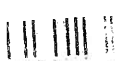
ESSAYS ON REMITTANCES, HOUSEHOLD EXPENDITURE AND LABOUR FORCE PARTICIPATION IN KENYA

JOHN NJOROGE MAARA

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF REQUIREMENT FOR THE AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY IN ECONOMICS OF THE UNIVERSITY OF NAIROBI



2019

DECLARATION

This thesis is my original work and has not been presented for the award of a degree in any othe university.

Signed..... Date 22/11/2019

John Njoroge Maara

This thesis has been submitted for examination with our approval as university supervisors.

Signed..... Date 22/11/2019

Prof. Damiano Kulundu Manda

Signed..... Date 25/11/2019

Dr. Joy Kiiru

DEDICATION

This thesis is dedicated to my parents Mr. Joseph Maara and Mrs. Naomi Wanjiku

ACKNOWLEDGEMENTS

The completion of the PhD journey would have been impossible without the favor and blessings of the Almighty God, with whom all things are possible. I am highly indebted to my supervisors, Prof. Damiano Kulundu Manda and Dr Joy Mueni Kiiru for their guidance and encouragement throughout this complex but exciting journey of writing the PhD thesis. Thank you very much for your constructive criticism, patience, advice, insightful comments and timely feedback that have helped shape this thesis. I am thankful to Prof. Anthony Wambugu, Dr. John Gathiaka and Dr Moses Mureithi for invaluable comments.

I also express my deep appreciation to the University of Nairobi, School of Economics for granting me the opportunity to pursue my PhD programme. I benefitted a lot from your personnel and facilities. My special thanks go to the African Economics Research Consortium (AERC) and Nation Research Fund (NRF) for funding my PhD thesis.

My deepest thanks go to my brothers and sisters for their encouragement, support and prayers throughout my academic journey. I particularly thank my parents for their continuous support. Thank you for believing in me. I wish to thank my classmates Rachael Musitia, Boaz Munga, David Kimani, Esther Nyaosi, Grace Njeru, Margret Ochillo and Pamela Audi for the collaboration and continuous encouragement. Heartfelt appreciation goes to my friend Simon Githuku for guidance and support during the thesis writing. I am extremely grateful to my friends Geoffrey Muricho, Isaac Wachira, Isabel Waiyaki, Richard Kabanda, Martin Warutere and Edward Wainaina for inspiring and encouraging me to soldier on. I will always be grateful. I also wish to thank Felix Kiruja, Veronicah Ndegwa, and Phyllis Mwangi for editing my thesis. Lastly, I make a special mention of my friend Edinah Johnny. Thank you for the moral support, inspiration and being a good study partner. God bless you all.

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LIST OF ABBREVIATIONS

AIDS	Almost Ideal Demand System
CLAD	Censored Least Absolute Deviation
DHM	Double Hurdle Model
ESP	Endogenous Switching Probit
FDI	Foreign Direct Investment
FIML	Full Information Maximum Likelihood
IOM	International Organization for Migration
KNBS	Kenya National Bureau of Statistics
LFP	Labour Force Participation
LIML	Limited Information Maximum Likelihood
NEML	New Economics of Labour Migration
ODA	Official Development Assistance
OLS	Ordinary Least Squares
PSM	Propensity Score Matching
RCT	Randomized Control Trial
RePEAT	Research on Poverty Environment and Agricultural Technology
SUR	Seemingly Unrelated Regression
UNDP	United Nations Development Programme
VIF	Variance Inflation Factor
WDI	World Development Indicators

OPERATIONAL DEFINITION OF TERMS

Country of origin: country of birth.

Extensive margin: refers to the decision on whether a migrant remit money back home or not

Household: consists of a person or group of persons, irrespective of whether they are related or not, who normally live together in the same housing unit or group of housing units and have a common cooking and eating arrangement.

Household head: a person who is responsible for generating and managing the largest part of a household's income.

Household members: persons who are currently living in a household.

Intensive margin: refers to the decision on how much (intensity) remittances a migrant remit.

Migrant: a person who used to live in a household in the country in which the interview was conducted, but left before the interview to live abroad, or in another village or urban area within the country, for at least six months.

Place of residence: where a person normally resides and excludes short-term stays (less than 3 months) for vacations, home visits, or business, medical or religious reasons.

Remittance: refers to international (cross-border) and internal (within-country) person-to-person transfer of money resources often sent by migrant workers.

Diaspora: consist of persons of Kenyan descent/origin and non-resident Kenyans holding a Kenyan passport and/or having dual citizenship and living outside the country for employment, business, education, vocation or any other purpose.

ABSTRACT

While remittances have been on an upward trend in Kenya, little attention has been given to the relationship between remittances and household spending and labour market decisions. The purpose of this thesis is to understand the drivers and the effect of remittances on household behaviour (in terms of spending and labour market participation) in Kenya. The dataset is drawn from single-round household survey conducted in Kenya by the World Bank in 2009. The determinants of remittances are analyzed using Heckman selection model while fractional multinomial logit and endogenous switching probit are applied to examine the effect of remittances on household spending and labour market participation, respectively.

Results indicate that external/internal migrants with higher levels of schooling prior to migration and employed migrants remit higher amounts than their counterparts with lower levels of schooling and who are unemployed. Households receiving external remittance allocate a higher share of expenditure to physical investment than similar households without remittances. Households receiving internal remittance allocate a lower share of expenditure to education and 'other' goods than households without remittance. Being a man (woman) residing in a household with remittance income reduces the probability of labour market participation relative to the counterfactual scenario. These findings imply the need to design policies and interventions that favour migration of skilled individuals, improve migrant's success in domestic (foreign) labour markets, guarantee that internal remittances are diverted to productive uses by recipients, and encourage work effort among remittance receivers.

CHAPTER ONE

INTRODUCTION

1.1 Background

Driven by globalization and rapid urbanization, migration has become a common feature of family life in many parts of the world (IOM, 2005). The number of people residing outside their country of birth, mainly in high income countries, increased from 173 million in 2000 to 244 million in 2015, representing 3.3% of the global population (IOM, 2018). Of the worldwide stock of external migrants, south-south migration (migration between developing countries) accounts for 37% while the south-north (migration from developing to high-income countries) is about 35% of total migration (Ratha et al., 2015). It is further estimated that around 23.2 million people from Sub-Saharan Africa (SSA) live in a country other than their country of birth (World Bank, 2016). Internal migration takes place at higher rates than external migration. For instance, in 2015, around 744 million people globally are estimated to have lived outside their area of birth within their home country (IOM, 2018).

Due to the high cost of migration, uncertainty of living conditions at the migration destination, and rigid migration policies, most migrants typically leave their relatives behind (Demurger, 2015). Migration impacts more on the household members left behind than on the migrants. This is because migrants send financial resources which can alleviate liquidity and budget constraints and so enhance recipients' long-term welfare through investment in human capital. Migration may also impose social costs on the members of a household since the physical absence of migrant may adversely impact on household members' education, health and labour supply (Demurger, 2015).

One of the key benefits of migration is remittances received by migrant members back home. Remittances or the personal monetary transfer made by migrants to their families left behind, have increased rapidly in the last one decade. The worldwide level of international remittances flows grew from US$ 330.3 billion in 2006 to US$ 592.9 billion in 2014 (World Bank, 2016). The officially recorded remittance flows are expected to reach US$ 715.0 billion globally by 2019, out of which US$ 538.0 billion will be received by developing countries (World Bank, 2018). It is estimated that SSA received US$ 34.8 billion worth of international remittances in

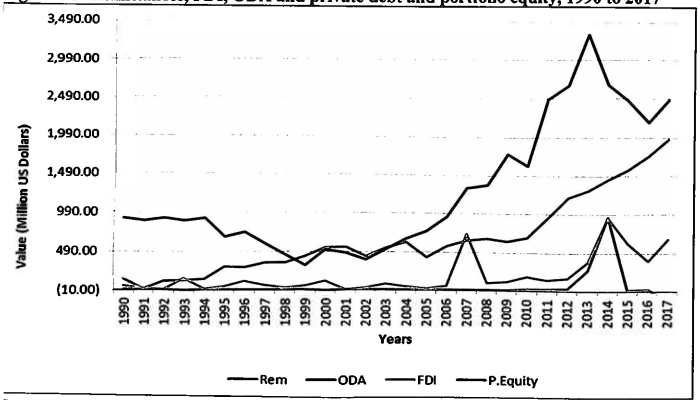
2014, and these are projected to reach US$ 47.0 billion in 2019 (World Bank, 2018). The level of external remittances received by East African region (Burundi, Kenya, South Sudan, Rwanda Tanzania and Uganda) has also increased rapidly from US$ 3.0 billion in 2014 to US$ 4.4 billion in 2017 and US$ 4.6 billion (excluding South Sudan) in 2018 (World Bank, 2019). However, the size of global remittance flows may be under-estimated because a significant proportion of remittances are sent through informal transfer channels (World Bank, 2016). The global estimates of internal remittances are non-existent. Governments in the labour exporting countries concentrate on harnessing international but not local remittances (McKay and Deshingkar, 2014).

