.36	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 6A, 6B & 6C shows the results for three methodologies used in the paper i.e. simple OLS, IV 2SLS & IV estimated through Treatment Effects Model. Table 6A reports the results for Ordinary Least Square estimation. OLS does not give us consistent results because of several issues already mentioned in methodology section of the paper. When OLS fails to provide consistent estimates, IV regressions are used which helps us deal with the problem of endogenity where the endogenous variable is instrumented. Table 6B reports the result for IV regression where average historic migration rates are used as an IV for external migration. Our endogenous independent variable is binary and the dependent variable is continuous in nature. When the endogenous variable is binary and the dependent variable is continuous in nature, IV estimated through Treatment effect model is preferred over IV 2SLS model. With instrumental variable regression, the results won't appear to be as efficient as with IV estimated through Treatment effect model. The last column of Table 6C shows the results for Treatment Effect Model. For all the methodologies discussed in the paper, we have used two different specifications. Colum (1) represents all the control variables without asset composition of the households whereas in column (2) the asset composition along with all other control variables is added into the regression. The purpose of using two

different specifications is to see whether any significant differences appear in the analysis. The results indicate almost similar results for all of the specifications used in the analysis.

The results for the IV model don't appear to be very efficient. Our main variable, external migration, is coming out to be insignificant for one variable i.e. Height for Age z-score. Whereas using the treatment effect model, our results appear to be more efficient with higher significance level.

Table 6C reports the result for treatment effect model. For testing the first hypothesis, two measures of child health are being used in the analysis i.e., Height for Age z-score and Weight for Age z-score. The results show that external migration has a positive and significant impact on both the measures of child health i.e. Height for Age z-score and Weight for Age z-score where having a migrant in the household is going to increase the child's height and weight by 0.98 and 0.79 SD respectively as compared to non-migrant households. With a migrant in the household, the impact on the child's health can be observed through two mechanisms. Firstly the migrant households experience an increase in household income which is translated into better health and living conditions for all the household members. Secondly, there is a spillover effect where the migrant members become aware of the new ideas and knowledge about improving child rearing practices.

The results indicate that child's HAZ and WAZ are decreasing with child's age and this might be due to the fact that at early age, the main source of nutrition for a child is breast milk and once weaning ends, malnutrition levels off and may even decline with the age of the child (Glewwe, 1999). This might be the reason for a declining HAZ and WAZ with child's age. The coefficient on the gender dummy is coming out to be negative but highly significant which confirms the fact that there is no more discrimination against girls within the households in Punjab. In fact it is indicative of the fact that male children are undernourished and this might be due to the fact that boys are allowed to go outside the house playing or being involved in other activities as compared to girls. Families with higher number of children tend to have difficulties in providing nutrition and basic health facilities to all the children

equally. Our results indicate that as the number of children under five years of age within the household increases, the two indicators of child health are going to fall. Child's height and weight are going to fall by 0.075 and 0.072 for HAZ and WAZ respectively. When household's with scarce resources tend to have younger children, then the health of each of the child is being compromised because of the non-availability of sufficient resources to cater to the needs of all the children within the household.

Parental education is going to positively affect the child's health. This might be due to the increasing household income when both the parents are working. Our results show that mother's education up to secondary level is going to increase the child's height and weight. This is indicative of the fact that mother's with education up to secondary level are better able to nurture their children as compared to uneducated or mother's with lower levels of education. The results indicate that as the number of children dead increases, it's going to negatively impact the surviving child's height and weight. The coefficient on the number of children dead is negative and highly significant. The children who have already died might be suffering from some inherited genetic problems, poor parenting techniques or lack of child rearing knowledge and practices. The negative coefficient is indicative of the fact that similar conditions are going to negatively affect the surviving children within the household and their WAZ and HAZ is going to fall. Similarly, the coefficient on number of surviving children is positive for HAZ which is indicative of the fact that as the number of surviving children increases, the HAZ increases because of the healthy environment and efficient child rearing practices. But for WAZ, the coefficient on the number of children surviving is negative and significant. One possible explanation of this negative coefficient on WAZ could be the fact that as the number of children surviving increases in a household, there appears the scarcity of resources within the household where less resources and health care facilities are available for all children resulting in lower WAZ.

The health environment being provided to the mothers at the time of delivering the child is significantly going to affect the child's health later in life. The coefficient on if the child is being delivered by a doctor is positive and highly significant which means that if the delivery is undertaken by

the doctor, it is positively going to affect the child's weight and height. This might be due to the reason that at the time of delivery, proper record of child's height and weight are being kept and if the child appears to be underweight, proper health measures are being taken and special treatment is provided to that particular child. So if the child is being delivered by a doctor, its height and weight are going to increase by 0.05 and 0.11 SD respectively. Health inputs being provided to children at early age of life is going to impact their development process. The coefficient on BCG and Measles vaccination is coming out to positive and significant which means that children who have received these vaccinations, their height and weight are going to increase in accordance with their age.

The coefficient on the household head is coming out to be positive and significant which means that children in male headed households have better HAZ and WAZ than female headed households. The explanation is consistent with literature where it is assumed that female headed households are poor as compared to the male headed households consequently leading to poor health conditions in those households which results in malnutrition among growing children. Our data doesn't provide any information regarding father's education so we have used household head's education as a proxy for father's education. The household head's education variable is coming out to be positive and highly significant at all levels of education. The household head's education is going to capture the impact of household income so the coefficient is coming out to be highly significant. Child's height and weight are going to increase by 0.41 and 0.28 SD if the household head has attained higher education as compared to primary education where HAZ and WAZ increase only by 0.10 and 0.08 SD respectively. This higher level of education is translated into higher income for the households improving the child's height and weight.

Health environment prevalent within the household has a positive impact on the child's health. Parental awareness regarding basic health conditions help them in improving child rearing practices with a significant decline in child catching up illnesses. Parental health knowledge which included parent's awareness regarding AIDS or prevalence of disease environment within the household impacts the child

health. The results indicate that if the parents are aware of a life threatening disease AIDS, their child's HAZ and WAZ are going to improve. One possible explanation of this could be parental awareness regarding diseases which helps them to raise healthier children. The coefficient on cough and fever is appearing to be negative and significant for one measure of child health i.e. HAZ. If the environment within the household is not healthy, children as the most vulnerable group are going to suffer more.

The household's asset composition determines the wealth status present within the household. The ownership of assets such as land, television, air conditioner etc., helps determining the financial situation of households. Moreover, our results indicate that households with television, air conditioner, washing machine and motorcycle have a positive impact on the child's HAZ and WAZ. The ownership of television not only predicts the financial situation but also has a positive spillover effect where parents are benefited with some health related knowledge regarding children. The ownership of motorcycle is going to increase the HAZ and WAZ by 0.07 and 0.11 SD respectively. This might be due to the reason that households having a motorcycle can have better access to health facilities in case of emergency situation. Urban areas are assumed to be better in providing basic health facilities to the households due to the availability of hospitals and health clinics nearby. The coefficient on urban is appearing to be negative and significant for WAZ which indicates that children living in rural areas are healthier as compared to those in urban areas. (See Appendix, Table 4C)

Treatment effect model is two stage estimation where the first stage is probit whereas the second is either probit or linear. As, TEM assumes that the correlation between both the errors terms is zero, so the chi square value which determines the results for joint likelihood ratio test is 16.28 and 23.36 respectively . So by observing this value, we can simply reject the null that ρ is not equal to zero suggesting that applying the treatment effect model is appropriate. The Wald chi value determines the goodness of fit of the model. With $p<0.0001$, we can conclude that variables used in the regression are appropriate.

7.1.4 Table 7: Comparing OLS, IV 2SLS & IV TEM: Height for Age (HFA) & Weight for Age (WFA)

DEPENDENT VARIABLES	Height for Age Zscore			Weight for Age Zscore		
	(1) OLS	(2) IV-2SLS	(3) IV-TEM	(1) OLS	(2) IV-2SLS	(3) IV-TEM
INDEPENDENT VARIABLES						
External Migration	0.0840292	0.0510796	0.9820404***	0.1190428***	1.18107**	0.7949048***
Child's Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Maternal Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Health Inputs	Yes	Yes	Yes	Yes	Yes	Yes
Household's Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Health Environment	Yes	Yes	Yes	Yes	Yes	Yes
Parental Health Knowledge & Disease Environment	Yes	Yes	Yes	Yes	Yes	Yes
Household's Asset Composition	Yes	Yes	Yes	Yes	Yes	Yes
Locational Factors	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.1122	0.1131	2502.17	0.0981	0.1131	2152.84
F	62.02	_	16.28	53.38	_	23.36
N	19669	19669	19669	19669	19669	19669
Wald chi	_	_	2502.17	_	_	2152.84

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 7 shows the comparison of three strategies used in this paper. As mentioned earlier, OLS does not give us consistent results because of several issues that are already mentioned in methodology section of the paper. When OLS fails to provide consistent estimates, IV regressions are used which helps us deal with the problem of endogenity where the endogenous variable is instrumented. In instrumental variable regression, average historic migration rates are used as an IV for our endogenous variable i.e., external migration but our endogenous independent variable is binary and the dependent variable is continuous in nature. Consequently with binary endogenous variable and continuous dependent variable, IV estimated through Treatment effect model is preferred over IV 2SLS model. With instrumental variable regression, the results won't appear to be as efficient as with IV Treatment effect model. By estimating IV through treatment effect model, the results are appearing to be highly significant where having external migrant in the household, HAZ and WAZ are going to increase by 0.98 and 0.79 SD respectively as compared to households with no external migrant. (See Appendix, Table 6A & 6B)

7.1.5 ESTIMATING THE IMPACT OF EXTERNAL MIGRATION ON CHILD HEALTH OUTCOMES WITHOUT HEALTH INPUTS

Table 8: IV-Treatment Effect Model: Height for Age (HFA) & Weight for Age (WFA) without health inputs, health environment & parental health knowledge and disease environment

DEPENDENT VARIABLES	Height for Age Zscore				Weight for Age Zscore			
	IV-TEM With HH Asset Composition	z	IV-TEM with Wealth Quantiles	z	IV-TEM With HH Asset Composition	z	IV-TEM with Wealth Quantiles	z
INDEPENDENT VARIABLES								
External Migration	1.123082***	15.23	1.072232***	13.45	0.7610097***	13.53	0.7696615***	13.41
Child's Characteristics	Yes		Yes		Yes		Yes	
Maternal Characteristics	Yes		Yes		Yes		Yes	
Household's Characteristics	Yes		Yes		Yes		Yes	
Household's Asset Composition	Yes		No		Yes		No	
Wealth Indices	No		Yes		No		Yes	
Locational Factors	Yes		Yes		Yes		Yes	
Wald chi	5855.11		5816.38		5305.34		5090.18	
N	60843		60843		60843		60843	
chi square	96.31		71.64		85.39		81.8	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 8 presents the results for IV regression estimated through treatment effect model using two different specifications and without vector of health inputs, health environment & parental health knowledge and disease environment prevalent in a household.[5] The basic purpose of not incorporating these vectors of control variables is just to make sure that the child health outcomes are not capturing the impact of these variables. While analyzing the impact of external

[5] Health inputs include whether the child is being delivered by a doctor, whether the child is ever being breastfeed, whether the child receives BCG, polio and measles vaccination. Health environment includes whether there is availability for hand washing, whether households treat water before drinking and whether the households have availability of water filter. Parental health knowledge and disease environment includes whether parents have ever heard of AIDS, whether the household members had cough and fever for the last three weeks and whether they are ever being diagnosed with tuberculosis and hepatitis.

migration on child health outcomes, it's important to incorporate these vectors of control variables along with other controls.[6]

All of the health, environmental and parental awareness related variables do positively impact the child health outcomes and the purpose of not including these vectors of control variables is just to separate out their effect from the impact of external migration on child health outcomes. Our results suggest that even if we do not incorporate these health, environmental and parental awareness related variables in our regression the results are still coming out to be positive and highly significant. Table 8 (column 1) shows that having an external migrant in the household is going to increase the child's height and weight by 1.12 and 0.76 SD respectively.(See Appendix, Table 4E)

[6] Other controls include child's characteristics, mother's characteristics, Household characteristics, household's asset composition and wealth indices.

7.2 ESTIMATING THE IMPACT OF REMITTANCES FROM OVERSEAS ON CHILD HEALTH OUTCOMES

7.2.1Table 9A: OLS Regression: Height for Age (HFA) & Weight for Age (WFA)

DEPENDENT VARIABLES	Height for Age Zscore				Weight for Age Zscore			
	OLS(1)	t-stat	OLS(2)	t-stat	OLS(1)	t-stat	OLS(2)	t-stat
INDEPENDENT VARIABLES								
Remittances from Overseas	1.91E-08	0.55	3.25E-08	0.95	0.0000000427*	1.65	0.0000000535**	2.09
Child's Characteristics	Yes		Yes		Yes		Yes	
Maternal Characteristics	Yes		Yes		Yes		Yes	
Health Inputs	Yes		Yes		Yes		Yes	
Household's Characteristics	Yes		Yes		Yes		Yes	
Health Environment	Yes		Yes		Yes		Yes	
Parental Health Knowledge & Disease Environn	Yes		Yes		Yes		Yes	
Wealth Score	No		Yes		No		Yes	
Locational Factors	Yes		Yes		Yes		Yes	
R2	0.1026		0.1215		0.135		0.1563	
F	3.47		4.05		4.74		5.43	
N	879		879		879		879	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

7.2.2 Table 9B: IV-2SLS Regression: Height for Age (HFA) & Weight for Age (WFA)

DEPENDENT VARIABLES	Height for Age Zscore						Weight for Age Zscore					
	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z
INDEPENDENT VARIABLES												
Remittances from Overseas	0.00000147**	2.04	0.00000125**	2.24	2.41E-07	0.39	0.000000965**	1.98	0.000000814**	2.16	4.21E-07	0.84
Child's Characteristics	Yes		Yes		Yes		Yes		Yes		Yes	
Maternal Characteristics	Yes		Yes		Yes		Yes		Yes		Yes	
Health Inputs	Yes		Yes		Yes		Yes		Yes		Yes	
Household's Characteristics	Yes		Yes		Yes		Yes		Yes		Yes	
Health Environment	Yes		Yes		Yes		Yes		Yes		Yes	
Parental Health Knowledge & Disease Environment	Yes		Yes		Yes		Yes		Yes		Yes	
Wealth Score	No		Yes		Yes		No		Yes		Yes	
Locational Factors	Yes		Yes		Yes		Yes		Yes		Yes	
Urban												
Wald chi	40.15		60.83		544.51		61.08		93.78		769.1	
N	879		879		879		879		879		879	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 9A & 9B reports the results for the two methodologies used for analyzing the relationship between the monetary amount of remittances received from overseas and the child health. Table 8A reports the results of OLS but due to the inconsistency of OLS estimates, we have used Instrumental variable estimation by using number of banks in a particular district as an IV for remittances from overseas. Banks are an important channel through which the transfer of funds is being facilitated. The number of banks present in each district acts an IV for remittances because if the households have accessibility to channels of transmission, it will facilitate the process of sending remittances from abroad.

Table 9B reports the result for IV regression where remittances from overseas (instrumented by number of banks in each district) is regressed on two measures of child health i.e. HAZ and WAZ. The results show that in remittance recipient households, both the child's height and weight are going to increase. Though the magnitude of increase in the z-scores for height and weight is very small, but the direction of increase is positive. The results suggest that sending 1 rupee in remittances is going to increase HAZ and WAZ by 0.00000125 and 0.000000814 SD respectively. If the migrants send 1 lac rupees in remittances, it's going to increase HAZ and WAZ by 0.12 and 0.08 SD respectively.