In Kenya, migration is characterized by movement of people both across boarder (external migration) and within borders (internal migration). External migration is dominated by cross-border movements to East African countries and OECD countries in pursuit of employment and education opportunities. According to International Organization for Migration (IOM), emigrants tend to be young people mostly between the age of 26 and 35 years and with higher levels of human capital (IOM. 2015). The World Development Indicators (WDI) identifies the United Kingdom (UK) as the most preferred destination for Kenyan external migrants with 30.7% of the emigrants estimated to have lived there in 2013, followed by United States of America (USA) (23.7%), Tanzania (12.5%), Uganda (9.3%) and Canada (5.6%). The within border migration is dominated by rural-urban migration with the intention of seeking employment and education opportunities in the urban sector. Rural-urban migration is frequently triggered by regional economic disparities. Urban areas have relatively developed economies with more high-wage employment opportunities (Agesa and Kim, 2001; Agesa, 2004).

The magnitude of international and internal remittances received by Kenyan households has increased rapidly in the last decade. For instance, the officially recorded remittances to Kenya from abroad rose from US$ 0.78 in 2004 to US$ 1.89 billion in 2017 (Republic of Kenya, 2019). The surge in the levels of external remittances to Kenya is attributed to several factors. First, is an increase in the number of external migrants investing money back in Kenya due to the attractive investment opportunities in the real estate sector (IOM, 2017). Second, is the tax amnesty on money repatriated to Kenya from abroad and, partnerships between commercial banks and external money remittance providers. Third, the number of Kenyans living abroad has

been rising and there has also been a low rate of naturalization of emigrants in the host countries particularly in Europe and North America (Ocharo, 2015). Finally, Kenya's 2010 Constitution permits dual citizenship, making it possible for migrants residing in the diaspora as dual citizens to send money back home. The trend in international remittances and other capital flows to Kenya from 1990 to 2017 is shown in Figure 1.1.

Figure 1.1: Remittances, FDI, ODA and private debt and portfolio equity, 1990 to 2017



Source: Author's construction from World Bank (2019), World Development Indicators

The figure reveals that levels of external remittances to Kenya have increased steadily in the last one decade. The figure also shows that external remittances exceed foreign direct investments (FDIs), and private debt and portfolio equity. Remittances from the diaspora are the second largest source of foreign finance, behind official development assistance (ODA). External remittances are less volatile and more stable than FDI, ODA and private debt and portfolio equity. Though the amounts of external remittances received by Kenya have generally been on upward trend in the last one decade, the levels are below the country's target of 5% of GDP (Republic of Kenya, 2008).

Owing to the vast amount of inward official remittances, the government now recognizes diaspora as a vital enabler of Kenya's economic development. Also, the government underscores the constraints hampering diaspora contribution to Kenya's economic development, including high remittance transaction costs and insufficient mechanisms for protecting Kenya nationals in the diaspora. To mitigate these constraints, the Government of Kenya has developed interventions/policies such as the Vision 2030 and Diaspora Policy to empower the diaspora to successfully make greater contribution to economic development (Republic of Kenya, 2014). Specifically, Kenya's Vision 2030 regards external remittances as a flagship project under financial services sector. Therefore, Kenya seeks to pursue a comprehensive remittance strategy. This goal is emphasized in the Second Medium-Term Plan of Vision 2030, whereby the country seeks to augment external remittances to at least 5% of Kenya's GDP (Republic of Kenya, 2008). Under Diaspora Policy, the government seeks to harness and maximize the developmental potential of diaspora, for instance by improving ability to provide consular services, easing the high remittance transaction costs, safeguarding Kenyans living abroad, and creating reintegration mechanisms for return migrants (Republic of Kenya, 2014).

The adoption of mobile phone-based money transfer in Kenya has allowed migrants to remit money cheaply. Subsequently, a sizable increase in internal remittances has been witnessed. For instance, the level of money transferred through mobile phone platforms reached US$ 35.18 billion in 2017 up from US$ 0.24 billion in 2007 (Republic of Kenya, 2018). Internal remittances are mainly sent to rural areas and tend to be dominated by well-educated and employed individuals living in urban areas (Godoy et al., 2012).

Remittances can affect recipient households in several ways. First, remittances serve as a lifeline for the poor (Ratha, 2007). Remittances are commonly used by the poor to finance necessities such as food, education and health, and thus improve household welfare. Some of the remittances are used for asset acquisition, thereby aiding wealth creation. Thus, understanding the determinants of remittances in Kenya would be critical in designing policies to fight poverty. Secondly, remittances may influence household spending behaviour. For instance, recipient households may choose to allocate remittances disproportionately on consumptive items (such as alcohol, cigarettes) rather than on productive investments (human and physical capital).

Thirdly, remittances may create a moral hazard problem and induce recipients to reduce their work effort (Chami et al., 2005; Naiditch and Vranceanu, 2009). Though remittances have been argued to influence household economic outcomes, the literature on their effects is scarce in Kenya.

1.2 Statement of the Problem

The levels of external and internal remittances received by households in Kenya have increased rapidly in the past one decade. Currently, remittances are treated as a major contributor to Kenya's economic growth and development because of their immense levels. Although remittances are very important in the Kenyan economy, the factors that influence remittance flows are not clearly understood. Previous empirical works analyzing the determinants of internal remittances such as Johnson and Whitelaw (1974) and Knowles and Anker (1981) fail to address sample selection bias. Studies that address sample selection bias (Hoddinott, 1992; 1994) focus on remittance behaviour of migrant sons only. Further, the studies overlook marginal effects and thus provide wrong interpretation of the impact of explanatory variables on levels of remittances. This study uses a nationally representative cross-sectional data to shed light on the drivers of both internal and external remittances. Unlike previous studies using selection model to explore the determinants of remittances, this study computes the conditional and unconditional marginal effects to explain the impact of explanatory variables on amounts of remittances sent.

Although the levels of remittances have increased substantially in Kenya in the recent past, it does not necessarily mean that they have a desirable effect on the economy. Their contribution to economic development depends on expenditure allocation and labour supply decisions in the recipient households (Chami et al., 2008). Remittances can lead to sub-optimal household spending by inducing recipients to spend on immediate consumption, which confers short-term benefits only. This renders recipient households worse-off and consequently perpetuate migration phenomenon. Given the remarkable levels of remittances in Kenya, it is imperative to analyze their impact on recipient's expenditure allocation behaviour in order to craft policy for leveraging productive use of remittances. While existing studies (Simiyu, 2013) investigate the impact of remittances on household expenditure allocation without controlling for sources of remittances, this study analyzes the differential impacts of internal and international remittances. This distinction is essential given that internal (external) remittances may vary in their nature.

External remittances might be more risky and volatile than domestic remittances. Also, external migrants are likely to be richer, more skilled, more connected and more exposed to new norms and ideas from abroad than domestic migrants (Askarov and Doucouliagos, 2018). Furthermore, external remittances, on average, dwarf domestic remittances and mostly go to higher-income and urban households relative to internal remittances (Thapa and Acharya, 2017). Thus, the two streams of flows may have different impacts on household expenditure allocation.

Generally, remittances occur under asymmetric information. Consequently, they may be plagued by moral hazard problem which can induce recipients to divert resources to leisure (Perez and Valente, 2018). This may in turn reduce recipient's income and decelerate economic growth (Naiditch and Vranceanu, 2009). Even though remittances have been rising rapidly in the past one decade, there is limited research on the association between remittances and labour supply decision in Kenya. Studies focusing on labour markets in Kenya (Odhiambo and Manda, 2003; Kabubo-Mariara, 2003; Wambugu, 2011; Asfaw et al., 2014) do not focus on work-effort-remittances nexus. With large size of remittances, understanding their impact on work incentives is essential to providing relevant information necessary for designing policy. Consistent with the research problem, this study seeks to answer the following research questions: What are the determinants of external and internal remittances in Kenya? What is the effect of these remittances on household expenditure allocation? What is the effect of remittances on labour market participation?

1.3 Objectives of the Study

The overall objective of this study is to understand the drivers and the effects of remittances on household behaviour in Kenya. To achieve this objective, this study pursued the following specific objectives:

a) Analyze the determinants of external and internal remittances in Kenya.
b) Examine the effect of these remittances on household expenditure allocation in Kenya.
c) Investigate the effect of remittances on labour force participation in Kenya.

1.4 Contribution of the Study

This study makes contribution to the literature on remittances in a number of ways. First, this study provides empirical evidence on remittances in Kenya by carrying out a comparative

analysis of the drivers of internal and external remittances and their effects on household spending and labour force participation using household survey data. Previous studies on the drivers of remittances in Kenya such as Johnson and Whitelaw (1974), and Knowles and Anker (1981) focus on urban to rural remittances. This study analyzes the drivers of internal and external remittances. This is important because the determinants of remittances may vary with nature of migration as demonstrated by Gubert (2002). It is also essential to explore the drivers of external and internal remittances to inform policy with a view to fostering internal and external remittances.

Second, some studies such as Johnson and Whitelaw (1974) and Knowles and Anker (1981) fail to address sample selection bias. This means that the parameter estimates of the determinants of remittances are likely to be biased and inconsistent. Studies applying Heckman sample selection model (Hoddinott, 1992; 1994) to address selection bias focus on male migrants and used data from certain geographical area; Hoddinott (1992) used data from Central Kenya while Hoddinott (1994) applied data from Western Kenya. This study uses national-wide household data to analyze remittance behaviour of both male and female migrants. The study also addresses selection bias and endogeneity of household income.

Third, the amounts of remittances received by Kenyan households have increased rapidly in the last one decade. However, the way remittances are spent by the recipient households and thus how they impact on economic development has not been thoroughly examined. Consequently, the findings of this study will be used by policy makers striving to maximize developmental impact of remittances. Previous empirical studies (Simiyu, 2013) explored the impact of remittances on household spending without decomposing remittances by source. This study examines the differing effect of internal and external remittances on household spending. The study also diverges from Simiyu (2013) by exploring the effect of remittances on a broad range of household expenditure: food, education, health, consumer durables, physical investments, housing and land, and discretionary goods. This study uses an estimation method that takes into account the fact that the share of total household expenditure allocated to a given category of good is bounded between zero and one. Besides, the study deals with endogeneity of remittances by applying instrumental variable technique and therefore provides unbiased parameter estimates of the effect of remittances.

Lastly, though there is growing literature on labour market studies in Kenya (Odhiambo and Manda, 2003; Kabubo-Mariara, 2002; 2003; Wambugu, 2011), there is scarcity of research on the relationship between remittances and labour force participation. With increasing levels of remittances received by households in Kenya, it is paramount to understand how they affect work effort in order to device appropriate policies for increasing labour force participation. Unlike previous studies analyzing the impact of remittances on labour market participation, this study applies endogenous switching probit estimator developed by Lokshin and Sajaia (2011) to deal with selection bias and potential endogeneity of remittances. Furthermore, by using switching probit estimator, this study concurrently estimates the effect of remittances on labour market participation among the recipients and non-recipients and, therefore, returns more robust parameter estimate of the impact of remittances.

1.5 Literature Overview

The main frameworks used to shed light on why migrants remit are altruism, self-interest and enlightened self-interest (Lucas and Stark, 1985). Other frameworks include weak altruism (Brown and Poirine, 2005), savings target (Glytsos, 1997) and information asymmetry (Naiditch and Vranceanu, 2009) models. Different econometric methodologies have been used to investigate migrant's remittance behaviour. Earlier studies overlook data censoring and use ordinary least square (OLS) estimator (Stark and Lucas, 1988). Other empirical works apply Tobit estimator to handle data censoring (Hoti, 2015). Previous studies (Gubert, 2002) use Censored Least Absolute Deviation (CLAD) or Heckman selection (Hoddinott, 1994) estimators as an alternative to Tobit estimator. Empirical studies show that the most important correlates/predictors of remittances are the characteristics of both the natal family and the migrant. Empirical results differ with the country of analysis, type of migration (external or internal), methodology and dataset used.

There are three standpoints regarding how remittances are perceived and thus spent by recipients. Remittance income may perhaps be perceived as fungible (Cuecuecha and Adams, 2016), regular/permanent income (Chami et al., 2008) or temporary/irregular/transitory income (Adams, 1998). Other theories include mental accounting (Shefrin and Thaler, 1988) and intra-household bargaining models (Amuedo-Dorantes and Pozo, 2011). Some studies pay no attention to censoring problem and thus use OLS estimator (Castaldo and Reilly, 2007). Other empirical

works handle the censoring problem by applying Tobit estimator. Of late, fractional logit estimator (Papke and Woodridge, 1996) has been put forward as a substitute to OLS and Tobit estimators. Empirical studies reveal that the way remittance is spent varies from one country to another and with source of remittance income.

Remittances may influence labour force participation decision of the household members left behind via raising reservation wage of recipients (Killingsworth, 1983), alleviating financial constraints faced by recipients (Woodruff and Zenteno, 2007) and by increasing recipient households' investment in education and training (Gorlich et al., 2007). Some studies ignore endogeneity and self-selection problems, thereby applying binary probit estimator (Konica and Filer, 2009). Recent studies eliminate endogeneity of remittance receipt by using instrumental variable (IV) (Jadotte and Ramos, 2016) or propensity score matching (PSM) techniques (Ndiaye et al., 2016). Empirical works reveal that the relationship between remittances and labour force participation of the left-behind family members is contradictory. Some analyses reveal that remittance reduces the likelihood of recipient participating in the labour market whereas others indicate an inverse or no relationship. Other empirical studies show that the impact on labour market participation of remittances varies with recipients' gender and the source of remittances.

1.6 Methodological Approaches

The theoretical framework for analyzing the determinants of remittances is based on a separable utility function in which a migrant values his or her own utility and that of the household at the place of origin (Funkhouser, 1995). The framework enables us to empirically examine several fundamental testable predictions that concern both the probability of remitting and the level of remittances among migrants who remit. To achieve the objective of this study, Heckman sample selection model is applied to analyze the determinants of remittances. Heckman's approach is used to address selection bias that emanates from the fact that some migrants do not remit within the reference period so that those who remit will have self-selected themselves into remitting. Given that Maximum Likelihood (ML) estimator has been criticized on grounds that it is hinged on stronger distribution assumptions and its estimates are less robust, Heckman's selection model is estimated using two-step procedure. In this study, household income is treated as endogenous. This model is developed, discussed and estimated in chapter two.

The theoretical framework for investigating the relationship between remittances is anchored on consumer demand theory as developed by Maitra and Ray (2003). In this framework, a household maximizes a utility/welfare function subject to a budget constraint that includes remittances besides other types of incomes. To achieve the objective of this study, fractional multinomial logit (FMlogit) estimator proposed by Buis (2012) is used. FMlogit is applied because household expenditure shares are bounded within [0, 1] interval and for each observation/household, the shares should add up to 1. This thesis first treats remittances as exogenous and later assumes them as endogenous. To deal with the issue of endogeneity, the study applies instrumental variable (IV) approach. FMlogit model is discussed further in chapter three.

To achieve the third objective, this study uses static neoclassical labour supply model developed by Cahuc and Zylberberg (2004). The static labour supply framework provides an understanding of the link between non-labour income (such as remittances) and recipient's labour force participation. Due to endogeneity and self-selection issues, two-step endogenous switching probit estimator developed by Lokshin and Sajaia (2011) is applied. This model is described in detail and estimated in chapter four.

1.7 Data Sources

This thesis uses Kenya dataset of the World Bank Migration and Remittances Household Survey. The household survey is single-round and was conducted between late October and mid-December 2009. It was administered as a part of African Migration Project, which sought to improve the understanding of the attributes of migrants in migrant sending countries and in so doing assist to enlighten national policy makers of migration and remittances motives, channels and their impact on the economic and social-social situation in Sub-Saharan Africa. The survey gathered data on households with domestic and external migrants. It also collected information on households without migrants/non-migrant households. The African Migration Project employed a homogeneous methodology formulated by the World Bank for all the six countries surveyed: Burkina Faso, Kenya, Nigeria, Senegal and Uganda - principally migrant-sending countries, and South Africa - principally migrant-receiving country. The household surveys were carried out by mainly country-based researchers and institutions. In the Kenyan case, the household survey was conducted by the University of Nairobi, School of Economics.

A two-stage sampling procedure drawn by the Kenya National Bureau of Statistics (KNBS) was used to gather information. To deal with population increase, migration and modifications of the administrative units such as districts that had taken place after the 1999 National Census, the 2005/2006 Kenya Integrated Household Budget Survey, the 2006/2007 Financial Services Deepening (FSD) Survey and the site/map of remittance service providers comprising of M-Pesa, Western Union and Money Gram were taken into account in devising the sampling frame.

A key challenge in carrying out the household survey was tracing households with external or return migrants. Therefore, to map out clusters with higher chance of finding external or return migrants, the survey sought guidance from officials from the KNBS, village elders and administrative officers. This resulted to selection of 17 districts and 92 clusters. It was apparent that if the sample is drawn randomly, the frequency of migration would not yield a high number of households with migrants, even in high migration areas. Thus, the household survey used a two-stage sampling approach in which the selection procedure of households to be interviewed entailed re-listing of households in all clusters to update the list of inhabited households to single out three sets of households: households with external (internal) migrants and non-migrant households. Every set of household was regarded as a distinct sub-frame. Random sampling was then employed to choose households in each set of household. At this point, a tool was developed to capture the key features of household: household headship, number of household members and existence and number of external (domestic) migrants. This enabled the identification of migrant households and afterward choosing a sample with more migrant households.

Finally, 1,942 households across the eight regions of Kenya were surveyed. In this survey, household head was the key respondent or a representative assisted by household head. Among the surveyed households, 51% were drawn from rural areas whereas 49% were based in urban areas. 37% of the surveyed households had external migrants, 29% domestic migrants, while 34% had non-migrants. At the individual level, the survey gathered information on 2,245 migrant and 8,343 no-migrants.