There is a limitation attached to remittances data that it often suffers from reporting error where households do not report actual amount of remittances received. The monetary amount of remittances received by households have a direct impact on the child's health where monetary income is translated into better health facilities provided to children.

The results suggest that age of child is negatively related to HAZ which means that as the age of child increases, HAZ is going to fall. One possible explanation for such a relationship might be the fact that a very early age, the main source of nutrition for the child is mother's milk and as weaning ends, malnutrition levels off and may even decline with the age of the child. This might be the reason for declining HAZ of the child.

Families with higher number of children tend to have difficulties in providing nutrition and basic health facilities to all the children equally. Our results indicate that as the number of children under five years of age within the household increases, the HAZ is going to fall. Child's height is going to fall by 0.19 SD HAZ. When household's with scarce resources tend to have younger children falling within the same age group, then the health of each of the child is going to be compromised because of the non-availability of sufficient resources to cater to the needs of all the children within the household.

The health environment being provided to the mothers at the time of delivering the child is significantly going to affect the child's health later in life. The coefficient on if the child is being delivered by a doctor is positive and significant for one measure of child health i.e. WAZ which means that if the delivery is undertaken by the doctor, it is positively going to affect the child's weight . This might be due to the reason that at the time of delivery, proper record of child's weight are being kept and if the child appears to be underweight, proper health measures are being taken and special treatment is provided to the children. So if the child is being delivered by a doctor, its weight is going to increase by 0.24 SD. Health inputs being provided to children at early age of life is going to impact their development process. The coefficient on measles vaccination is coming out to positive and significant which means that children who have received this vaccination, their weight is going to increase in accordance with their age.

The education of the parents has positive impact on the child's health. This might be through two channels where educated parents are aware of better health rearing practices and can cater to the needs of their child in a better way. The second mechanism through which the parent's education can impact child's health is through higher incomes when either mother of father is working. Our dataset doesn't provide us any information regarding father's education so we have used household head's education as a proxy for father's education. Our results suggest that household head's education up middle is going to increase the HAZ and WAZ by 0.5 SD. The household head's education is going to be translated into

higher incomes for the household so this variable is going to capture the impact of household income. An increase in the household income positively impacts the health of the child.

Wealth score helps determine the financial situation present within the household. [7] The coefficient on wealth score is coming out to be positive and is highly significant which is indicative of the fact that children in households with better financial situation have improved health conditions. The HAZ and WAZ are going to increase by 0.7 and 0.5 SD respectively. The coefficient on urban dummy is coming out to be negative and is significant for both the measures of child health which means that living in an urban area, is going to decrease the child's HAZ and WAZ by 0.4 and 0.3 SD.

Table 9B also reports the results for IV approach with district fixed effects. Our main variable of interest, remittances from overseas, doesn't come out to be significant for both HAZ and WAZ. Other control variables show almost the same results when district fixed effects are added into the regression. (See Appendix, Table 5B)

[7]The wealth score is created by MICS survey 2011 using the principal component analysis by using information on consumer durables, dwelling characteristics and all other factors that might determine the household's wealth status.

7.2.3 Table 10: Comparing OLS, IV 2SLS: Height for Age (HFA) & Weight for Age (WFA)

DEPENDENT VARIABLES	Height for Age Zscore		Weight for Age Zscore	
	(1) OLS	(2) IV-2SLS	(1) OLS	(2) IV-2SLS
INDEPENDENT VARIABLES				
Remittances from Overseas	3.25E-08	0.00000125**	0.0000000535**	0.000000814**
Child's Characteristics	Yes	Yes	Yes	Yes
Maternal Characteristics	Yes	Yes	Yes	Yes
Health Inputs	Yes	Yes	Yes	Yes
Household's Characteristics	Yes	Yes	Yes	Yes
Health Environment	Yes	Yes	Yes	Yes
Parental Health Knowledge & Disease Environn	Yes	Yes	Yes	Yes
Wealth Score	Yes	Yes	Yes	Yes
Locational Factors	Yes	Yes	Yes	Yes
R2	0.1215	_	0.1563	_
F	4.05	60.83	5.43	93.78
N	879	879	879	879

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 10 shows a comparison of both the methodologies used in the analysis to see the impact of remittances from overseas on child health outcomes. As mentioned earlier, OLS is not going to give consistent results because of the bias caused by several reasons mentioned in the methodology section of the paper. So in order to deal with the endogenity problem, we have incorporated the instrumental variable strategy estimated through two stage least square approach. We have instrumented our endogenous variable i.e., remittances from overseas with number of banks in each district. Our results are appearing to be highly significant for both the variables HAZ and WAZ. Though the magnitude of the both the coefficients are small and it shows the impact on HAZ and WAZ if migrants send 1 rupee in remittances. But if increase it to 1 lac, and then the results appear to make more sense because migrants usually send a higher amount from abroad. (See Appendix, Table 6C & 6D)

7.2.4 ESTIMATING THE IMPACT OF REMITTANCES FROM OVERSEAS ON CHILD HEALTH OUTCOMES WITHOUT HEALTH INPUTS

Table 8: IV-2SLS Regression: Height for Age (HFA) & Weight for Age (WFA) without health inputs, health environment, parental health knowledge & disease environment

DEPENDENT VARIABLES	Height for Age Zscore		Weight for Age Zscore	
	IV 2SLS	z	IV 2SLS	z
INDEPENDENT VARIABLES				
Remittances from Overseas	1.57E-07	0.39	4.16E-07	1.11
Child's Characteristics	Yes		Yes	
Maternal Characteristics	Yes		Yes	
Household's Characteristics	Yes		Yes	
Wealth Score	Yes		Yes	
Locational Factors	Yes		Yes	
R2	0.072		0.0122	
N	3167		3167	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 11 presents the results for IV regression estimated through two stage least square estimation and without vector of health inputs, health environment & parental health knowledge and disease environment prevalent in a household.[8]We have employed the similar approach as done for external migration where the basic purpose of not including these vectors of variables is just to make sure that the child health outcomes are not capturing the impact of these variables.

Our results suggest that even if we do not incorporate these health, environmental and parental awareness related variables in our regression the results are coming out to be positive but not significant. One possible explanation of such insignificant results is that the households receiving remittances from abroad are not directly spending these remittances on the health of the children

[8] Health inputs include whether the child is being delivered by a doctor, whether the child is ever being breastfeed, whether the child receives BCG, polio and measles vaccination. Health environment includes whether there is availability for hand washing, whether households treat water before drinking and whether the households have availability of water filter. Parental health knowledge and disease environment includes whether parents have ever heard of AIDS, whether the household members had cough and fever for the last three weeks and whether they are ever being diagnosed with tuberculosis and hepatitis.

e.g. making food expenditures but they might be spending it indirectly on health inputs by making an expenditure on the vaccination received by children at early age or by doing an expenditure on providing the facility of water filter which reduces the chance of getting water borne diseases by children and resulting in falling HAZ and WAZ. By not incorporating these vectors of control variables, the resulting HAZ and WAZ are coming out to be insignificant. Our study do not takes into consideration any spending done by households on food expenditures. So the only impact of remittance income on child's health is seen in terms of expenditures done on health inputs. (See Appendix, Table 5C)

7.3 ESTIMATING THE IMPACT OF INTRA HOUSEHOLD RESOURCE ALLOCATION BIAS WHERE BOYS IN MIGRANT HOUSEHOLDS GET PREFERENTIAL TREATMENT IN TERMS OF HEALTH CARE AS COMPARED TO GIRLS

7.3.1 Table 12A: IV-Treatment Effect Model: Height for Age (HFA)

DEPENDENT VARIABLES	Height for Age Zscore- BOYS				Height for Age Zscore-GIRLS			
	IV-TEM With HH Asset Composition	z	IV-TEM with Wealth Quantiles	z	IV-TEM With HH Asset Composition	z	IV-TEM with Wealth Quantiles	z
INDEPENDENT VARIABLES								
External Migration	0.0786304	0.19	0.01156	0.03	1.281885***	6.89	1.219137***	6.24
Child's Characteristics	Yes		Yes		Yes		Yes	
Maternal Characteristics	Yes		Yes		Yes		Yes	
Health Inputs	Yes		Yes		Yes		Yes	
Household's Characteristics	Yes		Yes		Yes		Yes	
Health Environment	Yes		Yes		Yes		Yes	
Parental Health Knowledge & Disease Environm	Yes		Yes		Yes		Yes	
Household's Asset Composition	Yes		Yes		Yes		Yes	
Wealth Indices	No		Yes		No		Yes	
Locational Factors	Yes		Yes		Yes		Yes	
Wald chi	1205.86		1195.39		1324.1		1195.39	
N	9878		9878		9791		9878	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

7.3.2 Table 12B: IV-Treatment Effect Model: Weight for Age (WFA)

DEPENDENT VARIABLES	Weight for Age Zscore- BOYS				Weight for Age Zscore-GIRLS			
	IV-TEM With HH Asset Composition	z	IV-TEM with Wealth Quantiles	z	IV-TEM With HH Asset Composition	z	IV-TEM with Wealth Quantiles	z
INDEPENDENT VARIABLES								
External Migration	0.673549***	3.72	0.788006***	4.74	0.8884572***	5.8	0.9406021***	6.42
Child's Characteristics	Yes		Yes		Yes		Yes	
Maternal Characteristics	Yes		Yes		Yes		Yes	
Health Inputs	Yes		Yes		Yes		Yes	
Household's Characteristics	Yes		Yes		Yes		Yes	
Health Environment	Yes		Yes		Yes		Yes	
Parental Health Knowledge & Disease Environm	Yes		Yes		Yes		Yes	
Household's Asset Composition	Yes		Yes		Yes		Yes	
Wealth Indices	No		Yes		No		Yes	
Locational Factors	Yes		Yes		Yes		Yes	
Wald chi	1103.47		1039.66		1080.36		1065.2	
N	9878		9878		9791		9791	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 12A and 12B shows the results for whether there is a presence of intra household resource allocation bias where boys in migrant households receive preferential treatment in terms of

health care as compared to girls resulting in higher HAZ and WAZ. Our results show the absence of gender bias in households having an external migrant. The coefficient for HAZ for girls is coming out to be positive and highly significant which confirms the fact that there is no more discrimination against girls within the households in Punjab. In fact it is indicative of the fact that male children are undernourished and this might be due to the fact that boys are allowed to go outside the house playing or being involved in other activities as compared to girls. External migration increases the HAZ score of girls by 1.28 SD in comparison to 0.07 SD for boys. For both the girls and boys, the coefficient on WAZ is coming out to be positive and highly significant but the magnitude of the coefficient for girls is higher which is suggestive of the fact that there is absence of gender bias in the migrant households. Similarly, external migration increases the WAZ score of girls by 0.88 SD in comparison to 0.67 SD for boys. The impact of external migration on HAZ and WAZ is higher for girls than boys which basically show that in a constrained household when there is no external migrant, the boys were already getting basic health care and nutrition But as the constraint was relaxed due to the amount of income the migrants are sending from abroad., the girls receive the required nutrition and health care which they were previously deprived of and therefore there appears more impact on girls than boys.

Another possible explanation of such results could be seen through the context of increased bargaining power[9] of women in households headed by females or increased spousal control over the allocation of resources (Antman, 2016). In Pakistan, mostly the households are headed by male members and due to the process of external migration; the male household heads are away giving the female spouse a greater command over decision making process resulting in a greater share of resources being spent on girls relative to boys. (See Appendix, Table 7A & 7B)

[9] There are several studies that have looked at the impact of increased bargaining power of women in households where resources are spent on girl's resulting in improvement of health of girls as compared to boys (Duflo,2003)

7.4 ESTIMATING THE IMPACT OF INTRA HOUSEHOLD RESOURCE ALLOCATION BIAS WHERE BOYS IN REMITTANCE RECEPIENT HOUSEHOLDS GET PREFERENTIAL TREATMENT IN TERMS OF HEALTH CARE AS COMPARED TO GIRLS

7.4.1 Table 13A: IV-2SLS: Height for Age (HFA)

DEPENDENT VARIABLES	Height for Age Zscore-BOYS		Height for Age Zscore-GIRLS	
	IV 2SLS	z	IV 2SLS	z
INDEPENDENT VARIABLES				
Remittances from Overseas	-1.29E-07	-0.6	0.000000591**	2.29
Child's Characteristics	Yes		Yes	
Maternal Characteristics	Yes		Yes	
Health Inputs	Yes		Yes	
Household's Characteristics	Yes		Yes	
Health Environment	Yes		Yes	
Parental Health Knowledge & Disease Environment	Yes		Yes	
Wealth Score	Yes		Yes	
Locational Factors	Yes		Yes	
R2	0.1019		0.0659	
N	436		443	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

7.4.2 Table 13B: IV-2SLS: Weight for Age (HFA)

DEPENDENT VARIABLES	Weight for Age Zscore-BOYS		Weight for Age Zscore-GIRLS	
	IV 2SLS	z	IV 2SLS	z
INDEPENDENT VARIABLES				
Remittances from Overseas	1.68E-07	1.05	0.000001***	3.66
Child's Characteristics	Yes		Yes	
Maternal Characteristics	Yes		Yes	
Health Inputs	Yes		Yes	
Household's Characteristics	Yes		Yes	
Health Environment	Yes		Yes	
Parental Health Knowledge & Disease Environment	Yes		Yes	
Wealth Score	Yes		Yes	
Locational Factors	Yes		Yes	
R2	0.0952		0.0659	
N	436		443	

Note: The sample comprises children 0-59 months of age with anthropometric data.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 13A and 13B shows the results for intra household resource allocation bias. Our results show the absence of gender bias in remittance recipient households. The results are quite similar to those households having an external migrant. The coefficient for HAZ and WAZ for girls is coming out to be positive and highly significant which confirms the fact that there is no more discrimination against girls within the households in Punjab. In fact it is indicative of the fact that male children are undernourished and this might be due to the fact that boys are allowed to go outside the house playing or being involved in other activities as compared to girls. On the other hand, the coefficient on HAZ for boys is coming out to be negative and insignificant which confirms the fact the remittance income from abroad is not being spent on male children and resources are directed towards the health of the female children in the households due to the spousal control over resources in migrant households. (See Appendix, Table 8A & 8B)

Another possible explanation could be that amount of remittances received from overseas have an impact on HAZ and WAZ for girls which basically show that in a constrained household when there is no remittance income, the boys were already getting basic health care and nutrition But as the constraint was relaxed due to the amount of remittances received from abroad., the girls receive the required nutrition and health care which they were previously deprived of and therefore there appears an impact on girl's health as compared to boy's health.

8. CONCLUSION & POLICY RECOMMENDATIONS

In most of the underdeveloped countries, income constraints force households to leave their home country in search of better economic opportunities and to cope with the existing income risk. There is a huge strand of literature that confirms the evidence that migration and remittances are one way through with households increase the accumulation of assets or increase their consumption expenditures which ultimately leads to higher standards of living. This paper presents a detailed analysis of the impact of temporary external migration and remittances from overseas on child health outcomes in Punjab. The focus of the study is young children aged (0-59) months which are considered to be the most vulnerable group whenever the households face any income constraint. Further, we test for the presence of intra household resource allocation bias where boys get preferential treatment in term of health care as compared to girls. Our basic purpose is to see whether the income flows generated through migration and remittances helped households to provide better nutrition and health care to girls or there is still the presence of female gender bias where mostly the resources are directed towards the male children.

The data has been taken from Multiple Indicator Cluster Survey (MICS) 2011, Bureau of Emigration and Overseas Employment and State Bank of Pakistan. Two indicators of child health i.e. Height for Age z-scores and Weight for Age z-scores are used in the analysis. Height for Age is a measure of stunting whereas the Weight for Age is a measure of wasting. Stunting is a condition which has long term consequences on the health of the child. Nutritional deficiencies at a very young age are likely to generate growth faltering outcomes for a child later in life.