The detailed questionnaire gathered information on household such as the number of household members, country of birth, age, sex, education, place of residence and marital status. The questionnaire also collected information on the characteristics of household members, housing and house ownership. It also gathered information about household assets, expenditure and household usage (access) of financial services. The comprehensive questionnaire also asked questions about former household and non-household members: migrant place of residence, motive for migrating, migrant's education, employment status (prior and post-migration), demographic characteristics, remittances behaviour, channel for remitting money and levels of remittances. Finally, the survey collected information on return migrants: household members presently residing in the household but who used to live outside the household either within the country or abroad.

1.8 Structure of the Thesis

This study is organized into five chapters. Each addresses a specific objective. The first chapter is an introduction. The next chapter analyzes the determinants of remittances in Kenya. Chapter three explores the relationship between remittances and household expenditure allocation. Chapter four analyzes the impact of remittances on labour force participation. Chapter five presents the summary, conclusions, policy recommendations and suggestions for further research.

CHAPTER TWO

DETERMINANTS OF REMITTANCES IN KENYA

2.1 Introduction

External remittances have become a vital source of financial flow to the Kenyan economy in the last one decade. Official recorded external remittances increased from US$ 0.8 billion in 2009 to US$ 1.69 billion in 2016 (Republic of Kenya, 2019). The official recorded inward remittances flows to Kenya in 2018 were estimated at US$ 2.67 billion (Republic of Kenya, 2019). The principal source of external remittances to Kenya is North America (51.54%) followed by Europe (32.31%) and the rest of the world constitutes the remaining 16.14% of the total inflows (Republic of Kenya, 2019). The true amount of external remittances to Kenya may be under-estimated because the official figures fail to account for money transferred through informal channels such as *hawala*[1] and friends and relatives.

The rapid growth in levels of external remittances received is attributable to several factors. First, there has been an increase in the number of external migrants investing money back in Kenya due to the attractive investment opportunities in the real estate sector (IOM, 2017). Second, there has been significant increase in number of Kenyans living in the diaspora and low rate of naturalization of emigrants in high income countries (Ocharo, 2015). Third, the Kenya Constitution currently allows dual citizenship, thus enabling Kenya dual citizens to remit money back home. Finally, there has been improvement in data collection and proper classification of remittances by commercial banks.

As a source of foreign resources to Kenya, external remittances are appealing because of several properties. First, their magnitude is large compared to foreign direct investments (FDIs) and private debt and portfolio equity. External remittances are the leading source of foreign exchange to the country. The amount of external remittances received surpasses the revenues from tea, horticulture and tourism (IOM, 2017). Second, external remittances are stable and resilient to

[1] An informal channel for transferring money commonly found in Arab countries. The system is based on trust and extensive use of connections such as family relationships or regional affiliations so that money is paid to an agent commonly known as hawaladar who then instructs an associate in the relevant country to pay the final recipient.

economic downturns relative to other private capital flows such as FDI and private debt and portfolio equity. Thirdly, external remittances have increased steadily over the years (Republic of Kenya, 2019; IOM, 2017).

Like in other countries, the true size of domestic remittances in Kenya is not known. This could be due to the lower recognition accorded to internal migration, and lack of recording of the remittances. Further, internal remittances are normally remitted through informal channels, therefore making it difficult to record domestic remittances in official estimates of remittances (Ratha et al., 2011). Nevertheless, the levels of remittances sent by domestic migrants in Kenya have increased rapidly in the last decade due to adoption of mobile money transfer services such as M-Pesa, Airtel Money, Equitel Money and T-Kash. For instance, the value of money sent through mobile phone platforms increased from US$ 0.24 billion in 2007 to US$ 35.18 billion in 2017 (Republic of Kenya, 2018).

Remittance is a key contributor to Kenya's economic growth and development. Existing literature shows that external remittances stimulate economic growth (Aboulezz, 2015; Kosgei et al., 2016), demand for housing construction (Kagochi and Kiambigi, 2012) and revamp stock market performance (Njoroge, 2015). Domestic/external remittances supplements household income (Johnson and Whitelaw, 1974; Hoddinott, 1994), increases household welfare (Kiiru, 2010), reduce income inequalities (Bang et al., 2016) and boost accumulation of physical capital (Jena, 2017). Studies also show that remittances intensify household investment on education, health and entrepreneurship (Odipo et al., 2015).

Despite the significance of remittances in the Kenyan economy, the drivers of internal and external remittances remain unclear. Existing works such as Johnson and Whitelaw (1974) estimate the determinants of urban to rural remittances in Kenya using ordinary least square (OLS) estimator. However, the findings may be biased and inconsistent because OLS does not consider the many zero remittance observations. Hoddinott (1992; 1994) also focus on the determinants of urban to rural remittances and remittance behaviour of migrant sons. The study also uses dataset from specific geographical area. The authors use Heckman sample selection model but failed to impose exclusion restriction. Failure to use exclusion restriction could lead to multicollinearity and inflated standard errors. This in turn leads to biased and inconsistent estimates. Furthermore, Hoddinott (1992; 1994) fail to determine the conditional and the

unconditional marginal effects of sample selection model. Failure to calculate the conditional and unconditional marginal effects of sample selection model leads to erroneous explanation of the impact of regressors on the levels of remittances (Hoffmann and Kassouf, 2005). Previous studies (Kagochi and Chen, 2013) analyzing the determinants of external remittances focus on altruism together with self-interest motive to remit. Furthermore, the authors omit variables measuring contractual agreement motivation. This study uses a nation-wide household survey dataset from the 2009 African Migration Project for Kenya to analyze the determinants of external and internal remittances in Kenya. It uses Heckman sample selection model to address sample selection bias. Unlike previous studies (Hoddinott, 1992; 1994), this analysis uses exclusion restriction to identify the parameters of the Heckman model. Following Hoffmann and Kassouf (2005), the study also calculates the conditional and unconditional marginal effects to explain the impact of independent variables on intensity of remittances. The investigation also empirically tests for main theories of remittances, namely: altruism, self-interest and implicit contractual agreement.

Consistent with the research gap, the study attempts to answer the following research questions: What are the determinants of external remittances to Kenya? What are the determinants of internal remittances in Kenya?

The main objective of this study is to investigate the determinants of remittances in Kenya. Specifically, this study seeks to:

a) Analyze the determinants of international remittances to Kenya.
b) Investigate the drivers of domestic remittances in Kenya.

The study makes three contributions to the literature on remittances. First, it explores the determinants of both external and internal remittances in Kenya. This is important because external and internal remittances could be influenced by different factors and, therefore, dissimilar policies might be needed to encourage external (internal) migration and remittances. Second, the study applies Heckman two-step procedure to reduce selection bias to attain unbiased and consistent parameter estimates. Third, the study uses estimates from the sample selection model to calculate the conditional and the unconditional marginal effects to explain the effect of the explanatory variables on the amount of money remitted. This is essential in

providing the correct interpretation of the effect of the explanatory variables on the level of remittances.

The sustainability of remittances received by the country may depend on household and migrant characteristics. Therefore, the findings of this study will inform policy to foster levels and sustainability of remittances. Identification of the determinants of remittances is crucial to policy makers striving to maximize benefits from remittances. This is because the motive for remitting may affect how the money is used by the recipient household, and thus how they impact economic development. For instance, if remittances are motivated by altruism, then the money will probably be used for immediate spending. The findings of this study are important to policy makers seeking to predict the response of remittances to social-economic conditions locally and in foreign countries. For example, if migrants remit out of altruistic reasons, then remittances would be less volatile and countercyclical. Conversely, if remittances are driven by self-interest/investment reasons, they would be cyclical to local economic conditions.

2.2 Literature Review

2.2.1 Theoretical Literature

From the seminal work of Lucas and Stark (1985), there are three motives for why migrants remit. These are pure altruism, self-interest and inter-temporal contractual agreement. On altruistic motive, migrants care about the welfare of their family left back home and derive utility from their own consumption and that of their family members. In this case, migrants remit without expecting any reciprocation from their families. This theory predicts that remittances are positively related with migrant's income and negatively associated with family income (Lucas and Stark, 1985; Cox et al., 1998), and assets and number of migrants from the same family (Agarwal and Horowitz, 2002). The theory also predicts that remittances increase with migrant's marital status and household dependency in the country of origin but reduces with migrant's length of stay at migration destination (Funkhouser, 1995; Gubert, 2002).

On self-interest motive, migrants remit money back home for their own personal gain. For instance, migrants may remit to parents back home to lure them to bequeath them inheritance. Under such circumstances, remittances should rise with value of household assets, household and

migrant's income, and likelihood of inheriting (function of parent's age and number of household members). They will conversely reduce with migrant's risk aversion (Rapoport and Docquire, 2005). Migrants could remit for investments in assets or to help to create a foundation of physical assets and for their maintenance. Migrants may also remit in preparation for their [illegible] social status and improve links with next of kin and friends.