The study employs an Instrumental Variable Approach with Two Stage Least Square and Instrumental Variable Approach estimated through Treatment Effect Model in order to deal with the problem of endogenity. Historic migration rates and number of banks in each district is used as an IV for external migration and remittances from overseas. Our results suggest significant and positive impact of external

migration and remittances on both indicators of child health outcomes (Height for Age z-scores and Weight for Age z-scores).

Our results suggest that temporary external migration and remittances significantly impact both the anthropometric measures: HFA & WFA. In consonance with the existing literature, our results point towards strong effects of external migration and remittances on child health outcomes (HAZ & WAZ) by loosening the credit constraint. Since our analysis is restricted to children under 5 years of age which are not school going and spend most of their time back home, so household dynamics which includes the number of HH members, mother's education, household head's education, parental health knowledge & household's asset composition all are significantly going to impact child's health.

It is generally presumed that female children face more discrimination in HH in Asia .This study rejects this presumption; male children under five years of age have lower z-scores than female children. Further this study confirms the presence of increased bargaining power of women in households headed by females where there is an increased spousal control over the allocation of resources. In Pakistan, mostly the households are headed by male members and their absence due to migration gives the female spouse a greater command over decision making process resulting in a greater share of resources being spent on girls relative to boys.

On the developmental side, our evidence on the positive effects of remittance income calls for policies that ease remittance flow by reducing fees or by giving tax breaks. Pakistan remittance initiative (PRI)[10] which is a joint initiative taken by State Bank of Pakistan, Ministry of Overseas Pakistanis and Ministry of Finance is a step towards promoting efficient and cheaper flows of remittances to Pakistan. Further, migration also has a spillover effect where the migrant members become aware of the new ideas and

[10] Pakistan Remittance Initiative (PRI) is established in 2009 and it's a joint initiative taken by State Bank of Pakistan, Ministry of Overseas Pakistanis and Ministry of Finance. The purpose of such an initiative is to provide for an ownership structure in Pakistan for remittance facilitation. Its purpose is to facilitate faster, cheaper and efficient flow of remittances

knowledge about improving child rearing practices often referred to as social remittances where the ideas, behaviors, identities and social capital flow from country of destination to country of origin. Migrant members of the household bring back not only financial remittances but also new information and values that may have a positive effect on children.

9. REFERENCES

Acosta, P., P. Fajnzylber and J. H. Lopez. 2007. The Impact of Remittances on Poverty and Human Capital: Evidence from Latin American Household Surveys. *World Bank Policy Research Working Paper No. 4247, Washington*

Acosta, P., P. Fajnzylber and J. H. Lopez. 2007. The Impact of Remittances on Poverty and Human Capital: Evidence from Latin American Household Surveys. *World Bank Policy Research Working Paper No. 4247, Washington.*

Adhikari et al. (2012). The Impact of Parental Migration on the Health of Children Living Separately from Parents: A Case Study of Kanchanaburi, Thailand. *Journal of Population and Social Studies, Volume 20 Number 2, January 2012: 20-37*

Afzal,U. Chaudhry, T. (2012). The Determinants of Child Health & Nutritional Status in Punjab: An Economic Ananlysis. *CREB Working Paper No.02-12*

Afzal,U. Yusuf, A. (2013). The State of Health in Pakistan: An Overview. *The Lahore Journal of Economics*18 : SE (September 2013): pp. 233–247

Alderman et al. (2001). Child Health and School Enrollment. *Journal of Human Resources 2001;36; 185-205.*

Antman,F.(2015). Gender Discrimination in the Allocation of Migrant Household Resources. *Popul Econ. 2015 July ; 28(3): 565–592*

Antón,J.(2010).The Impact of Remittances on Nutritional Status of Children in Ecuador. *The International Migration Review, Vol. 44, No. 2 (Summer 2010), pp. 269-299*

Arif et al. (2012). Child Malnutrition in Pakistan: Trends and Determinants. *Pakistan Institute of Development Economics*

Arif et al.,(2012).Child Malnutrition in Pakistan: Trends and Determinants. *Pakistan Institute of Development Economics*

Arif, R. Chaudhry, A.(2011). Effects of external migration on school enrollments accumulated schooling and dropouts in Punjab. *Applied Economics, 2015*

Brockerhoff, M. (1994). The Impact of Rural-Urban Migration on Child Survival. *Health Transition Review, Vol. 4, No. 2 (OCTOBER 1994), pp. 127-149*

Carballo, M & Mboup,M. (2005). International migration and health. *International Centre for Migration and Health.*

Chen J.J.(2006) Migration and Imperfect Monitoring: Implications for Intra-household Allocation. *American Economic Review 2006;96; 227-231.*

Chirwa,E.W. Ngalawa,H. (2006). Determinants of Child Nutrition in Malawi. *South African Journal of Economics, 76(4), 628-640*

Civilize,B. Frenk, S.(2009). The Impact of Remittances on Infant Mortality in Mexico: A Research Design.

De, P.K. Ratha,D. (2012). Impact of remittances on household income, asset and human capital: Evidence from Sri Lanka. *Migration and Development, 1:1, 163-179*

Desai, S. (1992). Children at Risk: The Role of Family Structure in Latin America and West Africa. *Population and Development Review*, *18*(4), 689-717.

Dillon, M. Walsh, C.A. (2012). Left Behind: The Experiences of Children of the Caribbean Whose Parents Have Migrated. *Journal of Comparative Family Studies, Vol. 43, No. 6 (NOVEMBER - DECEMBER 2012), pp. 871-902*

Frank, R. Hummer, R.A. (2002). The Other Side of the Paradox: The Risk of Low Birth Weight among Infants of Migrant and Non migrant Households within Mexico. *The International Migration Review, Vol. 36, No. 3 (Autumn, 2002), pp. 746-765*

Haddad, L., & Hoddinott, J. (1994). Women's Income and Boy-Girl Anthropometric Status in the Cote d'Ivoire. *World Development*, *22*(4), 543-553.

Hamilton, E.R.Choi, K.H. (2014). The mixed effects of migration: Community-level migration and birth weight in Mexico. *Social Science & Medicine 132 (2015) 278-286*

Hamilton,E.R. Choi,K.H.(). Migration and Low Birth weight: Testing Health Selection in Binational Data from Mexico and the U.S.

Hamilton,E.R.Villarreal,A. Hummer,R.A. (2009). Mother's, Household, and Community U.S. Migration Experience and Infant Mortality in Rural and Urban Mexico. *Population Research and Policy Review, Vol. 28, No. 2 (Apr., 2009), pp. 123-142*

Handa, S. (1999). Maternal Education and Child Height. *Economic Development and CulturalChange, 27*(2), 421-439.

Hildebrandt et al.(2005). The Effects of Migration on Child Health in Mexico. *Economía, Vol. 6, No. 1 (Fall, 2005), pp. 257-289*

Hildebrandt, N. McKenzie, D.J.(2005). The Effects of Migration on Child Health in Mexico. *World Bank Policy Research Working Paper 3573, April 2005*

Impact of migration on child growth in Albania and Macedonia, Albanian Centre for Socio-Economic Research, Tirana, 9 August 2013

Jia et al. (2010). Health-related quality of life of "left-behind children": A cross-sectional survey in rural China. *Quality of Life Research, Vol. 19, No. 6 (August 2010), pp. 775-780*

Kanaiaupuni,S.M. Donato, K.M. (1998).Migradollars and Mortality: The Effects of Migration on Infant Survival in Mexico.

Koechlin, V. 2007. International Remittances and Income Inequality: An empirical investigation. *Journal of Economic Policy Reform* 10 (2): 123-141.

Langworthy,B.(2011).The Effects of Parental Migration on Child Nutrition. *Honors Projects. Paper 39.*

Lopez-Cordova, E. 2006. Globalization, Migration and Development: The Role of Mexican Migrant Remittances. *INTAL-ITD Working Paper No. 20, the Inter-American Development Bank.*

Mansuri, G. (2006). Migration, Sex Bias, And Child Growth in Pakistan. *World Bank Policy Research*

Mayda, A. Maria (2007). International Migration: A Panel Data Analysis of the Determinants of Bilateral Flows. *CReAM, Discussion Paper No. 07/07.*

Mckenzie, D. Sasin, M. (2007). Migration, Remittances, Poverty, and Human Capital: Conceptual and empirical challenges. *World Bank Policy Research Working Paper 4272*

Narazani,E.(2013). THE IMPACT OF MIGRATION ON INFANT MORTALITY REDUCTION IN ALBANIA. *Economics & Statistics Cognetti de Martiis.*

Ponce, J. Olivie,I & Onofa,M. (2011). The Role of International Remittances in Health Outcomes in Ecuador: Prevention and Response to Shocks. *International Migration Review (Impact Factor: 1.15). 08/2011; 45(3):727 – 745*

Prabal K. De & Dilip Ratha (2012): Impact of remittances on Household income, Asset and Human capital: evidence from Sri Lanka .*Migration and Development, 1:1, 163-179*

Robson et al. (2008). THE STATUS OF CARE AND NUTRITION OF 774 LEFT-BEHIND CHILDREN IN RURAL AREAS IN CHINA. *Public Health Reports (1974-), Vol. 123, No. 3, Veterinary Public Health (MAY/JUNE 2008), pp. 382-389*

Schmeer,K. (2009). Father Absence due to Migration and Child Illness in Rural Mexico. *Soc Sci Med. 2009 October; 69(8): 1281–1286*

Ssengonzi et al. (2002). The Effect of Female Migration on Infant and Child Survival in Uganda. *Population Research and Policy Review, .Vol. 21, No. 5 (Oct., 2002), pp. 403-431*

Stark O, and David Bloom (1985). The New Economics of Labor Migration. *American Economic Review 1985;75; 173-178.*

Stillman,S. Mckenzie, D. (2009). The Impact of Immigration on Child Health: Experimental Evidence From a Migration Lottery Program. *Economic Inquiry (ISSN 0095-2583) Vol. 50, No. 1, January 2012, 62–81 Working Paper 3946, June 2006*

World Bank. 2005. Global Economic Prospects. Economic Implications of Remittances and Migration, Washington.

World Bank. 2006. The Development Impact of Workers' Remittances in Latin America – Volume II, detailed findings. *Economic Report No. 37026, Washington.*

Yang,D. (2005). Are Remittances Insurance? Evidence from Rainfall Shocks in the Philippines. Discussion Papers are available on the World Wide Web at: http://www.spp.umich.edu/rsie/workingpapers/wp.html

Yang,D. (2008). International migration, remittances and household investment: evidence from philippine migrants' exchange rate shocks. *The Economic Journal, 118 (April), 591–630*

10. APPENDICES

Table 1: QUANTIFICATION OF DEPENDENT, INDEPENDENT & CONTROL VARIABLES

In order to investigate the effect of external migration and remittances on child's health, similar quantification approaches will be adopted as suggested by literature.

DEPENDENT VARIABLES	**QUANTIFICATION**
Weight for Age	z-scores
Height for Age	z-scores
MAIN INDEPENDENT VARIABLES	
External Migration	Dummy equals to 1 if there is an external migrant in the household and zero otherwise
Remittances	Monetary value
CONTROL VARIABLES	
Child's Characteristics	
Age of Child	In months (0-59)
Childs Gender	(female=0,male=1)
Number of children under 5 in HH	Numerical value
Maternal Characteristics	
Mother's Education-Primary	Dummy equals to 1 if mother is educated up to primary level & zero otherwise
Mother's Education-Middle	Dummy equals to 1 if mother is educated up to middle level & zero otherwise
Mother's Education-Secondary	Dummy equals to 1 if mother is educated up to secondary level & zero otherwise
Mother's Marital Status	(married=1,divorced=0)
Children Surviving	Numerical value
Children Dead	Numerical value
Health Inputs	
Child Delivered by Doctor	Dummy equals to 1 if child is delivered by a doctor & zero otherwise

Child Ever Breastfeed	Dummy equals to 1 if child is breastfeed & zero otherwise
Child Receive BCG Vaccination	Dummy equals to 1 if child receives BCG vaccination & zero otherwise
Child Receive Polio Vaccination	Dummy equals to 1 if child receives polio vaccination & zero otherwise
Child Receive Measles Vaccination	Dummy equals to 1 if child receive measles vaccination & zero otherwise
Household's Characteristics	
Number of Household Members	Numerical value
Household Head Sex	(female=0,male=1)
Household Head Education-Primary	Dummy equals to 1 if HH is educated up to primary level & zero otherwise
Household Head Education-Middle	Dummy equals to 1 if HH is educated up to middle level & zero otherwise
Household Head Education-Secondary	Dummy equals to 1 if HH is educated up to secondary level & zero otherwise
Household Head Education-Higher	Dummy equals to 1 if HH is educated up to higher level & zero otherwise
Health Environment	
Water Availability for Hand washing	Dummy equals to 1 if water is available for hand washing & zero otherwise
Treat water before drinking	Dummy equals to 1 if water is treated before drinking & zero otherwise
Water Filter	Dummy equals to 1 if there is availability of water filter & zero otherwise
Parental Health Knowledge & Disease Environment	
Has Heard of AIDS	Dummy equals to 1 if HH members have ever heard of AIDS & zero otherwise
Had Cough and Fever for last three weeks	Dummy equals to 1 if HH members have cough and fever for last three weeks & zero otherwise

Diagnosed as having Tuberculosis	Dummy equals to 1 if HH is diagnosed as having tuberculosis & zero otherwise
Diagnosed as having Hepatitis	Dummy equals to 1 if HH is diagnosed as having hepatitis & zero otherwise
Household's Asset Composition	
Household owns Home	Dummy equals to 1 if HH owns home & zero otherwise
HH Member Own land	Dummy equals to 1 if HH owns land & zero otherwise
Household has Electricity	Dummy equals to 1 if HH has electricity & zero otherwise
Household has Gas	Dummy equals to 1 if HH has gas & zero otherwise
Household owns Television	Dummy equals to 1 if HH owns television & zero otherwise
Household owns Air Conditioner	Dummy equals to 1 if HH owns air conditioner & zero otherwise
Household owns Washing Machine	Dummy equals to 1 if HH owns washing machine & zero otherwise
Household owns Motorcycle	Dummy equals to 1 if HH owns motorcycle & zero otherwise
Household owns Car	Dummy equals to 1 if HH owns car & zero otherwise
Household owns Bicycle	Dummy equals to 1 if HH is diagnosed as having hepatitis & zero otherwise
Household owns Air cooler	Dummy equals to 1 if HH owns air cooler & zero otherwise
Wscore	Calculated by MICS(2011)
Locational Factors	
Urban	(rural=0,urban=1)

INSTRUMENTAL VARIABLES FOR MIGRATION

INSTRUMENTAL VARIABLES	REFERENCES
Historic Migration Rates	Hildebrandt et al.,2005
	Chaudhry & Arif,2011
Household Composition	Mansuri (2006)
Migration networks & Migration history at the village or household level	Mansuri (2006b, c), Acosta (2006)
Rainfall in Mexican villages	Munshi (2003)
State Historic migration rates	Hamilton & Choi (2014)

INSTRUMENTAL VARIABLES FOR REMITTANCES

INSTRUMENTAL VARIABLES	REFERENCES
Dummy variable equals to 1 for the presence of bank or money transfer institution, Two dummies for source country	Ponce, Olivie & Onofa (2011)
Remittance Kinship or Baradri IV	Vyborny & Jamil (2013)
Rainfall shocks , Exploits the natural experiment of 1997 Asian financial crises	Yang (2005), Yang (2006)
Distance between each household locality and its closest western union	Civilize & Frenk (2009)
Number of Western Union offices per 100,000 people at province level,	Antón (2010)

ESTIMATING IMPACT OF HISTORIC MIGRATION RATES ON EXTERNAL MIGRATION

Table 2: Relationship between Historic Migration Rates & External Migration-First Stage Results