The contractual agreement between migrant and their family comprises of co-insurance, implicit loan-agreement and exchange motivation (Hagen-Zanker and Siegel, 2007). First, remittances may serve to repay costs borne by the family in financing migrant's human capital investment and migration (Poirine, 1997; Ilahi and Jafarey, 1999). Second, remittances may represent payment for services supplied by a migrant's household in the country of origin. In this case, services may include taking care of a migrant's property or parents (Cox, 1987; Rapoport and Docquire, 2005). The contractual agreement motive predicts that remittances should rise with migrant's income and lower levels of unemployment in the home country (Schiopu and Siegfried, 2006).

Further, according to the new economics of labour migration theory, migration substitutes for the imperfect markets, for instance credit, insurance or labour markets in the migrant's homeland (Stark, 1991; Taylor, 1999; Poirine, 1997; Ilahi and Jafarey, 1999). The household initially invests in human capital of its members and then finances their migration to urban areas or into foreign countries (Taylor, 1999). When a migrant starts working, he or she remits to the family during times of shock, for example death, sickness or poor harvests, to increase consumption and augment household investments. If a migrant faces shock such as unemployment at the destination, the family provides financial assistance to the migrant. This way, remittances enables the household and the migrant to co-insure one another. In this hypothesis, remittances ought to increase with household and migrant shocks (Hagen-Zanker and Siegel, 2007).

Brown and Poirine (2005) developed a different hypothesis known as weak altruism. Investment in education is formulated within informal family arrangement that enforces on children the task to return remittances to their parents to reciprocate for investment in the human capital. A family invests in human capital of the offspring that is, the prospective migrants. After successful

migration, a migrant remits to parents to compensate for investment in human capital. Parents use remittances to finance their consumption in the subsequent years.

An alternative model developed by Glytsos (1997) postulates that a migrant has an objective to return home quickly with a certain amount of savings (savings target). The ability of a migrant to remit is taken as the supply side and the family claim as the demand side of the remittance function. The migrant and the family embark on a tug-of-war governed by bargaining power of the two parties. While the migrant desires to minimize income leakage through remittances and consumption and maximize on savings, the family tries to maximize benefits from remittances relative to that of its neighbours. The level of remittances therefore varies with migrant's earnings, average income in the migrant sending country and migrant and household's bargaining power.

Naiditch and Vranceanu (2009) theorize that if family members and friends have less information regarding migrant's income abroad, migrant's remittances may signal their success abroad in the eyes of household members and friends. Since migrants care about status and prestige and that remittances indicate migrant's success abroad, the less-successful migrants send more remittances to hide their financial challenges and thus create impression that they have succeeded. However, successful migrants may remit more than their less-successful counterparts to signal their true economic situation abroad.

Thus, the abovementioned theoretical literature reveals that there are several theories of remittances. They include pure altruism, self-interest, inter-temporal contractual agreement, new economics of labour migration, weak altruism, savings target and imperfect information theories.

2.2.2 Empirical Literature

There are two strands of studies analyzing the determinants of remittances. First are studies that use survey data on households and/or remitters and second are macro-level studies that examine migrants' country of origin and/or host countries macroeconomic variables. The micro-level studies generally focus on identifying the characteristics of remitters and households that affect remittances. The main issue in these studies is the difference between the decision to remit or not, and the decision on how much to remit. The macro-level analyses typically examine the

influence of native and host country macroeconomic variables on the decision on how much to remit (Elbadawi and Rocha, 1992).

Several empirical studies have been done to analyze the determinants of remittances using different methodologies in their analysis. Some earlier empirical studies such as Johnson and Whitelaw (1974), Knowles and Anker (1981), Lucas and Stark (1985) and Stark and Lucas (1988) use OLS in the estimation and thus overlook non-remitters in their analysis. These studies overlook data censoring problem of the dependent variable (amount of remittances) and, thus, they are likely to return biased and inconsistent coefficients of the determinants of remittances if the scale of censorship (zero remittance observations) is significant (Cameron and Trivedi, 2005). The censored nature of the dependent variable (amount of remittances) arises because some migrants do not remit at all in a given year (Niimi et al., 2009; Mahapatro, 2017).

To address the problem of data censoring, previous studies (Banerjee, 1984; Brown, 1998; Cox et al., 1998; Niimi et al., 2009; Hoti, 2015) use Tobit/censored normal regression model (Tobin, 1958). For instance, Banerjee (1984) applied Tobit and two-stage selection model to analyze the decision to remit and levels of remittances sent by migrants in Delhi to their place of origin. The study finds that levels of remittances sent are positively correlated to dependents in the family and migrant's schooling and negatively related to length of stay abroad. Brown (1998) examines remittance behaviour of Pacific Island migrants residing in Sydney and find that migrants remit more if they have higher income, return intentions and if migration trip is financed by family. Cox et al. (1998) use cross-sectional dataset from Peru to analyze the determinants of transfers from offspring to parents and vice versa. The findings support the exchange motive. The results also show that levels of remittances are positively correlated to family pre-transfer income. In Kosovo, Hoti (2015) demonstrates that the incidence and level of external remittances increases with migrant's employment and years of migration while reducing with household income. A key shortcoming of Tobit estimator in addressing censorship is that it rests on strong distribution assumptions of homoskedasticity and normality and, therefore, yields inconsistent parameter estimates if error term is heteroskedastic or non-normal (Cameron and Trivedi, 2005; Greene, 2003). To address the problems due to distributional assumption of the Tobit model, some studies use Censored Least Absolute Deviation (CLAD) estimator developed by Powell (1984).

CLAD specification relies on weaker assumptions than Tobit model and produces robust and consistent parameter estimates even in presence of heteroscedasticity and non-normality (Greene, 2003; Cameron and Trivedi, 2005). De la Briere et al. (2002) and Gubert (2002) apply CLAD estimator to analyze the determinants of internal and external remittances in Dominican Sierra and Kayes region in Western Mali, respectively. Specifically, De la Briere et al. (2002) test between insurance and investment motivations to remit and find that that motivation to remit varies with migration destination (domestic versus external migration) and gender of the remitter. Women migrants to US remit more when their parents are ill, while similar men fail to remit unless they are the only migrant from the household. Gubert (2002) supplements CLAD specification with Tobit estimator and finds that remittances insure households against adverse shocks arising from drop in grain output and death in the family. However, both De la Briere et al. (2002) and Gubert (2002) fail to address for selection in receiving of remittances and, therefore, their parameter estimates may be biased. Furthermore, CLAD generates less efficient estimates meaning that the computed standard errors are inappropriate for drawing inferences (Cameron and Trivedi, 2005). Recent studies apply two-stage estimators mainly double-hurdle (Cragg, 1971) and Heckman sample selection (1979) models to relax Tobit's assumption that the decision to remit is a single-step decision so that the probability to remit and level of remittances are determined simultaneously.

Heckman sample selection approach is used by several previous studies (Hoddinott, 1992; 1994; Agarwal and Horowitz, 2002; Bouoiyour and Miftah, 2015; Biyase and Tregenna, 2016; Phan and Coxhead, 2016; Mahapatro, 2017) to investigate the drivers of remittances. For instance, Hoddinott (1992) finds that remittances to Central Kenya from migrant sons increase with parental landholdings while inheritable land asset has a stronger effect if the household has multiple migrant sons. Hoddinott (1994) finds that migrant sons from Western Kenya send more domestic remittances to wealthier parents with ability to offer reward for remittances beyond a threshold, in form of inheritable land. Moreover, remittances increase with number of adult sons in the family and migrant's education. One drawback of empirical studies of Hoddinott (1992; 1994) is that they use unrepresentative datasets from specific geographical area. The studies also consider urban to rural remittances and investigate remittance behaviour of only one gender: sons. Our study focuses on both genders. The authors also fail to include exclusion restriction in the sample selection model. This suggests that the parameter estimates are likely to be biased and

inconsistent. Further, the studies do not generate marginal effects which, as advised by Hoffmann and Kassouf (2005), are vital for explaining the impact of regressors on probability and level of remittances.

A similar econometric approach is applied by Garip (2012) to explore the determinants of remittances in Thailand. The author models remittance behaviour using an integrated approach that considers migration as a mechanism for selection. In this study, the two outcome variables are measured using binary variables and, therefore, a variant of Heckman's two-step specification known as censored bivariate probit estimator is applied. In conformity with the exchange motive of remittances, estimated parameters show that the number of migrants and presence of inheritable assets in the household positively impacts on the probability to remit.