Dependent Variable External Migration=1 if there is an external migrant in the house	OLS(1)	OLS(2)	OLS(3)
Average Historic Migration Rates*No.of Adult males in HH	0.00143***	0.00137***	0.00140***
	(6.21e-05)	(6.21e-05)	(6.21e-05)
Number of children under five years of age in HH	0.0120***	0.0106***	0.0104***
	(0.00109)	(0.00109)	(0.00109)
Mother's education-Primary	0.00115	-0.00854***	-0.00373
	(0.00250)	(0.00248)	(0.00253)
Mother's education-Middle	0.0198***	0.0114***	0.0137***
	(0.00326)	(0.00324)	(0.00327)
Mother's education-Secondary	0.0307***	0.0248***	0.0250***
	(0.00303)	(0.00303)	(0.00304)
Mother's Marital Status-currently married	0.0347***	0.0359***	0.0361***
	(0.00620)	(0.00622)	(0.00622)
Number of HH Members	-0.00775***	-0.00615***	-0.00621***
	(0.000512)	(0.000505)	(0.000505)
Number of Women in HH	0.0307***	0.0310***	0.0319***
	(0.00135)	(0.00135)	(0.00135)
Household Head's Age	0.000958	0.00101	0.000908
	(0.000648)	(0.000650)	(0.000650)
Household Head's Sex(Male=1)	-0.210***	-0.212***	-0.215***
	(0.00383)	(0.00382)	(0.00382)
Education of HH Head-Primary	-0.000438	-0.00325	0.000271
	(0.00265)	(0.00266)	(0.00266)
Education of HH Head-Middle	-0.00295	-0.00472	0.000210
	(0.00297)	(0.00298)	(0.00298)
Education of HH Head-Secondary	-0.00661**	-0.00408	0.000891
	(0.00279)	(0.00281)	(0.00280)
Education of HH Head-Higher	-0.0332***	-0.0206***	-0.0143***
	(0.00361)	(0.00356)	(0.00352)
Urban(Urban=1, Rural=0)	-0.0368***	-0.0725***	-0.0715***
	(0.00247)	(0.00232)	(0.00232)
Availability of Water Filter	0.0295***		
	(0.00761)		
Household owns Home	0.0110***		
	(0.00274)		
HH Members Own Land	0.0263***		
	(0.00222)		

Electricity	-0.00354		
	(0.00708)		
Gas	-0.00352		
	(0.00259)		
Television	0.00435*		
	(0.00230)		
Air Conditioner	0.0103**		
	(0.00514)		
Washing Machine	0.0315***		
	(0.00250)		
Motor Cycle	-0.00410*		
	(0.00220)		
Car	-0.0198***		
	(0.00504)		
Bicycle	-0.00118		
	(0.00196)		
Air Cooler	0.00614		
	(0.00621)		
Telephone	0.0973***		
	(0.00455)		
Refrigerator	0.0440***		
	(0.00250)		
Computer	0.0292***		
	(0.00415)		
Cooking Range	0.0387***		
	(0.00496)		
Wscore		0.0545***	
		(0.00134)	
Wealth Index Second			0.00921***
			(0.00306)
Wealth Index Middle			0.0391***
			(0.00318)
Wealth Index Fourth			0.0878***
			(0.00347)
Wealth Index Highest			0.143***
			(0.00402)
Constant	0.131***	0.209***	0.147***
	(0.00863)	(0.00744)	(0.00751)
Observations	60,984	61,629	61,629
R-squared	0.139	0.126	0.125

Note: The sample comprises children 0-59 months of age with anthropometric data. Standard errors appear in parenthesis.
Asterisks denote the level of significance parentheses *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

ESTIMATING THE IMPACT OF NO. OF BANKS IN EACH DISTRICT ON REMITTANCE FROM OVERSEAS

Table 3: Relationship between Number of banks in each district & Remittances-First Stage Results

Dependent Variable Remittances Received from Overseas	OLS(1)	OLS(2)	OLS(3)
No. of Banks in each district*No. of Adult Males	12.11*	14.81**	14.09**
	(7.129)	(7.128)	(7.077)
No. of children under 5 in HH	82,052**	64,427**	67,137**
	(31,945)	(31,283)	(31,300)
Mother's education-Primary	-86,138	-125,287	-132,702
	(82,904)	(81,286)	(82,854)
Mother's education-Middle	-102,779	-99,482	-79,071
	(89,014)	(88,165)	(88,662)
Mother's education-Secondary	2,263	-23,189	-12,411
	(75,708)	(74,956)	(75,717)
Mother's Marital Status- currently married	252,842	292,240	261,826
	(191,336)	(190,445)	(189,856)
No. of Household Members	-13,502	-5,748	-6,912
	(13,654)	(13,387)	(13,358)
Number of Women in HH	26,885	39,748	39,470
	(35,803)	(35,683)	(35,486)
Household Head's Age	23,158	24,728	21,527
	(20,533)	(20,459)	(20,405)
Household Head's Gender	-31,915	23,060	21,893
	(71,403)	(69,061)	(68,852)
Education of HH- Primary	178,588**	192,664**	204,595**
	(87,437)	(87,105)	(86,850)
Education of HH-Middle	51,982	37,640	47,010
	(93,141)	(92,231)	(92,157)
Education of HH-Secondary	208,822**	214,666***	208,371**
	(83,568)	(82,872)	(82,364)
Education of HH-Higher	157,411	170,102*	176,114*
	(100,349)	(99,892)	(98,641)
Urban (Urban=1,Rural=0)	-236,367***	-175,009**	-168,412**
	(77,989)	(70,192)	(70,477)
Availability of Water Filter	311,476**		
	(146,270)		
Household owns Home	26,172		
	(135,235)		
Household Members Own Land	-19,017		
	(65,715)		
Electricity	-1.041e+06**		
	(413,058)		
Gas	174,122**		
	(73,394)		

Television	21,900		
	(90,681)		
Air Conditioner	-25,496		
	(98,071)		
Washing Machine	-117,426		
	(92,355)		
Motor Cycle	22,418		
	(65,854)		
Car	373,652***		
	(106,456)		
Bicycle	261,882***		
	(63,762)		
Air Cooler	-47,318		
	(279,278)		
Telephone	-118,508		
	(79,605)		
Refrigerator	202,771**		
	(92,756)		
Computer	-27,048		
	(81,798)		
Cooking Range	-6,108		
	(92,949)		
Wscore		22,133	
		(43,846)	
Wealth Index Second			-166,508
			(196,357)
Wealth Index Middle			277,615
			(180,584)
Wealth Index Fourth			-168,272
			(175,448)
Wealth Index Highest			28,199
			(180,329)
Constant	846,865**	-113,905	-56,351
	(415,932)	(213,487)	(260,683)
Observations	3,152	3,194	3,194
R-squared	0.031	0.012	0.022

Note: The sample comprises children 0-59 months of age with anthropometric data. Standard errors appear in parenthesis.
Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

ESTIMATING THE IMPACT OF EXTERNAL MIGRATION ON CHILD HEALTH OUTCOMES

Table 4A-Estimating the Effect of EXTERNAL MIGRATION on Child Health measures-Height for Age z-score & Weight for Age z-score using OLS

		Height for Age Zscore				Weight for Age Zscore		
DEPENDENT VARIABLE	OLS(1)	t-value	OLS(2)	t-value	OLS(1)	t-value	OLS(2)	t-value
INDEPENDENT VARIABLES								
External Migration	0.204074***	3.89	0.0840292	1.59	0.228853***	5.62	0.1190428***	2.91
Child's Characteristics								
Age of Child in Months	(0.0399243)***	-27.99	(0.0402337)***	-28.28	(0.0081867)***	-7.39	(0.0085022)***	-7.72
Childs Gender (female=0,male=1)	(0.1000333)***	-4.42	(0.1043438)***	-4.63	(0.0611821)***	-3.49	(0.0640714)***	-3.67
Number of children in HH	(0.0846329)***	-6.44	(0.0735804)***	-5.6	(0.0780511)***	-7.65	(0.0709238)***	-6.97
Maternal Characteristics								
Mother's Education_Primary	0.0713884**	2.31	0.0286621	0.92	0.0537219**	2.24	0.0241203	1
Mother's Education_Middle	0.0667133	1.63	0.0027964	0.07	0.0659724**	2.07	0.0175988	0.55
Mother's Education_Secondary	0.1538116***	3.98	0.0882993**	2.27	0.1217632***	4.06	0.0704783**	2.34
Mother's Marital Status	0.0624281	0.66	0.0204315	0.22	0.0298566	0.41	-0.0068715	-0.09
Children Surviving	(0.0140973)**	-2.26	-0.0042752	-0.68	(0.025005)***	-5.15	(0.0154446)***	-3.18
Children Dead	(0.0769814)***	-4.92	(0.0629906)***	-4.03	(0.0580441)***	-4.78	(0.0465983)***	-3.85
Health Inputs								
Child Delivered by Doctor	0.1251921***	4.66	0.0634512**	2.35	0.1750803***	8.4	0.1223225***	5.84
Child Ever Breastfeed	0.0398714	0.64	0.0661329	1.06	-0.0208261	-0.43	0.002595	0.05
Child Receive BCG Vaccination	0.065334*	1.69	0.0494108	1.28	0.0697808**	2.33	0.0571972*	1.92
Child Receive Polio Vaccination	-0.1526487	-1.16	-0.1544766	-1.18	-0.0582385	-0.57	-0.0604517	-0.59
Child Receive Measles Vaccination	0.1817539***	5.85	0.1574958***	5.07	0.1673683***	6.94	0.1523534***	6.34
Household's Characteristics								
Number of Household Members	0.0202336***	5.31	0.00416	1.03	0.0197426***	6.68	0.0059438*	1.9
Household Head Sex(female=0,male=1)	(0.1301558)***	-2.7	(0.1255423)***	-2.6	(0.1339397)***	-3.58	(0.1308557)***	-3.5
Household Head Education_Primary	0.1166348***	3.55	0.083357**	2.54	0.0929977***	3.65	0.06351**	2.5
Household Head Education_Middle	0.2974098***	8.01	0.2334243***	6.26	0.2093429***	7.26	0.1547727***	5.36
Household Head Education_Secondary	0.3835281***	11.29	0.2770122***	8.01	0.3044953***	11.55	0.2067252***	7.72
Household Head Education_Higher	0.5858699***	13.61	0.3915495***	8.72	0.4563884***	13.66	0.2678248***	7.7
Health Environment								
Water Availability for Handwashing	0.1798388**	2.56	0.1044121	1.48	0.1097651**	2.01	0.0551949	1.01
Treat water before drinking	0.0878798	1.53	0.0127643	0.22	0.1196968***	2.68	0.0497211	1.11
Water Filter	0.125259	1.24	-0.0036835	-0.04	0.1967531**	2.51	0.0756995	0.95
Parental Health Knowledge & Disease Environment								
Has Heard of AIDS	0.2706637***	9.29	0.1716893***	5.78	0.2605624***	11.52	0.1737151***	7.55
Had Cough and Fever for last three weeks	(0.1590998)**	-2.38	(0.1360199)**	-2.05	-0.0457296	-0.88	-0.0305831	-0.59
Diagnosed as having Tuberculosis	-0.1157251	-0.36	-0.0936807	-0.3	-0.1674368	-0.68	-0.1468867	-0.6
Diagnosed as having Hepatitis	-0.1561393	-0.66	-0.1496394	-0.63	-0.1809118	-0.98	-0.1575016	-0.85
Household's Asset Composition								
Household owns Home			0.0222986	0.66			-0.011484	-0.44
HH Member Own land			0.1215568***	4.48			0.1484793***	7.06
Household has Electricity			0.1590683*	1.88			0.0588443	0.9
Household has Gas			0.1402524***	4.29			0.1192933***	4.71
Household owns Television			0.1464786***	5.27			0.0922426***	4.29
Household owns Air Conditioner			0.2662972***	4.6			0.2134849***	4.76
Household owns Washing Machine			0.2343***	7.74			0.1923808***	8.21
Household owns MotorCycle			0.0673847**	2.53			0.1148027***	5.56
Household owns Car			0.1214678*	1.94			0.1511403***	3.12
Household owns Bicycle			0.0271474	1.11			(0.0308927)*	-1.64
Household owns AirCooler			-0.0463383	-0.61			0.0329383	0.56
Locational Factors:								
Urban	0.1387639***	5.53	0.0152846	0.49	0.0369593*	1.9	(0.0483701)**	-2.02
R2	0.0998		0.1122		0.0804		0.0981	
F	75.57		62.02		59.57		53.38	
N	19787		19669		19787		19669	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations

Table 4B- Estimating the effect of EXTERNAL MIGRATION on Child Health measures-Height for Age z-score & Weight for Age z-score using IV 2SLS

			Height for Age Zscore						Weight for Age Zscore			
DEPENDENT VARIABLE	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z
INDEPENDENT VARIABLES												
External Migration	0.7262626	1.22	0.0510796	0.08	4.072799	0.63	1.595376***	3.38	1.18107**	2.36	6.311995	0.97
Child's Characteristics												
Age of Child in Months	0.0400436)***	-28	(0.0402289)***	-28	(0.0405257)***	-22	(0.008499)***	-7.44	(0.0086542)***	-7.72	(0.0093489)***	-4.98
Childs Gender (female=0,male=1)	0.0997309)***	-4.4	(0.1043825)***	-4.6	(0.0943111)***	-3.7	(0.0603909)***	-3.35	(0.0628255)***	-3.54	(0.0575926)**	-2.26
Number of children in HH	0.0851412)***	-6.5	(0.0735151)***	-5.6	(0.0813128)***	-3.6	(0.0793815)***	-7.56	(0.0730294)***	-7.03	(0.0817453)***	-3.55
Maternal Characteristics												
Mother's Education_Primary	0.0706768**	2.28	0.0285216	0.91	0.0230272	0.32	0.0518595**	2.1	0.0286474	1.16	0.0459646	0.63
Mother's Education_Middle	0.0556181	1.29	0.0032143	0.08	-0.0621361	-1.2	0.0369372	1.08	0.0041283	0.12	-0.0497578	-0.97
Mother's Education_Secondary	0.1383335***	3.26	0.0889334**	2.18	0.0142787	0.2	0.0812583**	2.4	0.0500402	1.56	-0.0207728	-0.28
Mother's Marital Status	0.0305737	0.3	0.0221744	0.22	-0.1615833	-0.5	-0.0535036	-0.66	-0.0630483	-0.8	-0.3189025	-0.91
Children Surviving	-0.0094886	-1.2	-0.0045139	-0.6	0.0312042	0.58	(0.0129444)**	-1.99	-0.0077484	-1.27	0.0338602	0.63
Children Dead	0.0732194)***	-4.5	(0.0631635)***	-4	-0.0357786	-1.1	(0.0481993)***	-3.73	(0.041024)***	-3.27	-0.0148655	-0.46
Health Inputs												
Child Delivered by Doctor	0.1180436***	4.2	0.0635989**	2.34	0.0247416	0.61	0.1563734***	7	0.1175617***	5.49	0.0850867**	2.08
Child Ever Breastfeed	0.033984	0.54	0.0665553	1.1	-0.0235235	-0.1	-0.0362328	-0.72	-0.0110212	-0.22	-0.1262859	-0.73
Child Receive BCG Vaccination	0.0675825	1.74	0.0492144	1.27	0.0429676	0.77	0.0756649**	2.45	0.0635274**	2.09	0.0679228	1.21
Child Receive Polio Vaccination	-0.1322803	-1	-0.155824	-1.2	-0.0292382	-0.2	-0.004936	-0.05	-0.0170219	-0.16	0.1201074	0.61
Child Receive Measles Vaccination	0.1753424***	5.49	0.1577859***	5.01	0.0839214	1.64	0.15059***	5.92	0.1430038***	5.76	0.0816456	1.59
Household's Characteristics												
Number of Household Members	0.0163534***	2.81	0.0043335	0.83	-0.0130889	-0.4	0.0095883**	2.07	0.0003492	0.08	-0.0253797	-0.69
Household Head Sex(female=0,male=1)	-0.023667	-0.2	-0.1321056	-1	0.6430745	0.54	0.1447325	1.4	0.0806919	0.76	1.059042	0.89
Household Head Education_Primary	0.112462***	3.38	0.0834462**	2.54	0.0451561	1.18	0.0820778***	3.1	0.0606332**	2.35	0.0363801	0.95
Household Head Education_Middle	0.2899593***	7.6	0.2335808***	6.25	0.1712863***	3.51	0.1898457***	6.25	0.149728***	5.09	0.106571**	2.18
Household Head Education_Secondary	0.3786347***	11	0.2767489***	7.93	0.2587512***	4.09	0.2916897***	10.6	0.2152109***	7.83	0.2357549***	3.71
Household Head Education_Higher	0.5801235***	13.3	0.39088***	8.37	0.4379074***	3.59	0.4413506***	12.7	0.2894053***	7.87	0.4013521***	3.28

DEPENDENT VARIABLE			Height for Age Zscore						Weight for Age Zscore			
	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z
INDEPENDENT VARIABLES												
Health Environment												
Water Availability for Handwashing	0.1707519**	2.4	0.1046132	1.48	0.0706306	0.72	0.0859855	1.52	0.0487141	0.88	-0.0108794	-0.11
Treat water before drinking	0.0804676	1.38	0.0128881	0.22	0.0503746	0.74	0.1002997**	2.16	0.0457301	1	0.0621531	0.91
Water Filter	0.0859284	0.78	-0.0020527	-0	-0.2116893	-0.5	0.0938283	1.07	0.0231374	0.27	-0.2432849	-0.58
Parental Health Knowledge & Disease Environment												
Has Heard of AIDS	0.252029***	7	0.1723541***	5.33	0.1275762	1.58	0.2117969***	7.39	0.1522858***	5.98	0.0906218	1.12
Had Cough and Fever for last three wee	(0.155389)**	-2.3	(0.1361953)**	-2.1	-0.0513637	-0.6	-0.0360185	-0.67	-0.0249307	-0.48	0.0226167	0.26
Diagnosed as having Tuberculosis	-0.0987538	-0.3	-0.0944986	-0.3	0.0567308	0.14	-0.1230242	-0.48	-0.1205242	-0.48	0.0267885	0.07
Diagnosed as having Hepatitis	-0.1616732	-0.7	-0.1492109	-0.6	-0.0525227	-0.2	-0.1953936	-1.03	-0.171314	-0.91	-0.1350764	-0.5
Household's Asset Composition												
Household owns Home			0.0226395	0.66					-0.0224727	-0.83		
HH Member Own land			0.1224902***	3.77					0.118396***	4.62		
Household has Electricity			0.1591553***	1.88					0.0560428	0.84		
Household has Gas			0.1405533***	4.24					0.1095929***	4.19		
Household owns Television			0.1467408***	5.2					0.0837897***	3.77		
Household owns Air Conditioner			0.2681577***	3.94					0.153518***	2.87		
Household owns Washing Machine			0.2358141***	5.62					0.143577***	4.34		
Household owns MotorCycle			0.0675085***	2.52					0.1108114***	5.26		
Household owns Car			0.1221169*	1.91					0.1302172***	2.59		
Household owns Bicycle			0.0269586	1.1					-0.0248085	-1.28		
Household owns AirCooler			-0.0460545	-0.6					0.02379	0.4		
WealthIndexSecond					0.2113598***	3.04					0.1282117*	1.84
WealthIndexMiddle					0.2931296	1.41					0.1165731	0.56
WealthIndexFourth					0.3114104	0.66					0.0129381	0.03
WealthIndexHighest					0.4126641	0.55					-0.0329273	-0.04
Locational Factors:												
Urban	0.1527268	5.15	0.0141208	0.37	0.1402625	0.39	0.0734991***	3.11	-0.0108606	-0.36	0.2158599	0.59
R2	0.0959		0.1131		0.0372		0.0959		0.1131		0.0118	
N	19787		19669		19787		19787		19669		19787	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations

Table 4C- Estimating the effect of EXTERNAL MIGRATION on Child Health measures-Height for Age z-score & Weight for Age z-score using Treatment Effects Model

DEPENDENT VARIABLE		Height for Age Zscore			Weight for Age Zscore			
	TEM(1)	z	TEM(2)	z	TEM(1)	z	TEM(2)	z
INDEPENDENT VARIABLES								
External Migration	1.581821***	15.35	0.9820404***	5.6	1.28308***	16.9	0.7949048***	6.88
Child's Characteristics								
Age of Child in Months	(0.0396899)***	-27.77	(0.0401674)***	-28.24	(0.0080577)***	-7.3	(0.0085017)***	-7.72
Childs Gender (female=0,male=1)	(0.1019812)***	-4.51	(0.1035436)***	-4.6	(0.0602452)***	-3.4	(0.0631099)***	-3.62
Number of children in HH	(0.0838837)***	-6.26	(0.0752505)***	-5.69	(0.0773791)***	-7.4	(0.0721955)***	-7.05
Maternal Characteristics								
Mother's Education_Primary	0.0702449**	2.23	0.032432	1.03	0.0552869**	2.26	0.0269342	1.11
Mother's Education_Middle	0.0355428	0.85	-0.0100807	-0.24	0.0429014	1.32	0.0079063	0.24
Mother's Education_Secondary	0.1116225***	2.83	0.0684473*	1.74	0.0930344***	3.04	0.055518	1.82
Mother's Marital Status	-0.0229409	-0.24	-0.0279215	-0.29	-0.0280458	-0.4	-0.0433905	-0.59
Children Surviving	-0.0022062	-0.34	0.0022076	0.34	(0.0157279)***	-3.2	(0.0105507)***	-2.13
Children Dead	(0.0658364)***	-4.12	(0.0579515)***	-3.68	(0.0496714)***	-4	(0.042768)***	-3.51
Health Inputs								
Child Delivered by Doctor	0.1049017***	3.91	0.0593793**	2.2	0.1622119***	7.79	0.1195552***	5.72
Child Ever Breastfeed	0.0561722	0.9	0.0708944	1.14	4.61E-06	0.21	0.0080067	0.17
Child Receive BCG Vaccination	0.0569314	1.47	0.0455673	1.18	0.0623308**	2.07	0.0549565*	1.84
Child Receive Polio Vaccination	-0.1574873	-1.2	-0.1519558	-1.16	-0.0554836	-0.5	-0.0571198	-0.56
Child Receive Measles Vaccination	0.1735973***	5.58	0.1541317***	4.97	0.1635813***	6.78	0.1503789***	6.26
Household's Characteristics								
Number of Household Members	0.0093605***	2.38	-0.0005492	-0.13	0.0114748***	3.76	0.0023984	0.75
Household Head Sex(female=0,male=1)	0.1517108***	2.89	0.0537286	0.91	0.0837752**	2.07	0.0040632	0.09
Household Head Education_Primary	0.1048033***	3.13	0.08035**	2.44	0.0824591***	3.18	0.0612287**	2.4
Household Head Education_Middle	0.2766126***	7.3	0.228462***	6.09	0.1952436***	6.64	0.1510212***	5.2
Household Head Education_Secondary	0.3709921***	10.71	0.2827308***	8.12	0.2951079***	11	0.2110186***	7.83
Household Head Education_Higher	0.5645917***	12.87	0.4069916***	8.99	0.4402095***	12.9	0.2794538***	7.98
Health Environment								
Water Availability for Handwashing	0.1771435**	2.48	0.1102279	1.56	0.1133789**	2.05	0.0586058	1.07
Treat water before drinking	0.0746143	1.31	0.014466	0.25	0.11078**	2.5	0.0511938	1.15
Water Filter	0.019252	0.19	-0.0528527	-0.51	0.1161715	1.45	0.0385396	0.48
Parental Health Knowledge & Disease Environment								
Has Heard of AIDS	0.2318916***	7.97	0.1639653***	5.53	0.2283339***	10.1	0.1676446***	7.3
Had Cough and Fever for last three weeks	(0.1461938)**	-2.18	(0.133601)**	-2.01	-0.0362994	-0.7	-0.0288734	-0.56
Diagnosed as having Tuberculosis	-0.131796	-0.41	-0.1056065	-0.33	-0.1732936	-0.7	-0.1533994	-0.62
Diagnosed as having Hepatitis	-0.1372098	-0.57	-0.1403652	-0.59	-0.1383164	-0.7	-0.1498726	-0.81
Household's Asset Composition								
Household owns Home			0.0129256	0.38			-0.0185662	-0.7
HH Member Own land			0.0961081***	3.46			0.1293458***	6.05
Household has Electricity			0.1569686*	1.84			0.0571764	0.87
Household has Gas			0.1312558***	3.98			0.1125121***	4.41
Household owns Television			0.1385669***	4.95			0.0863039***	3.99
Household owns Air Conditioner			0.2136329***	3.62			0.173806***	3.82
Household owns Washing Machine			0.1915547***	6.08			0.1601864***	6.64
Household owns MotorCycle			0.0635299**	2.37			0.1119073***	5.39
Household owns Car			0.1028141	1.63			0.1371053***	2.81
Household owns Bicycle			0.0323235	1.32			-0.0270018	-1.42
Household owns AirCooler			-0.0542438	-0.71			0.0270021	0.46
Locational Factors:								
Urban	0.1733927***	6.76	0.046245	1.46	0.0638804***	3.21	-0.0250307	-1.03
Wald chi	2387.5		2502.17		1944.41		2152.84	
N	19669		19669		19669		19669	
chi square	111.28		16.28		136.24		23.36	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 4D: Effect of EXTERNAL MIGRATION on Child Health measures - Height for Age z-score & Weight for Age z-score using IV Treatment Effect Model with Wealth Indices

DEPENDENT VARIABLE	Height for Age Zscore		Weight for Age Zscore	
	IV-TEM WITH WEALTH INDICES	z	IV-TEM WITH WEALTH INDICES	z
INDEPENDENT VARIABLES				
External Migration	0.9295877***	5.01	0.8804221***	8.15
Child's Characteristics				
Age of Child in Months	(0.0399426)***	-28.12	(0.0082038)***	-7.44
Childs Gender (female=0,male=1)	(0.1015652)***	-4.52	(0.0606136)***	-3.47
Number of children in HH	(0.0743114)***	-5.64	(0.0703005)***	-6.86
Maternal Characteristics				
Mother's Education_Primary	-0.0001128	0	0.0059631	0.24
Mother's Education_Middle	-0.0453156	-1.08	-0.0186678	-0.57
Mother's Education_Secondary	0.0408971	1.04	0.0356913	1.17
Mother's Marital Status	-0.0071594	-0.07	-0.0229231	-0.31
Children Surviving	0.0010799	0.17	(0.0123353)**	-2.5
Children Dead	(0.052057)***	-3.31	(0.0384148)***	-3.14
Health Inputs				
Child Delivered by Doctor	0.0513527*	1.9	0.1178357***	5.61
Child Ever Breastfeed	0.079983	1.29	0.015702	0.33
Child Receive BCG Vaccination	0.0363027	0.94	0.0453079	1.52
Child Receive Polio Vaccination	-0.1170739	-0.89	-0.0280288	-0.28
Child Receive Measles Vaccination	0.1429928***	4.61	0.1397198***	5.81
Household's Characteristics				
Number of Household Members	0.0042948	1.07	0.0068085**	2.23
Household Head Sex(female=0,male=1)	0.0719596	1.2	0.0422607	1
Household Head Education_Primary	0.0620523*	1.88	0.0502669**	1.96
Household Head Education_Middle	0.2133672***	5.69	0.1470717***	5.04
Household Head Education_Secondary	0.2650143***	7.61	0.213256***	7.87
Household Head Education_Higher	0.4083678***	9.13	0.3155199***	9.08
Health Environment				
Water Availability for Handwashing	0.1020098	1.44	0.0596516	1.09
Treat water before drinking	0.019144	0.33	0.0622362	1.39
Water Filter	0.0108443	0.11	0.0960672	1.21
Parental Health Knowledge & Disease Environment				
Has Heard of AIDS	0.1626217***	5.49	0.1711265***	7.45
Had Cough and Fever for last three weeks	(0.1153875)*	-1.74	-0.0122374	-0.24
Diagnosed as having Tuberculosis	-0.1360471	-0.43	-0.1790544	-0.73
Diagnosed as having Hepatitis	-0.1286813	-0.54	-0.1323191	-0.72
WealthIndexSecond	0.289243***	7.93	0.1941178***	6.85
WealthIndexMiddle	0.4331427***	10.95	0.3002906***	9.84
WealthIndexFourth	0.5570167***	11.94	0.418133***	11.85
WealthIndexHighest	0.7754989***	13.25	0.5980354***	13.71
Locational Factors:				
Urban	-0.0509223	-1.61	(0.110949)***	-4.66
Wald chi	2523.18		2084.11	
N	19669		19669	
chi square	13.39		32.01	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations

Table 4E: Estimating the effect of EXTERNAL MIGRATION on Child Health measures-Height for Age z-score & Weight for Age z-score using IV Treatment Effect Model WITHOUT HEALTH INPUTS

DEPENDENT VARIABLES	Height for Age Zscore				Weight for Age Zscore			
	TEM With HH Asset Composition	z	TEM with Wealth Quantiles	z	TEM With HH Asset Composition	z	TEM with Wealth Quantiles	z
INDEPENDENT VARIABLES								
External Migration	1.123082***	15.23	1.072232***	13.45	0.7610097***	13.53	0.7696615***	13.41
Child's Characteristics								
Age of Child in Months	(0.0129363)***	-36.52	(0.0128981)***	-36.43	(0.0012916)***	-4.64	(0.0012509)***	-4.48
Childs Gender (female=0,male=1)	(0.0249323)**	-2.11	(0.0244719)**	-2.07	-0.0127822	-1.37	-0.0120579	-1.29
Number of children in HH	(0.0247062)***	-3.57	(0.0248826)***	-3.62	(0.0414959)***	-7.66	(0.0404368)***	-7.48
Maternal Characteristics								
Mother's Education_Primary	0.0179882	1.1	-0.0114465	-0.69	0.0162563	1.26	-0.0114721	-0.88
Mother's Education_Middle	0.0270565	1.26	-0.0078778	-0.37	0.0181233	1.08	-0.0178587	-1.06
Mother's Education_Secondary	0.1066983***	5.32	0.0784901***	3.91	0.0996445***	6.35	0.0719159***	4.57
Mother's Marital Status	-0.0552278	-1.18	-0.0444909	-0.95	-0.0053734	-0.15	0.0036052	0.1
Children Surviving	-0.0031196	-0.9	-0.0045919	-1.33	(0.0140852)***	-5.17	(0.0156505)***	-5.77
Children Dead	(0.0619417)***	-7.43	(0.05731)***	-6.88	(0.0528026)***	-8.08	(0.0491694)***	-7.51
Household's Characteristics								
Number of Household Members	(0.0076175)***	-3.44	-0.0018909	-0.89	-0.0013876	-0.8	0.0033908**	2.04
Household Head Sex(female=0,male=1	0.0951044***	3.14	0.1138278***	3.69	0.0124295	0.53	0.0373365	1.59
Household Head Education_Primary	0.0700656***	4.03	0.0598271***	3.44	0.0417806***	3.06	0.0346627***	2.53
Household Head Education_Middle	0.1741747***	8.96	0.163225***	8.38	0.120599***	7.92	0.1149566***	7.51
Household Head Education_Secondary	0.2541698***	13.92	0.2452562***	13.4	0.18046***	12.61	0.1797332***	12.5
Household Head Education_Higher	0.4295148***	18.44	0.4434644***	19.24	0.3125005***	17.13	0.3444628***	19.02
Household's Asset Composition								
Household owns Home	0.0011074	0.06			-0.0052058	-0.37		
HH Member Own land	0.0899036***	6.13			0.1031717***	8.99		
Household has Electricity	0.2111517***	4.54			0.1361412***	3.74		
Household has Gas	0.0930962***	5.53			0.0951595***	7.21		
Household owns Television	0.1237722***	8.3			0.1024817***	8.78		
Household owns Air Conditioner	0.2258638***	7.53			0.2681658***	11.41		
Household owns Washing Machine	0.1735911***	10.77			0.16723***	13.27		
Household owns MotorCycle	0.097137***	6.88			0.1039163***	9.4		
Household owns Car	0.1619771***	5.02			0.1625893***	6.43		
Household owns Bicycle	0.0143197	1.11			(0.027572)***	-2.73		
Household owns AirCooler	(0.1000689)**	-2.45			-0.0481807	-1.51		
WealthIndexSecond			0.2356085***	11.77			0.1715847***	10.91
WealthIndexMiddle			0.3689373***	17.51			0.3173602***	19.21
WealthIndexFourth			0.4891099***	20.52			0.4336783***	23.34
WealthIndexHighest			0.7363008***	25.45			0.6744592***	30.09
Locational Factors:								
Urban	0.0678451***	4.14	(0.0346945)**	-2.14	0.0018139	0.14	(0.0930878)***	-7.38
Wald chi	5855.11		5816.38		5305.34		5090.18	
N	60843		60843		60843		60843	
chi square	96.31		71.64		85.39		81.8	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