Apart from methodological issues, one may categorize remittance studies into various groups. First is that most studies focusing on the determinants of internal remittances are based on cross-section data due to lack of panel and time series data. For instance, Johnson and Whitelaw (1974) analyze the determinants of urban to rural remittance using data gathered from Kenya and finds that the share of migrant income remitted is negatively correlated with migrant's wage. Another study on Kenya (Knowles and Anker, 1981) finds that the probability to remit varies with migrant's intentions to return home while the amount remitted varies with migrant's level of income. The study also finds that remittances are inversely related to duration of migration. Similar studies on other African countries reveal that internal migrants with higher levels of schooling remit higher amounts (Lucas and Stark, 1985; Stark and Lucas, 1988). Their finding is consistent with loan repayment theory but refute altruism motivation. Phan and Coxhead (2016) find that the levels of urban to rural remittances intensify with migrant wages, lower attachment with migration destination and lower rural household income. The studies further find that migrant sons remit more to households with large herds of cattle and large incomes. In line with insurance motivation, the results show that migrants remit higher amounts to families facing higher risk of losing cattle and crops due to drought.

Some studies focus on studying drivers of international remittances using time series, panel and cross-section data. For example, Straubhaar (1986) and Aydas et al. (2005) use time series data to analyze the determinants of external remittances in Turkey. Straubhaar (1986) focuses on remittances from Germany to Turkey for the period 1963 to 1982 and finds a positive effect on

remittances of economic situation in the host country, migrant's confidence in the safety and liquidity of investments in the home country. Interest rate and exchange rate does not affect remittances significantly. Building on ideas of Straubhaar (1986), Aydas et al. (2005) study the determinants of aggregate remittances from abroad using data for the period 1979 to 1993. The findings suggest that inflation, military regime and black market premium have an adverse effect on remittances while economic growth has a positive and significant effect on levels of remittances.

Leuth and Ruiz-Arranz (2006) analyze the determinants of remittances in eleven countries in Europe and Asia using a dataset of bilateral remittance flows. Empirical results support mixed motives. As per altruistic hypothesis, remittances are positively correlated to dependency ratio in the home country. Surprisingly, remittances fail to increase after natural disaster in the migrant sending country. Remittances respond to business climate in the migrant sending country and in the host country and increase with economic cycle back home. This indicates that the flows are motivated by investments. Alleyne et al. (2008) investigate the determinants of remittances in English-speaking Caribbean countries and find that remittances are influenced by altruism and investment motives. Frankel (2011) use the same dataset as Leuth and Ruiz-Arranz (2006) but finds that remittances are countercyclical with respect to income in home country and cyclical with respect to income in host country. Ahmed and Martinez-Zarzoso (2016) use the same approach as Leuth and Ruiz-Arranz (2006) to explore the link between transaction costs on bilateral remittances inflows to Pakistan from 23 host countries. The results indicate that increase in transaction cost curtail remittances. This suggests that higher remittance transaction costs may deter remittances or encourage the use of informal remittance channels.

Connell and Brown (2004), and Holst and Schrooten (2006) use cross-sectional data to analyze migrant's remittance behaviour in Australia and Germany, respectively. Connell and Brown (2004) find that households with skilled workers (proxied by nurses) remit more than their counterparts with unskilled workers. Remittances sent by households with skilled workers do not decline over time. However, remittances sent by households with unskilled workers diminish sharply after 15 years of migration. Holst and Schrooten (2006) find that income has insignificant effect on remittances while migrant's country of origin and degree of integration in the host country are important determinants of remittances.

One advantage of analyses based on cross-sectional data is that they capture remittances transferred through both formal and informal channels (Bredtmann et al., 2019). Also, these analyses differentiate between various motives to remit, quite easily than analyses using time series data (Borja, 2012). However, analyses based on cross-sectional data are subject to estimation issue of selection bias because not all migrants remit within a given time period. Failure to address for selection in the receipt of remittances may yield biased parameter estimates (Adams, 2011). Empirical studies applying cross-sectional data are also confronted with reverse causality problem. For instance, investments made using remittances in the past may increase current household income, therefore leading to biased estimate on the positive effect of household income on remittances (Adams, 2011).

Several empirical studies use gendered approach to analyze the determinants of remittances (VanWey, 2004; Niimi and Reilly, 2009; Mahapatro, 2017). VanWey (2004) uses data from Nang Rong Thailand to scrutinize motivations to remit and finds that women have a higher probability to remit than men. Decomposition analysis indicates that gender differences in treatment are more significant than endowment differences in explaining the entire gender differences in remittances. The estimated coefficients also indicate that women's remittance behaviour is strongly motivated by altruism while men behave more contractually. Dissimilar findings are reported by Niimi and Reilly (2009) in Vietnam. The authors find that women and men remit for altruistic and insurance reasons, but women are more reliable remitters than men. Another key finding of this study is that the endowment differences (associated with household head status, labour market earnings and age differences) are more significant than treatment differences in explaining the entire gender difference in remittances. In India, Mahapatro (2017) finds that the amount of remittances sent by both genders are positively and significantly associated with household income, suggesting migrants behave contractually. The study also finds gender differences in remittance behaviour. Specifically, education has a positive and statistically significant effect on women but not men's remittance behaviour.

While empirical works of VanWey (2004), Niimi and Reilly (2009) and Mahapatro (2017) emphasize how the determinants of remittances are influenced by gender, their analyses have shortcomings. For instance, VanWey (2004) focuses on the decision to remit and not the amount remitted. The empirical analysis of Niimi and Reiily (2004) measure remittances using

money/goods sent home and/or money/goods given to relatives during migrant's visits. Thus, the dataset does not distinguish between the two actions as amount remitted is the overall value of money/goods that migrant remitted/gave to their relatives in the area of origin during the one year period before the survey. Additionally, the authors use migrant characteristics only in the analysis as the survey failed to collect information on households from which a migrant originated. This means that the parameter estimates may be biased due to omitted variables (Adams, 2011). Furthermore, Mahapatro (2017) focuses on remittances without controlling for migration destination (internal or external migration).

Some studies test remittance theories to assess what motivates migrants to send money back home. For instance, Agarwal and Horowitz (2002) examine altruistic versus risk sharing motive in Guyana. Stemming from differences in remittance behaviour of sole and multiple migrants, the study concludes that remittances are altruistically motivated. Brown and Poirine (2005) use data from Tongan and Samoan households living in Australia to scrutinize weak altruism theory. The study finds evidence of weak altruism hypothesis and consequently proposes combining theories of private intergenerational transfers, human capital investments and remittances when exploring migrant's remittance behaviour. Despite household income being potentially endogenous, the authors fail to use instrumental variable estimation method and, therefore, the estimates may be biased.

Using Mexican data, Amuedo-Dorantes and Pozo (2006a) test between family-provided versus self-provided insurance motives. The authors find that migrants exposed to higher income risk have a higher probability to remit and send a larger fraction of income for insurance purposes than migrants with lower income risks. Naufal (2008) use data from Nicaragua to examine altruism and self-interest motivations for remitting. In line with Agarwal and Horowitz (2002), the author finds empirical evidence in support of altruism. Migrant remittance behaviour also exhibits heterogeneity as women are more altruistic relative to their men counterparts. Bouoiyour and Miftah (2015) explore altruism and welfare hypothesis in Morocco and find dissimilar results. The empirical estimates show that remittances are motivated by altruism, since migrants have a higher probability to remit and send higher amounts if the household needs financial support from the migrant. Additionally, migrants remit more if they are employed and the household has fewer migrants. The authors also find that migrants remit more if the family had

paid for his/her migration expenses, suggesting that remittances are motivated by implicit family agreement. Thus, this study lends support to mixed motivations combining altruism and implici family arrangements.

2.2.3 Overview of Literature

Theoretical literature review indicates that the main motives to remit are altruism, self-interes and contractual agreement. Review of empirical literature shows that the drivers of remittance: vary according to the country of investigation. Most studies analyze the determinants of interna remittances (Biyase and Tregenna, 2016; Phan and Coxhead, 2016) or international remittance: (Sinning, 2007; Bouoiyour and Miftah, 2015). Few studies investigate the determinants of both external and internal remittances (De la Briere et al., 2002; Gubert, 2002). Previous studie: indicate that migrant's remittance behaviour depends on whether remittances are external or internal (De la Briere et al., 2002).

One estimation issue encountered by previous studies is many zero remittance observations. The use of OLS estimator produces biased and inconsistent parameter estimates. To address zero remittance observations, most studies apply Tobit estimator (Amuedo-Dorantes and Pozo, 2006a). However, Tobit estimator is restrictive because it assumes that an explanatory variable has the same effect on the probability to remit and amount remitted. Recent studies (Bouoiyour and Miftah, 2015; Phan and Coxhead, 2016) use Heckman sample selection model to relax Tobit's assumption. Another estimation issue encountered in analyzing the determinants of remittances is potential endogeneity of household income. Previous studies (Gubert, 2002; Bouoiyour and Miftah, 2015) address endogeneity of household income using predicted values of per-capita household expenditure.

There are only a few empirical studies that attempt to investigate the determinants of remittances in Kenya. Some of the studies focus on the determinants of urban to rural remittances (Johnson and Whitelaw, 1974; Knowles and Anker, 1981). Other empirical studies (Hoddinott, 1992; 1994) focus on analyzing the determinants of internal remittances using dataset from certain geographical areas (central Kenya and western Kenya). Furthermore, some empirical studies concentrate on scrutinizing remittance behaviour of migrant sons and therefore overlook female migrant's remittance behaviour (Hoddinott, 1992; 1994).