ESTIMATING THE IMPACT OF REMITTANCES FROM OVERSEAS ON CHILD HEALTH OUTCOMES

Table 5A-Estimating the Effect of Remittances from Overseas on Child Health measures-Height for Age z-score & Weight for Age z-score using OLS

DEPENDENT VARIABLE	Height for Age Zscore				Weight for Age Zscore			
	OLS(1)	t	OLS(2)	t	OLS(1)	t	OLS(2)	t
INDEPENDENT VARIABLES								
Remittances from Overseas	1.91E-08	0.55	3.25E-08	0.95	0.000000042*	1.65	(0.0000000535)**	2.09
Child's Characteristics								
Age of Child in Months	(0.0290598)***	-4.12	(-0.0301149)***	-4.31	(0.008751)*	-1.65	(0.0096078)*	-1.83
Childs Gender (female=0,male=1)	(0.2025239)**	-1.97	(0.1938151)*	-1.9	-0.0684506	-0.88	-0.0613787	-0.8
Number of children in HH	(0.1047493)**	-1.96	(0.1005275)*	-1.9	-0.0227106	-0.56	-0.0192823	-0.48
Maternal Characteristics								
Mother's Education_Primary	(0.2633756)*	-1.76	(0.3021814)**	-2.04	-0.0394993	-0.35	-0.0710112	-0.64
Mother's Education_Middle	0.110064	0.67	0.0433933	0.27	-0.0079913	-0.06	-0.0621308	-0.51
Mother's Education_Secondary	0.1312852	0.96	0.0867501	0.64	0.2198156**	2.14	0.1836512*	1.81
Mother's Marital Status	0.2642716	0.48	0.2574214	0.48	0.4831141	1.18	0.4775514	1.18
Children Surviving	0.06026*	1.66	0.0704631*	1.95	-0.0181777	-0.67	-0.0098924	-0.37
Children Dead	0.0406708	0.31	0.092765	0.71	-0.0168158	-0.17	0.0254869	0.26
Health Inputs								
Child Delivered by Doctor	0.1535378	1.32	0.0593773	0.51	0.2218265**	2.53	0.1453642*	1.65
Child Ever Breastfeed	-0.3994762	-1.35	-0.3671496	-1.25	0.0768402	0.35	0.1030908	0.47
Child Receive BCG Vaccination	0.1346203	0.64	0.0391004	0.19	0.3778318**	2.38	0.3002657	1.9
Child Receive Polio Vaccination	(1.221497)**	-2.46	(1.123105)**	-2.28	(0.7382937)**	-1.98	(0.6583949)*	-1.79
Child Receive Measles Vaccination	0.2307791	1.44	0.2141922	1.35	0.3302296***	2.75	0.3167603***	2.66
Household's Characteristics								
Number of Household Members	0.026123	1.59	0.0206161	1.26	0.0117972	0.95	0.0073253	0.6
Household Head Sex(female=0,male=1)	0.1217109	0.95	0.0898793	0.71	0.0608311	0.63	0.0349826	0.37
Household Head Education_Primary	0.1220337	0.77	0.0914036	0.58	0.0304388	0.26	0.0055659	0.05
Household Head Education_Middle	0.5116359***	3.04	0.4499643***	2.69	0.5196605***	4.11	0.4695805***	3.75
Household Head Education_Secondary	0.2199004	1.45	0.1673626	1.11	0.0471607	0.41	0.0044978	0.04
Household Head Education_Higher	0.1314089	0.75	0.0139346	0.08	0.1449452	1.09	0.0495511	0.37
Health Environment								
Water Availability for Handwashing	0.6833048	1.09	0.4379937	0.71	0.0906769	0.19	-0.108526	-0.23
Treat water before drinking	0.0855256	0.42	-0.0346941	-0.17	0.0724703	0.48	-0.0251532	-0.17
Water Filter	0.1761973	0.64	0.0146039	0.05	0.3120454	1.5	0.1808248	0.87
Parental Health Knowledge & Disease Environment								
Has Heard of AIDS	0.312889***	2.75	0.1675477	1.42	0.316599***	3.7	0.1985758**	2.25
Had Cough and Fever for last three weeks	-0.2098603	-0.59	-0.108343	-0.31	-0.3404097	-1.28	-0.2579734	-0.98
Diagnosed as having Hepatitis	-0.2664304	-0.17	-0.1404615	-0.09	-0.5914403	-0.51	-0.4891483	-0.43
Wealth score			0.3703183***	4.28			0.300714	4.63
Locational Factors:								
Urban	0.0339211	0.3	(0.2362891)*	-1.84	0.0217328	0.26	(0.1976892)**	-2.05
R2	0.1026		0.1215		0.135		0.1563	
F	3.47		4.05		4.74		5.43	
N	879		871		879		879	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations

Table 5B-Estimating the Effect of Remittances from Overseas on Child Health measures-Height for Age z-score & Weight for Age z-score using IV 2SLS

DEPENDENT VARIABLE		Height for Age z-score						Weight for Age z-score			
	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z	IV 2SLS(1)	z	IV 2SLS(2)	z	IV 2SLS with District FE	z
INDEPENDENT VARIABLES												
Remittances from Overseas	0.00000147**	2.04	0.00000125**	2.24	2.41E-07	0.39	0.000000965**	1.98	0.000000814**	2.16	4.21E-07	0.84
Child's Characteristics												
Age of Child in Months	-0.0192457	-1.46	(0.0227324)**	-1.99	(0.0303122)***	-3.94	-0.0025595	-0.29	-0.0050102	-0.65	-0.006897	-1.1
Childs Gender (female=0,male=1)	-0.2476893	-1.39	-0.2248445	-1.43	(0.2103327)**	-1.97	-0.0969918	-0.81	-0.0804967	-0.75	-0.0714088	-0.82
Number of children in HH	(0.2170238)**	-2.01	(0.1904772)**	-2.08	-0.0848911	-1.14	-0.0940937	-1.29	-0.075571	-1.21	-0.0166177	-0.27
Maternal Characteristics												
Mother's Education_Primary	(0.4440113)*	-1.66	(0.4825294)**	-2.03	(0.3576205)**	-2.29	-0.153285	-0.85	-0.1822142	-1.13	-0.1344358	-1.05
Mother's Education_Middle	-0.0226867	-0.08	-0.1172432	-0.45	0.0171093	0.09	-0.092629	-0.47	-0.1620585	-0.91	-0.1630672	-1.02
Mother's Education_Secondary	0.1968126	0.83	0.1072639	0.51	0.0839365	0.58	0.261459	1.62	0.1970563	1.38	0.1628034	1.38
Mother's Marital Status	-0.2448667	-0.25	-0.1767257	-0.21	-0.8967547	-1.38	0.1659587	0.25	0.2193713	0.38	0	
Children Surviving	0.0104236	0.15	0.0368902	0.63	0.0652368*	1.68	-0.0498983	-1.09	-0.0309142	-0.78	-0.0139101	-0.44
Children Dead	0.1108185	0.48	0.1907308	0.92	0.2164248	1.43	0.0275869	0.18	0.0862741	0.62	0.0710719	0.57
Health Inputs												
Child Delivered by Doctor	0.4244734*	1.79	0.2138801	1.1	-0.0127679	-0.09	0.3926807**	2.45	0.2412283*	1.83	0.1432839	1.19
Child Ever Breastfeed	-0.0435334	-0.08	-0.0421032	-0.09	-0.2546597	-0.79	0.2973138	0.84	0.3012836	0.95	0.1946926	0.74
Child Receive BCG Vaccination	-0.4497693	-1.05	-0.5223884	-1.38	-0.1668778	-0.58	0.0106987	0.04	-0.0453517	-0.18	0.0458443	0.19
Child Receive Measles Vaccination	0.267648	0.96	0.2314223	0.94	0.182017	1.08	0.3545383*	1.88	0.3282753**	1.96	0.2502685*	1.82
Household's Characteristics												
Number of Household Members	0.020532	0.72	0.0117752	0.46	0.0072708	0.41	0.008263	0.43	0.0018342	0.11	0.0017738	0.12
Household Head Sex(female=0,male=1)	-0.1081077	-0.44	-0.1252523	-0.57	0.0771694	0.48	-0.0849625	-0.51	-0.0994587	-0.67	-0.014995	-0.11
Household Head Education_Primary	0.0132963	0.05	-0.0223234	-0.09	0.0754445	0.46	-0.0384695	-0.2	-0.0648883	-0.38	-0.0344847	-0.26
Household Head Education_Middle	0.632658**	2.11	0.5026359*	1.92	0.4200793**	2.17	0.5975448***	2.95	0.5042423***	2.84	0.4825847***	3.06
Household Head Education_Secondary	-0.0650258	-0.22	-0.109891	-0.42	0.1153645	0.67	-0.1329549	-0.67	-0.1677256	-0.94	-0.0652809	-0.46
Household Head Education_Higher	-0.394855	-1.03	-0.5142018	-1.49	-0.1396337	-0.5	-0.1872099	-0.72	-0.2774305	-1.19	-0.1044422	-0.46
Health Environment												
Water Availability for Handwashing	0.2068768	0.19	-0.1507868	-0.16	0.0363863	0.04	-0.2062098	-0.28	-0.4512236	-0.69	-0.5123299	-0.75
Treat water before drinking	0.4011461	1.07	0.1378246	0.43	0.0584253	0.21	0.2709473	1.07	0.0809487	0.37	0.0770251	0.34
Water Filter	0.1029183	0.21	-0.1706674	-0.4	0.0963117	0.26	0.2671925	0.83	0.0688935	0.24	0.0985259	0.33
Parental Health Knowledge & Disease Environment												
Has Heard of AIDS	0.1973445	0.96	-0.0387909	-0.19	0.21396	1.52	0.2432045*	1.75	0.0700036	0.5	0.157906	1.37
Had Cough and Fever for last three weeks	-0.6802923	-1.08	-0.4277068	-0.78	0.0136105	0.04	-0.6326095	-1.49	-0.4514988	-1.21	-0.203569	-0.67
Diagnosed as having Hepatitis	-0.5675155	-0.22	-0.3735649	-0.16	0.0014154	0.05	-0.6933803	-0.39	-0.559044	-0.35	-0.3858005	-0.3
Wealth Score			0.6516351***	3.67	0.4732654**	2.15			0.4754989***	3.95	0.3561262**	1.98
Locational Factors:												
Urban	0.1249676	0.61	(0.3666118)*	-1.82	(0.3067082)*	-1.88	0.0802375	0.58	(0.2772394)**	-2.02	-0.214092	-1.61
R2	0.0352		0.0435		0.0941		0.0352		0.0435		0.0737	
N	879		879		879		879		879		879	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 5C: Estimating the effect of REMITTANCES FROM OVERSEAS on Child Health measures-Height for Age z-score & Weight for Age z-score using IV-2SLS WITHOUT HEALTH INPUTS

DEPENDENT VARIABLES	Height for Age Zscore		Weight for Age Zscore	
	IV 2SLS	z	IV 2SLS	z
INDEPENDENT VARIABLES				
Remittances from Overseas	1.57E-07	0.39	4.16E-07	1.11
Child's Characteristics				
Age of Child in Months	(0.0125056)***	-7.99	(0.0035717)**	-2.47
Childs Gender (female=0,male=1)	-0.0573609	-1.19	-0.0212612	-0.48
Number of children in HH	-0.0304341	-0.88	-0.0328326	-1.03
Maternal Characteristics				
Mother's Education_Primary	-0.0909988	-1.07	-0.0012547	-0.02
Mother's Education_Middle	0.1224265	1.46	0.0205505	0.27
Mother's Education_Secondary	0.0910937	1.42	0.0559316	0.94
Mother's Marital Status	-0.148421	-0.6	-0.1348022	-0.6
Children Surviving	-0.0083355	-0.44	-0.0162935	-0.94
Children Dead	0.0944519	1.58	-0.0104707	-0.19
Household's Characteristics				
Number of Household Members	-0.0044349	-0.53	-0.0138414	-1.8
Household Head Sex(female=0,male=1)	0.0707336	1.2	0.1117545**	2.05
Household Head Education_Primary	0.0949595	0.87	0.0192297	0.19
Household Head Education_Middle	0.1746141**	2.17	0.0916678	1.24
Household Head Education_Secondary	0.1102228	0.96	-0.070835	-0.67
Household Head Education_Higher	0.1150053	1.02	0.0034103	0.03
Wealth Score	0.4146664***	10.48	0.3703181***	10.15
Locational Factors:				
Urban	-0.1236292	-1.34	-0.0766101	-0.9
Wald chi	324.22		228.6	
N	3162		3162	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 6A: Comparing OLS, IV 2SLS & IV Treatment effect Model External Migration & Height for Age z-score