Some studies analyzing the determinants of remittances in Kenya use OLS estimator (Johnson and Whitelaw, 1974), but their results could be biased and inconsistent. This is because OLS estimator does not adjust for the many zero remittance observations. Few studies (Hoddinott, 1992; 1994) use Heckman sample selection bias and, therefore, test and address selection bias emanating from the fact that some migrants do not remit at all. However, the authors do not use exclusion restriction in their analysis. Failure to use exclusion restriction may generate multicollinearity and inflated standard errors. In turn, this may give rise to biased and inconsistent coefficients. Studies using Heckman's approach (Hoddinott, 1992; 1994) fail to compute the marginal effects that are necessary for interpreting the impact of explanatory variables on the level of remittances. This leads to a wrong interpretation of the parameter estimates on the level of remittances. Other empirical studies in Kenya (Kagochi and Chen, 2013) focus on the determinants of external remittances and thus ignore the drivers of internal remittances. Also, they test a few theories of remittances: altruism and self-interest.

Following De la Briere et al. (2002) and Gubert (2002), this essay analyzes the determinants of both external and internal remittances in Kenya using cross-section data. Unlike previous studies in Kenya applying Heckman's approach to take into account selection issues in the receipt of remittances, this essay computes marginal effects (conditional and unconditional) of Heckman sample selection model to explain the effect of explanatory variables on levels of remittances sent. The essay also addresses for potential endogeneity of household income to provide consistent parameter estimates of the effect of household income on remittances. It also focuses on both male and female migrants. Additionally, the essay empirically tests the main theories of remittances, namely altruism, self-interest and implicit contractual agreement.

2.3 Methodology

2.3.1 Theoretical Framework

Following Funkhouser (1995), assume two economic agents: a migrant (m) living in a local migration destination or in foreign country and a recipient household (h) consisting of one or more individuals. Assume a separable utility function having a migrant's utility U_m, and utility of the remittance receiving household U_h. The utility function takes the form:

$$U(U_m, U_h) = U_m(C_m) + V\{U_h(C_h), Z\} \tag{2.1}$$

where U_m is the utility of the migrant, U_h is the utility of the household in the migrant's place of origin. U_m and U_h are both functions of consumption c_m and c_h alone. Z is a vector of the migrant's household characteristics. The total utility function satisfies the usual concave properties as: $U_m' > 0$, $U_h' > 0$, $U_m'' < 0$, and $U_h'' < 0$. In choosing the amount to remit, a migrant maximizes the following separable lifetime utility function:

$$Max\ U_{mt} = \sum_t U_m\{C_{mt}\}\left(1/(1+\delta_u)^t\right) + V\{U_h\left(Y_{ht} + R_t + N_{ht}\,\bar{R}_t\right), Z\}\left(1/(1+\delta_v)^t\right) \tag{2.2}$$

Subject to

$$C_{mt} + R_{mt} = W_{mt} + I_{mt}$$

$$W_{mt} = \beta_0 + \beta_1 X_{mt} + \varepsilon_{mt} \tag{2.3}$$

where C_{mt} is migrant's consumption at time t, Y_{ht} is the income of the remittance receiving household h at time t. R_t denotes the amount of remittances received by household h from the migrant at time t. N_{ht} represents the number of other migrants from household h at time t. $\bar{R}_t$ is the average remittances received from other migrants at time t. W_{mt} indicates the migrant's wage income at t while I_{mt} is the migrant's non-labour income at time t. X_{mt} is a vector of the migrant's characteristics at time t. $\left(1/(1+\delta_u)^t\right)$ is a discount rate applied to the migrant's utility. $\left(1/(1+\delta_v)^t\right)$ is a discount rate applied to the household's utility. In this model, it is also assumed that the migrant does not either borrow or lend. Thus, a migrant's wage income, w_{mt} at time t and non-wage income I_{mt} is either consumed or remitted to the migrant's household of origin.

Solving the maximization problem yields the following first order condition for a positive level of remittances at time t

$$\partial V/\partial U_h\left(U_h'\right)\left[1/(1+\delta_v)\right]^t dR - \left(U_m'\right)\left[1/(1+\delta_u)\right]^t dR = 0 \tag{2.4}$$

Equation 2.4 indicates that a gradual rise in utility from additional household income emanating from remittances compensates for reduction in migrant's utility due to decreased migrant consumption following the remittances. According to Funkhouser (1995), a corner solution to the maximization problem yields either censored regression model or self-selection model. In both cases, the reduced form equation for the latent variable determining the level of remittances is given by:

$$R^* = f(\delta_u, \delta_v, X_{it}, I_t, Y_{ht}, N_{ht}, \bar{R}_t) \tag{2.5}$$

There are five predictions from equation 2.5. First, a migrant with higher income as measured by employment status and human capital will remit more. Second, remittances increase if a household in the place of origin has lower income. Third, remittances increase with relationship between migrant and the recipient household members, and migrant's plan to return home. Fourth, remittances decrease with the number of migrants from the same household. Lastly, migrants increase with duration of stay at the migration destination.

2.3.2 Model Specification

Based on predictions of equation 2.5, the remittance equation to be estimated can be expressed in linear functional form as in Funkhouser (1995):

$$R^* = \alpha + \beta X + \gamma Z + \mu \tag{2.6}$$

where X is a vector of migrant characteristics, Z is a vector of household characteristics, and μ is a normally distributed error term, $\mu \sim N(0, \sigma^2)$. Two estimation issues are likely to be encountered in estimation of equation 2.6. First, data on remittances are only available for remitters. Specifically, there is a problem of data censoring so that estimation of the level of remittances using OLS estimator can result to biased and inconsistent parameter estimates (Greene, 2003). The standard approach for addressing the limited dependent variable is the use of Tobit, Censored Least Absolute Deviation (CLAD) and two-stage estimators. Tobit model is inappropriate in estimating the determinants of remittances because it relies on stringent assumptions of normality and homoscedasticity. If the assumptions are violated, Tobit estimates would be biased and inconsistent (Greene, 2003). Tobit estimator is also very limiting because it assumes that the two decisions (whether to remit or not and how much to remit) are made jointly,

and the same explanatory variables affect both decisions with the same sign. Though CLAD (a generalization of Least Absolute Deviation (LAD) estimator) generates robust and consisten estimates even in the existence of non-normality and heteroscedasticity, it is less efficien (Cameron and Trivedi, 2005).

Two-stage or two-tier models such as double hurdle, two-part and Heckman selection models have been proposed as alternatives in the literature to overcome the drawbacks of Tobi estimator. Double hurdle model (DHM) is developed to deal with a case where participation and zero amounts are observed simultaneously. That is, in DHM model, a household may repor receiving remittances yet report zero amounts. Zero amounts are classified as either behavioura zeros (non-participation) or random zeros (participation but no amount of remittances sent) DHM is designed to handle these two types of zeros (Mahuteau et al., 2010). Two-part and Heckman selection models presume that zero amounts should not be observed once the first hurdle (participation) is overcome. In the two-part and Heckman selection models, only one zero is observed. Only non-recipient households report zero for the level equation (Mahuteau et al., 2010). Since participation and zero amounts are not observed simultaneously in the dataset, DHM is not applied.

Heckman sample selection model is preferred over two-part model because this study is interested in analyzing the potential remittances (potential outcome) whereas two-part model is best suited for estimating the actual outcome. Additionally, two-part model fails to account for the fact that migrants who remit are not randomly selected from the population. Thus, the use of two-part estimator may give rise to biased estimates, since remitters may be systematically different from non-remitters (Dow and Norton, 2003). Thus, this analysis uses sample selection model as proposed by Heckman (1979), also known as the type-2 Tobit model (Amemiya, 1985). This is because Heckman model, unlike two-part model, addresses the problem of sample selection bias. The Heckman model may be estimated using two-step procedure commonly known as adjusted Tobit/Heckit approach/Limited Information Maximum Likelihood (LIML) method or using a one-step Maximum Likelihood (MLE)/Full Information Maximum Likelihood (FIML) estimator. FIML is based on stronger distribution assumptions and its estimates are less robust than those of Heckman two-step procedure (Wooldridge, 2010). Therefore, in this study,

the two-step procedure is applied. Following Hoffmann and Kassouf (2005), the first stage of Heckman's procedure is given by equation 2.7.