DEPENDENT VARIABLE	OLS	t-value	IV 2SLS	z	IV-TEM	z
Height for Age Zscore						
INDEPENDENT VARIABLES						
External Migration	0.0840292	1.59	0.0510796	0.08	0.9820404***	5.6
Child's Characteristics						
Age of Child in Months	(0.0402337)***	-28.28	(0.0402289)***	-28.24	(0.0401674)***	-28.24
Childs Gender (female=0,male=1)	(0.1043438)***	-4.63	(0.1043825)***	-4.63	(0.1035436)***	-4.6
Number of children in HH	(0.0735804)***	-5.6	(0.0735151)***	-5.57	(0.0752505)***	-5.69
Maternal Characteristics						
Mother's Education_Primary	0.0286621	0.92	0.0285216	0.91	0.032432	1.03
Mother's Education_Middle	0.0027964	0.07	0.0032143	0.08	-0.0100807	-0.24
Mother's Education_Secondary	0.0882993**	2.27	0.0889334**	2.18	0.0684473*	1.74
Mother's Marital Status	0.0204315	0.22	0.0221744	0.22	-0.0279215	-0.29
Children Surviving	-0.0042752	-0.68	-0.0045139	-0.58	0.0022076	0.34
Children Dead	(0.0629906)***	-4.03	(0.0631635)***	-3.96	(0.0579515)***	-3.68
Health Inputs						
Child Delivered by Doctor	0.0634512**	2.35	0.0635989**	2.34	0.0593793**	2.2
Child Ever Breastfeed	0.0661329	1.06	0.0665553	1.06	0.0708944	1.14
Child Receive BCG Vaccination	0.0494108	1.28	0.0492144	1.27	0.0455673	1.18
Child Receive Polio Vaccination	-0.1544766	-1.18	-0.155824	-1.16	-0.1519558	-1.16
Child Receive Measles Vaccination	0.1574958***	5.07	0.1577859***	5.01	0.1541317***	4.97
Household's Characteristics						
Number of Household Members	0.00416	1.03	0.0043335	0.83	-0.0005492	-0.13
Household Head Sex(female=0,male=1)	(0.1255423)***	-2.6	-0.1321056	-0.98	0.0537286	0.91
Household Head Education_Primary	0.083357**	2.54	0.0834462**	2.54	0.08035**	2.44
Household Head Education_Middle	0.2334243***	6.26	0.2335808***	6.25	0.228462***	6.09
Household Head Education_Secondary	0.2770122***	8.01	0.2767489***	7.93	0.2827308***	8.12
Household Head Education_Higher	0.3915495***	8.72	0.39088***	8.37	0.4069916***	8.99
Health Environment						
Water Availability for Handwashing	0.1044121	1.48	0.1046132	1.48	0.1102279	1.56
Treat water before drinking	0.0127643	0.22	0.0128881	0.22	0.014466	0.25
Water Filter	-0.0036835	-0.04	-0.0020527	-0.02	-0.0528527	-0.51
Parental Health Knowledge & Disease Environment						
Has Heard of AIDS	0.1716893***	5.78	0.1723541***	5.33	0.1639653***	5.53
Had Cough and Fever for last three weeks	(0.1360199)**	-2.05	(0.1361953)**	-2.05	(0.133601)**	-2.01
Diagnosed as having Tuberculosis	-0.0936807	-0.3	-0.0944986	-0.3	-0.1056065	-0.33
Diagnosed as having Hepatitis	-0.1496394	-0.63	-0.1492109	-0.62	-0.1403652	-0.59
Household's Asset Composition						
Household owns Home	0.0222986	0.66	0.0226395	0.66	0.0129256	0.38
HH Member Own land	0.1215568***	4.48	0.1224902***	3.77	0.0961081***	3.46
Household has Electricity	0.1590683*	1.88	0.1591553***	1.88	0.1569686*	1.84
Household has Gas	0.1402524***	4.29	0.1405533***	4.24	0.1312558***	3.98
Household owns Television	0.1464786***	5.27	0.1467408***	5.2	0.1385669***	4.95
Household owns Air Conditioner	0.2662972***	4.6	0.2681577***	3.94	0.2136329***	3.62
Household owns Washing Machine	0.2343***	7.74	0.2358141***	5.62	0.1915547***	6.08
Household owns MotorCycle	0.0673847**	2.53	0.0675085***	2.52	0.0635299**	2.37
Household owns Car	0.1214678*	1.94	0.1221169*	1.91	0.1028141	1.63
Household owns Bicycle	0.0271474	1.11	0.0269586	1.1	0.0323235	1.32
Household owns AirCooler	-0.0463383	-0.61	-0.0460545	-0.61	-0.0542438	-0.71
Locational Factors:						
Urban	0.0152846	0.49	0.0141208	0.37	0.046245	1.46
R2	0.1122		0.1131			
F	62.02					
N	19669		19669		19669	
Wald chi					2502.17	
chi square					16.28	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 6B: Comparing OLS, IV 2SLS & IV Treatment Effect Model-External Migration & Weight for Age z-score

DEPENDENT VARIABLE	OLS	t-statistics	IV 2SLS	z	IV-TEM	z
Weight for Age Zscore						
INDEPENDENT VARIABLES						
External Migration	0.1190428***	2.91	1.18107**	2.36	0.7949048***	6.88
Child's Characteristics						
Age of Child in Months	(0.0085022)***	-7.72	(0.0086542)***	-7.72	(0.0085017)***	-7.72
Childs Gender (female=0,male=1)	(0.0640714)***	-3.67	(0.0628255)***	-3.54	(0.0631099)***	-3.62
Number of children in HH	(0.0709238)***	-6.97	(0.0730294)***	-7.03	(0.0721955)***	-7.05
Maternal Characteristics						
Mother's Education_Primary	0.0241203	1	0.0286474	1.16	0.0269342	1.11
Mother's Education_Middle	0.0175988	0.55	0.0041283	0.12	0.0079063	0.24
Mother's Education_Secondary	0.0704783**	2.34	0.0500402	1.56	0.055518	1.82
Mother's Marital Status	-0.0068715	-0.09	-0.0630483	-0.8	-0.0433905	-0.59
Children Surviving	(0.0154446)***	-3.18	-0.0077484	-1.27	(0.0105507)***	-2.13
Children Dead	(0.0465983)***	-3.85	(0.041024)***	-3.27	(0.042768)***	-3.51
Health Inputs						
Child Delivered by Doctor	0.1223225***	5.84	0.1175617***	5.49	0.1195552***	5.72
Child Ever Breastfeed	0.002595	0.05	-0.0110212	-0.22	0.0080067	0.17
Child Receive BCG Vaccination	0.0571972*	1.92	0.0635274**	2.09	0.0549565*	1.84
Child Receive Polio Vaccination	-0.0604517	-0.59	-0.0170219	-0.16	-0.0571198	-0.56
Child Receive Measles Vaccination	0.1523534***	6.34	0.1430038***	5.76	0.1503789***	6.26
Household's Characteristics						
Number of Household Members	0.0059438*	1.9	0.0003492	0.08	0.0023984	0.75
Household Head Sex(female=0,male=1)	(0.1308557)***	-3.5	0.0806919	0.76	0.0040632	0.09
Household Head Education_Primary	0.06351**	2.5	0.0606332**	2.35	0.0612287**	2.4
Household Head Education_Middle	0.1547727***	5.36	0.149728***	5.09	0.1510212***	5.2
Household Head Education_Secondary	0.2067252***	7.72	0.2152109***	7.83	0.2110186***	7.83
Household Head Education_Higher	0.2678248***	7.7	0.2894053***	7.87	0.2794538***	7.98
Health Environment						
Water Availability for Handwashing	0.0551949	1.01	0.0487141	0.88	0.0586058	1.07
Treat water before drinking	0.0497211	1.11	0.0457301	1	0.0511938	1.15
Water Filter	0.0756995	0.95	0.0231374	0.27	0.0385396	0.48
Parental Health Knowledge & Disease Environment						
Has Heard of AIDS	0.1737151***	7.55	0.1522858***	5.98	0.1676446***	7.3
Had Cough and Fever for last three weeks	-0.0305831	-0.59	-0.0249307	-0.48	-0.0288734	-0.56
Diagnosed as having Tuberculosis	-0.1468867	-0.6	-0.1205242	-0.48	-0.1533994	-0.62
Diagnosed as having Hepatitis	-0.1575016	-0.85	-0.171314	-0.91	-0.1498726	-0.81
Household's Asset Composition						
Household owns Home	-0.011484	-0.44	-0.0224727	-0.83	-0.0185662	-0.7
HH Member Own land	0.1484793***	7.06	0.118396***	4.62	0.1293458***	6.05
Household has Electricity	0.0588443	0.9	0.0560428	0.84	0.0571764	0.87
Household has Gas	0.1192933***	4.71	0.1095929***	4.19	0.1125121***	4.41
Household owns Television	0.0922426***	4.29	0.0837897***	3.77	0.0863039***	3.99
Household owns Air Conditioner	0.2134849***	4.76	0.153518***	2.87	0.173806***	3.82
Household owns Washing Machine	0.1923808***	8.21	0.143577***	4.34	0.1601864***	6.64
Household owns MotorCycle	0.1148027***	5.56	0.1108114***	5.26	0.1119073***	5.39
Household owns Car	0.1511403***	3.12	0.1302172***	2.59	0.1371053***	2.81
Household owns Bicycle	(0.0308927)*	-1.64	-0.0248085	-1.28	-0.0270018	-1.42
Household owns AirCooler	0.0329383	0.56	0.02379	0.4	0.0270021	0.46
Locational Factors:						
Urban	(0.0483701)**	-2.02	-0.0108606	-0.36	-0.0250307	-1.03
R2	0.0981					
F	53.38		0.1131			
N	19669		19669		19669	
Wald chi					2152.84	
chi square					23.36	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 6C: Comparing OLS & IV 2SLS-Remittances from Overseas & Height for Age z-score

DEPENDENT VARIABLE	OLS	t-statistics	IV 2SLS	z
Height for Age Zscore				
INDEPENDENT VARIABLES				
Remittances from Overseas	3.25E-08	0.95	0.00000125**	2.36
Child's Characteristics				
Age of Child in Months	(0.0301149)***	-4.31	(0.0227309)**	-1.99
Childs Gender (female=0,male=1)	(0.1938151)*	-1.9	-0.2248483	-1.43
Number of children in HH	(0.1005275)*	-1.9	(0.1905002)**	-2.1
Maternal Characteristics				
Mother's Education_Primary	(0.3021814)**	-2.04	(0.4825927)**	-2.05
Mother's Education_Middle	0.0433933	0.27	-0.1172957	-0.45
Mother's Education_Secondary	0.0867501	0.64	0.1072438	0.51
Mother's Marital Status	0.2574214	0.48	-0.177549	-0.21
Children Surviving	0.0704631*	1.95	0.0368759	0.64
Children Dead	0.092765	0.71	0.1907597	0.93
Health Inputs				
Child Delivered by Doctor	0.0593773	0.51	0.2139088	1.11
Child Ever Breastfeed	-0.3671496	-1.25	-0.0420819	-0.09
Child Receive BCG Vaccination	0.0391004	0.19	-0.5226071	-1.43
Child Receive Polio Vaccination	(1.123105)**	-2.28		
Child Receive Measles Vaccination	0.2141922	1.35	0.2314429	0.94
Household's Characteristics				
Number of Household Members	0.0206161	1.26	0.011773	0.46
Household Head Sex(female=0,male=1)	0.0898793	0.71	-0.1253102	-0.58
Household Head Education_Primary	0.0914036	0.58	-0.0223891	-0.09
Household Head Education_Middle	0.4499643**	2.69	0.5026166*	1.92
Household Head Education_Secondary	0.1673626	1.11	-0.1099725	-0.42
Household Head Education_Higher	0.0139346	0.08	-0.5143779	-1.54
Health Environment				
Water Availability for Handwashing	0.4379937	0.71	-0.1520422	-0.16
Treat water before drinking	-0.0346941	-0.17	0.1378738	0.43
Water Filter	0.0146039	0.05	-0.1707842	-0.4
Parental Health Knowledge & Disease Environment			-0.0388579	-0.19
Has Heard of AIDS	0.1675477	1.42	-0.4278501	-0.78
Had Cough and Fever for last three weeks	-0.108343	-0.31	-0.3745304	-0.16
Diagnosed as having Hepatitis	-0.1404615	-0.09		
Wealth Score	0.3703183***	4.28	0.6517218***	3.79
Locational Factors:				
Urban	(0.2362891)*	-1.84	(0.3666738)*	-1.83
R2	0.1215			
F	4.05			
N	879		879	
Wald chi			997.32	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1
Source: Based on author's calculations

Table 6D: Comparing OLS & IV 2SLS-Remittances from Overseas & Weight for Age z-score

DEPENDENT VARIABLE	OLS	t-statistics	IV 2SLS	z
Weight for Age Zscore				
INDEPENDENT VARIABLES				
Remittances from Overseas	0.1604181**	2.5	0.000000765**	2.2
Child's Characteristics				
Age of Child in Months	(0.0057597)**	-1.97	-0.0052888	-0.71
Childs Gender (female=0,male=1)	-0.0407046	-0.9	-0.0795372	-0.77
Number of children in HH	(0.0474573)**	-2.01	-0.0718999	-1.21
Maternal Characteristics				
Mother's Education_Primary	-0.0151348	-0.24	-0.1765895	-1.14
Mother's Education_Middle	-0.0398441	-0.51	-0.1561321	-0.91
Mother's Education_Secondary	0.0539914	0.78	0.1956039	1.42
Mother's Marital Status	0.2716973	1.49	0.2223575	0.41
Children Surviving	(0.0286826)**	-2.09	-0.0295367	-0.78
Children Dead	-0.0558709	-1.49	0.0828175	0.61
Health Inputs				
Child Delivered by Doctor	0.1131502**	2.14	0.2357639*	1.86
Child Ever Breastfeed	0.1518182	1.23	0.2933702	0.96
Child Receive BCG Vaccination	0.0376348	0.46	-0.0284827	-0.12
Child Receive Polio Vaccination	-0.0563584	-0.24	0	0
Child Receive Measles Vaccination	0.1962075***	3.03	0.3268275**	2.02
Household's Characteristics				
Number of Household Members	0.0051586	0.7	0.0021521	0.13
Household Head Sex(female=0,male=1)	0.0197418	0.35	-0.0908723	-0.64
Household Head Education_Primary	0.0663665	1	-0.0610247	-0.37
Household Head Education_Middle	0.2672431***	3.38	0.5002936***	2.91
Household Head Education_Secondary	0.1125762	1.6	-0.1577459	-0.93
Household Head Education_Higher	0.1470057*	1.64	-0.2595672	-1.18
Health Environment				
Water Availability for Handwashing	-0.0440268	-0.28	-0.4550388	-0.74
Treat water before drinking	0.070482	0.61	0.075841	0.36
Water Filter	0.1695267	0.98	0.0722238	0.26
Parental Health Knowledge & Disease Environment				
Has Heard of AIDS	0.1582754***	2.82	0.0778391	0.59
Had Cough and Fever for last three week	-0.0299357	-0.2	-0.4450951	-1.24
Diagnosed as having Tuberculosis	0.6912682	0.58	0	0
Diagnosed as having Hepatitis	0.3307854	0.78	-0.6293286	-0.41
Wealth Score	0.2774797***	6.86	0.4653381***	4.12
Locational Factors:				
Urban	(0.2002887)***	-3.27	(0.2740293)**	-2.08
R2	0.1273			
F	13.51			
N	871		879	
Wald chi			3329.28	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations

Table 7A: Estimating the impact of Intra household resource allocation bias where boys in migrant households get preferential treatment in terms of health care (HAZ) as compared to girls

DEPENDENT VARIABLES	Height for Age Zscore- BOYS				Height for Age Zscore-GIRLS			
	TEM With HH Asset Composition	z	TEM with Wealth Quantiles	z	TEM With HH Asset Composition	z	TEM with Wealth Quantiles	z
INDEPENDENT VARIABLES								
External Migration	0.0786304	0.19	0.01156	0.03	1.281885***	6.89	1.219137***	6.24
Child's Characteristics								
Age of Child in Months	(0.0393634)***	-19.34	(0.0388731)***	-19.12	(0.0409027)***	-20.55	(0.0408488)***	-20.57
Number of children in HH	(0.057894)***	-3.08	(0.0587872)***	-3.13	(0.0906925)***	-4.88	(0.0885527)***	-4.8
Maternal Characteristics								
Mother's Education_Primary	0.0335585	0.76	0.0106253	0.24	0.0301519	0.68	-0.0108078	-0.24
Mother's Education_Middle	-0.019246	-0.32	-0.0469379	-0.79	0.0031973	0.05	-0.0414236	-0.71
Mother's Education_Secondary	0.0269097	0.48	0.0055206	0.1	0.1404113***	2.52	0.1067354*	1.92
Mother's Marital Status	-0.020052	-0.14	0.0215714	0.15	0.0234986	0.18	0.0381937	0.29
Children Surviving	-0.0081606	-0.87	-0.0107221	-1.15	0.008953	0.99	0.0085051	0.95
Children Dead	(0.062621)***	-2.79	(0.0575006)***	-2.56	(0.0565553)***	-2.57	(0.0483415)**	-2.2
Health Inputs								
Child Delivered by Doctor	0.089959**	2.34	0.078466**	2.04	0.0273528	0.72	0.0199421	0.52
Child Ever Breastfeed	-0.0853707	-0.97	-0.0803748	-0.92	0.2297479***	2.6	0.2372848***	2.69
Child Receive BCG Vaccination	0.025547	0.46	0.0123819	0.22	0.0682484	1.28	0.0623772	1.17
Child Receive Polio Vaccination	-0.0995189	-0.48	-0.0530577	-0.26	-0.2071965	-1.23	-0.1726353	-1.02
Child Receive Measles Vaccination	0.1677108***	3.8	0.1582171***	3.59	0.1406712***	3.23	0.1266412***	2.91
Household's Characteristics								
Number of Household Members	0.0028005	0.46	0.0096419	1.62	-0.0007379	-0.13	0.0026314	0.48
Household Head Sex(female=0,male=1)	-0.1405981	-1.35	-0.1272818	-1.25	0.132349*	1.73	0.1527912**	1.98
Household Head Education_Primary	0.0668917	1.44	0.0463391	0.99	0.0988931	2.12	0.0790028*	1.69
Household Head Education_Middle	0.2362223***	4.47	0.2256147***	4.27	0.2268994***	4.26	0.2060383***	3.87
Household Head Education_Secondary	0.2763216***	5.64	0.260691***	5.3	0.2895122***	5.87	0.2658963***	5.39
Household Head Education_Higher	0.408654***	6.32	0.4174047***	6.54	0.3938875***	6.19	0.3816073***	6.08
Health Environment								
Water Availability for Handwashing	0.0638278	0.64	0.0466026	0.47	0.1562032	1.56	0.1463525	1.46
Treat water before drinking	0.0053298	0.07	0.0086536	0.11	0.0182031	0.22	0.0246443	0.3
Water Filter	-0.1000242	-0.68	-0.0418957	-0.29	0.0556153	0.38	0.126138	0.87
Parental Health Knowledge & Disease Environment								
Has Heard of AIDS	0.164679***	3.87	0.1680301***	3.96	0.1645853***	3.97	0.1607641***	3.88
Had Cough and Fever for last three week	-0.1421963	-1.49	-0.12038	-1.26	-0.1261887	-1.36	-0.1051081	-1.14
Diagnosed as having Tuberculosis	0.0834031	0.2	0.0452059	0.11	-0.394084	-0.79	-0.421916	-0.85
Diagnosed as having Hepatitis	-0.079536	-0.28	-0.0540475	-0.19	-0.329023	-0.76	-0.3446107	-0.8
Household's Asset Composition								
Household owns Home	-0.0211886	-0.44			0.0542384	1.13		
HH Member Own land	0.1305205***	3.27			0.0764646*	1.95		
Household has Electricity	0.0946291	0.82			0.2231703*	1.76		
Household has Gas	0.1526533***	3.29			0.1125211**	2.41		
Household owns Television	0.2161485***	5.44			0.0640035	1.63		
Household owns Air Conditioner	0.2600426***	3.05			0.1936937**	2.33		
Household owns Washing Machine	0.1971485***	4.18			0.2154176***	4.93		
Household owns MotorCycle	0.0786432**	2.09			0.0526127	1.37		
Household owns Car	0.1377704	1.58			0.0593536	0.65		
Household owns Bicycle	0.0427017	1.23			0.0189064	0.55		
Household owns AirCooler	-0.0066264	-0.06			-0.098372	-0.85		
WealthIndexSecond			0.2970469***	5.74			0.2909011***	5.65
WealthIndexMiddle			0.4884306***	8.48			0.4081159***	7.39
WealthIndexFourth			0.5602522***	7.83			0.6101091***	9.61
WealthIndexHighest			0.8991694***	10.03			0.7225608***	9.07
Locational Factors:								
Urban	0.0221617	0.48	(0.0860072)*	-1.76	0.0537491	1.22	-0.0506773	-1.18
Wald chi	1205.86		1195.39		1324.1		1195.39	
N	9878		9878		9791		9878	
chi square	0		0.01		21.76		18.39	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations

Table 7B: Estimating the impact of Intra household resource allocation bias where boys in Migrant Households get preferential treatment in terms of health care (WAZ) as compared to girls

DEPENDENT VARIABLES	Weight for Age Zscore- BOYS				Weight for Age Zscore-GIRLS			
	TEM With HH Asset Composition	z	TEM with Wealth Quantiles	z	TEM With HH Asset Composition	z	TEM with Wealth Quantiles	z
INDEPENDENT VARIABLES								
External Migration	0.673549***	3.72	0.788006***	4.74	0.8884572***	5.8	0.9406021***	6.42
Child's Characteristics								
Age of Child in Months	(0.0068721)***	-4.42	(0.0063894)***	-4.1	(0.0103088)***	-6.61	(0.0101459)***	-6.5
Number of children in HH	(0.0595299)***	-4.12	(0.059197)***	-4.09	(0.0842153)***	-5.8	(0.0810492)***	-5.59
Maternal Characteristics								
Mother's Education_Primary	0.0214148	0.63	0.0079254	0.23	0.0327851	0.94	0.0047714	0.14
Mother's Education_Middle	-0.047048	-1.03	-0.0702968	-1.53	0.0627853	1.37	0.0319747	0.7
Mother's Education_Secondary	0.0025597	0.06	-0.0154122	-0.36	0.1146477	2.63	0.0918688	2.1
Mother's Marital Status	-0.0852873	-0.79	-0.0559309	-0.51	0.0013513	0.01	0.0126962	0.12
Children Surviving	(0.0177945)***	-2.57	(0.020509)***	-2.96	-0.0023807	-0.34	-0.0034745	-0.49
Children Dead	(0.0476932)***	-2.77	(0.0443508)***	-2.56	(0.0400851)**	-2.33	(0.0343401)**	-1.99
Health Inputs								
Child Delivered by Doctor	0.1188243***	4.06	0.115289***	3.91	0.1199657***	4.02	0.1197744***	4
Child Ever Breastfeed	-0.090403	-1.35	-0.085501	-1.27	0.1106924	1.6	0.1192241*	1.72
Child Receive BCG Vaccination	0.0339625	0.8	0.0231564	0.54	0.0778296*	1.86	0.0689011*	1.65
Child Receive Polio Vaccination	0.1767921	1.12	0.2034958	1.28	(0.2271641)*	-1.71	-0.1959841	-1.48
Child Receive Measles Vaccination	0.1453763***	4.31	0.1352666***	4	0.1549119***	4.53	0.143249***	4.18
Household's Characteristics								
Number of Household Members	0.0039107	0.87	0.0095321**	2.21	0.0004745	0.1	0.0037128	0.85
Household Head Sex(female=0,male=1	-0.0655911	-1.05	-0.0265422	-0.43	0.0682891	1.12	0.1051141*	1.76
Household Head Education_Primary	0.0637775*	1.79	0.0514107	1.43	0.0609119*	1.67	0.0507161	1.38
Household Head Education_Middle	0.1780884***	4.4	0.1768092***	4.34	0.125553***	3.01	0.1180601***	2.82
Household Head Education_Secondary	0.2351148***	6.25	0.2409792***	6.36	0.1866043***	4.84	0.1840101***	4.75
Household Head Education_Higher	0.2877502***	5.83	0.333007***	6.8	0.2704117***	5.44	0.2962308***	6.01
Health Environment								
Water Availability for Handwashing	-0.0014083	-0.02	-0.0073009	-0.1	0.1186164	1.51	0.1200899	1.53
Treat water before drinking	0.0777683	1.26	0.094251	1.52	0.0208623	0.32	0.0271108	0.42
Water Filter	-0.0003271	0	0.0520548	0.47	0.0905219	0.78	0.1531512	1.34
Parental Health Knowledge & Disease Environment								
Has Heard of AIDS	0.1757242***	5.44	0.1821671***	5.63	0.1558252***	4.78	0.1568711***	4.81
Had Cough and Fever for last three wee	0.005969	0.08	0.023517	0.32	-0.0607465	-0.84	-0.0441441	-0.61
Diagnosed as having Tuberculosis	-0.0660827	-0.21	-0.1024504	-0.32	-0.31729	-0.81	-0.3279462	-0.84
Diagnosed as having Hepatitis	-0.0299939	-0.14	-0.0017337	-0.01	-0.436617	-1.28	-0.4500999	-1.32
Household's Asset Composition								
Household owns Home	-0.0374949	-1.01			0.0019457	0.05		
HH Member Own land	0.14938***	5.01			0.1071574***	3.5		
Household has Electricity	0.0283825	0.32			0.0841871	0.85		
Household has Gas	0.1190688***	3.35			0.1058774***	2.89		
Household owns Television	0.1409762***	4.63			0.0300917	0.98		
Household owns Air Conditioner	0.1824161***	2.85			0.1632125***	2.51		
Household owns Washing Machine	0.1521636***	4.46			0.1698037***	4.96		
Household owns MotorCycle	0.1090837***	3.78			0.1159026***	3.87		
Household owns Car	0.1558236**	2.33			0.1211749*	1.7		
Household owns Bicycle	-0.010188	-0.38			-0.0432442	-1.6		
Household owns AirCooler	0.0179929	0.23			0.0366444	0.41		
WealthIndexSecond			0.1879886***	4.73			0.2033602***	5.03
WealthIndexMiddle			0.2983574***	6.93			0.3063803***	7.07
WealthIndexFourth			0.41452***	8.25			0.4278668***	8.6
WealthIndexHighest			0.6045135***	9.85			0.5978739***	9.6
Locational Factors:								
Urban	-0.0337468	-0.98	(0.1177771)***	-3.47	-0.0136847	-0.4	(0.103515)***	-3.09
Wald chi	1103.47		1039.66		1080.36		1065.2	
N	9878		9878		9791		9791	
chi square	7.14		11.1		15.36		19.11	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations

Table 8A: Estimating the impact of Intra household resource allocation bias where boys in remittance recipient households get preferential treatment in terms of health care (HAZ) as compared to girls

DEPENDENT VARIABLE	Height for Age Zscore-BOYS		Height for Age Zscore-GIRLS	
	IV 2SLS	z	IV 2SLS	z
INDEPENDENT VARIABLES				
Remittances from Overseas	-1.29E-07	-0.6	0.000000591**	2.29
Child's Characteristics				
Age of Child in Months	(0.0301611)***	-2.95	(0.0224263)**	-2.06
Number of children in HH	-0.0652378	-0.84	(0.1870976)**	-2.28
Maternal Characteristics				
Mother's Education_Primary	-0.3214268	-1.53	-0.3440814	-1.57
Mother's Education_Middle	0.2034555	0.83	-0.1190427	-0.5
Mother's Education_Secondary	-0.2699717	-1.41	0.380431*	1.83
Mother's Marital Status	-1.00341	-0.87	0.3322211	0.51
Children Surviving	0.0957434*	1.91	-0.0066764	-0.11
Children Dead	0.0415155	0.26	-0.0155887	-0.06
Health Inputs				
Child Delivered by Doctor	-0.0724219	-0.42	0.1586823	0.91
Child Ever Breastfeed	-0.3843973	-0.94	0.0266231	0.05
Child Receive BCG Vaccination	0.0583204	0.19	0	
Child Receive Polio Vaccination	0		(1.916871)***	-3.23
Child Receive Measles Vaccination	0.1030261	0.45	0.3589045*	1.74
Household's Characteristics				
Number of Household Members	0.0122739	0.53	0.0189852	0.75
Household Head Sex(female=0,male=1)	0.2467188	1.34	-0.0636688	-0.32
Household Head Education_Primary	0.0420635	0.19	0.1399698	0.58
Household Head Education_Middle	0.4089233*	1.77	0.4596799*	1.77
Household Head Education_Secondary	0.4576407**	2.13	-0.2109133	-0.89
Household Head Education_Higher	0.2583435	0.92	-0.3238032	-1.28
Health Environment				
Water Availability for Handwashing	1.175463	1.34	-0.2838115	-0.31
Treat water before drinking	-0.1390945	-0.47	-0.0452981	-0.15
Water Filter	-0.058214	-0.14	-0.0651697	-0.17
Parental Health Knowledge & Disease Environment				
Has Heard of AIDS	0.2980724*	1.73	-0.026771	-0.15
Had Cough and Fever for last three weeks	-0.1084239	-0.2	0.0373105	0.07
Diagnosed as having Hepatitis	-0.3094663	-0.2	0	
Wealth Score	0.1891394	1.42	0.6150548***	5.11
Locational Factors:				
Urban	0.0315531	0.16	(0.3453191)*	-1.68
Wald chi	57.14		71.81	
N	436		443	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations

Table 8B: Estimating the impact of intra household resource allocation bias where boys in Remittance recipient households get preferential treatment in terms of health care (WAZ) as compared to girls

DEPENDENT VARIABLE	Weight for Age Zscore-BOYS		Weight for Age Zscore-GIRLS	
	IV 2SLS	z	IV 2SLS	z
INDEPENDENT VARIABLES				
Remittances from Overseas	1.68E-07	1.05	0.000001***	3.66
Child's Characteristics				
Age of Child in Months	-0.0070512	-0.92	-0.0012006	-0.1
Number of children in HH	-0.0258248	-0.44	-0.1166587	-1.34
Maternal Characteristics				
Mother's Education_Primary	0.0277282	0.18	-0.3053608	-1.31
Mother's Education_Middle	-0.0064768	-0.04	-0.1535913	-0.61
Mother's Education_Secondary	0.0288593	0.2	0.3412843	1.54
Mother's Marital Status	0.1805931	0.21	0.2578443	0.37
Children Surviving	-0.0064607	-0.17	-0.0732495	-1.18
Children Dead	-0.0033648	-0.03	0.032529	0.12
Health Inputs				
Child Delivered by Doctor	0.0925073	0.71	0.25291	1.36
Child Ever Breastfeed	0.1672143	0.54	0.5714403	1.09
Child Receive BCG Vaccination	0.1754176	0.76	0	
Child Receive Polio Vaccination	0		-0.9800507	-1.55
Child Receive Measles Vaccination	0.2929361*	1.69	0.5009054**	2.29
Household's Characteristics				
Number of Household Members	0.0124618	0.71	-0.0174734	-0.65
Household Head Sex(female=0,male=1)	0.0497456	0.36	-0.1121466	-0.52
Household Head Education_Primary	-0.1419903	-0.84	0.1072333	0.42
Household Head Education_Middle	0.4455752***	2.56	0.4317355	1.56
Household Head Education_Secondary	0.0987309	0.61	-0.3674533	-1.46
Household Head Education_Higher	-0.0437423	-0.21	-0.2370755	-0.88
Health Environment				
Water Availability for Handwashing	0.0172336	0.03	-0.2129239	-0.22
Treat water before drinking	-0.0294213	-0.13	0.0598191	0.18
Water Filter	-0.1182517	-0.38	0.2890853	0.69
Parental Health Knowledge & Disease Environment				
Has Heard of AIDS	0.2079844	1.6	0.0295696	0.15
Had Cough and Fever for last three weeks	-0.4196963	-1.05	-0.0538558	-0.1
Diagnosed as having Hepatitis	-0.6654245	-0.58	0	
Wealth Score	0.3159045***	3.16	0.4819312***	3.77
Locational Factors:				
Urban	-0.2051364	-1.4	-0.0970252	-0.44
Wald chi	67.98		61.6	
N	436		443	

Asterisks denote the level of significance *** p<0.01, ** p<0.05, *p<0.1

Source: Based on author's calculations