$$D_i^* = X_i'\beta + \mu_i \tag{2.7}$$

$$\Pr(D_h = 1 \mid X) = \Phi(X_i'\beta) \tag{2.8}$$

where D_i^* is the latent (non-observable) discrete migrant decision of whether to or not remit, D is the observable discrete migrant decision of whether to or not remit so that $D_i = 1$ if $D_i^* > 0$ and $D_i = 0$ if $D_i^* \leq 0$; β is a vector of parameters to be estimated, X_i' is a vector of exogenous explanatory variables and μ_i is the error term. Equation 2.7 is estimated using binary probit estimator as defined by equation 2.8. The probit maximum likelihood estimates are then used to compute a set of inverse Mills ratio (IMR)/expected value of the error for each migrant i. The IMR is derived as: $\lambda_i = \dfrac{\phi(X_i'\beta)}{\Phi(X_i'\beta)}$ (2.9)

where ϕ and Φ denotes the probability density function (pdf) and cumulative distribution function (cdf) of the standard normal distribution, respectively. The IMR is then used as an additional explanatory variable in the second step which is estimated using OLS estimator. The estimated remittance equation is therefore written as:

$$E(Y_i \mid D_i = 1) = W_i'\beta + \rho\sigma_\varepsilon \lambda(X_i'\beta) \tag{2.10}$$

Assuming that $\rho\sigma_\varepsilon = \beta_\lambda$, equation 2.10 can be rewritten as:

$$E(Y_i \mid D_i = 1) = W_i'\beta + \beta_\lambda(X_i'\beta) \tag{2.11}$$

where $Y_i = W_i'\beta + \varepsilon_i$ is observed if $D_i = 1$ for migrants who decide to remit, and 0 if otherwise. W_i', and X_i' are vector of explanatory variables. ρ is the correlation between unobserved determinants of probability to remit and unobserved determinants of level of remittance and σ_ε is the standard error of ε. The coefficient of IMR is given by $\rho\sigma$ where ρ is the correlation coefficient between ε, and ν and σ is the standard deviation of ε (Khitarishvili, 2009).

The parameter estimate of the IMR indicates the presence of sample selection bias. If the coefficient is statistically significant, inclusion of IMR as an additional explanatory variable increases efficiency of the estimation. If the coefficient of the IMR is statistically insignificant, then the two equations can be estimated separately using two-part/double hurdle estimator (Cameron and Trivedi, 2005). Cameron and Trivedi (2005) propose the use of exclusion restriction to identify Heckman model. The model would otherwise be identified by non-linearity of the IMR. As noted by Cameron and Trivedi (2005), identification based on non-linearity of the IMR creates severe multicollinearity and inflated standard errors, which lead to biased and inconsistent parameter estimates.

Fulfilling identification in the sample selection model requires that at least one explanatory variable in the selection equation be excluded from the outcome equation (Hoffmann and Kassouf, 2005). In this study, the selection of identifiers is guided by previous empirical studies. Existing works on the determinants of remittances (Czaika and Spray, 2013; Jena, 2016; Mahapatro, 2017) identify Heckman model using recipient's place of residence. The studies posit that urban households (less remote) normally have higher incomes and can easily expand their income sources without difficulty relative to rural households. As a result, they have a lower chance of appealing for remittances. However, the amount remitted if a migrant chooses to send money back home is independent of whether the recipient household is based in urban or rural area.

The second identifier used in Heckman model is gender of the household head at migrant's place of origin. It can be postulated that women-headed households have a higher chance of obtaining remittances compared to men-headed households. This is because migrants have a higher propensity of being more caring towards female household heads than to male household heads (Carling, 2008). Remittances may be affected by social pressure if offspring remitting to female household members are perceived as more altruistic (Jena, 2016). However, the amount remitted is conceivably determined by demand for remittances by the receiver and not their gender as such (Jena, 2016). To assess the validity of place of residence and gender of household head as identifiers, a simple falsification test is used. The identifying variables are first included as explanatory variables both in the selection and the outcome equations. An identifying variable

would be deemed to be suitable if it significantly affects the decision to remit but not the amount remitted.

The estimated parameters of the regressors that are common to both the selection and level/outcome equations cannot be interpreted as standard elasticities due to the inclusion of IMR in the level equation. Greene (2003) and Hoffmann and Kassouf (2005) derive the conditional marginal effect.[2] Let X_k represent variables common to the selection and level equations. The marginal effect of the regressor is written as:

$$\frac{\partial E(Y_i \mid D_i^* > 0)}{\partial X_{ki}} = \beta_k - \frac{\gamma_k}{\sigma_\mu}\beta_\lambda \delta_i \tag{2.12}$$

The marginal effect given in equation 2.12 comprises a change in the level of remittances due to a change in X_k, for migrants that send remittances. This effect is known as the conditional marginal effect for a continuous variable. The conditional marginal effect of a binary variable is given by $E(\Delta Y_i \mid D^* > 0) = \beta_i + \beta_\lambda \Delta\lambda$, where $\Delta\lambda$ is the change in the IMR when a binary explanatory variable moves from 1 to 0 as characterized by equation 2.13.

$$\Delta\lambda = \frac{\phi\left(\gamma' \bar{X}_{(1)} / \sigma_\mu\right)}{\Phi\left(\gamma' \bar{X}_{(1)} / \sigma_\mu\right)} - \frac{\phi\left(\gamma' \bar{X}_{(0)} / \sigma_\mu\right)}{\Phi\left(\gamma' \bar{X}_{(0)} / \sigma_\mu\right)} \tag{2.13}$$

where Y_i denotes the natural logarithm of remittances. Therefore, the conditional marginal effect given by equation 2.12 and 2.13 corresponds to a relative change in levels of remittances. The estimated percentage level of remittance due to a unit increase in X_k is $[\exp(c) - 1]100$, where c denotes the estimated value of the conditional marginal effect.

Following Hoffmann and Kassouf (2005), the unconditional relative marginal effect of continuous variables common to both selection and outcome equation on the expected level of remittances is given by:

[2] See Yen and Rosinki (2008) for an alternative derivation of marginal effects of log-transformed Heckman model

$$\frac{\partial}{\partial X_{kt}}\ln E(g_t) = \beta_k - \frac{\gamma_k}{\sigma_\mu}\beta_k\delta_t + \left[\Phi\left(\frac{\gamma' X_t}{\sigma_\mu}\right)\right]^{-1}\phi\left(\frac{\gamma' X_t}{\sigma_\mu}\right)\frac{\gamma_k}{\sigma_\mu} \tag{2.14}$$

The first two terms on the right hand side (e_I) of equation 2.14 show the effect associated with a change in the level of remittances for migrants who remit while the last term (e_{II}) is the impact associated with the change in the probability to remit. The percentage change in the level of remittances due to an increase in X_k is given by $[\exp(e_I + e_{II})]100$. The unconditional marginal effect for a binary variable is written as:

$$\Delta \ln E(g_t) = \Delta \ln E(g_h \mid D_t^* > 0) + \Delta \ln \Phi(-\alpha_\mu) \tag{2.15}$$

where the first term (e_I), and the second term (e_{II}) on the right hand side of equation 2.15 are defined above.

The appropriateness of Heckman model over alternative two-part model is also tested using the procedure suggested by Puhani (2000). This method entails assessing the degree of collinearity of Heckman's lambda (IMR) with explanatory variables in the Heckman model using mean variance inflation factor (VIF). A sufficient condition of the presence of collinearity for given explanatory variable is a high VIF. Puhani (2000) suggests that a value of 20 defines a high VIF.

The second estimation issue is that household expenditure which is used to proxy household income is potentially endogenous. Endogeneity may arise from reverse causality and because remittances may influence household income by affecting labour supply of household members left behind. Following Gubert (2002) and Bouoiyour and Miftah (2015), this study uses the predicted value of per-capita household expenditure as an indicator of household income. The per-capita household expenditure is regressed on a set of covariates that measure household's human and physical capital: age, gender, household head level of education and employmen status, share of household members with formal education, and household ownership of lanc (Table A1 in Appendix). Subsequently, the OLS estimates are used to compute predicted/fitte values of household income.

2.3.3 Definition and Measurement of Variables

The definition and measurement of variables used in this study are reported in Table 3.1.

Table 2.1: Description of variables and their measurements

Variable	Definition	Measurement
	Dependent variable	
Amount	Amount of remittances sent by migrant in the last one year	Logarithm of amount of remittances sent
Remittance	Whether migrant sent any remittance in the last one year	Binary, 1=yes; 0 otherwise
	Explanatory variables	
Age	Migrant age	Age of migrant in years
Age squared	Age of migrant squared	Age squared in years
Migrant gender	Gender of migrant	Binary,1=male; 0 otherwise
Migrant marital status	Marital status of migrant	Binary,1=married; 0 otherwise
Illiterate	Migrant has no formal education	Categorical, 1 if migrant has no formal education
Primary	Migrant has primary education	Categorical, 2 if migrant has primary education
Secondary	Migrant has secondary education	Categorical, 3 if migrant has secondary education
Tertiary	Migrant has tertiary education	Categorical, 4 if migrant has tertiary education
Duration	Duration of migration	Duration of migration in years
Duration squared	Duration of migration squared	Duration of migration squared in years
Migrant Employment	Migrant employment status	Binary, 1=employed; 0 otherwise
Household head age	Age of household head	Age of household head in years
Household head gender	Gender of household head	Binary, 1 =male; 0 otherwise
Household employment	Household head is employed	Binary, 1=employed; 0 otherwise
Household size	Size of household at the origin	Total number of individuals living in a household
Household income	Income of household at migrant's area of origin	Logarithm of total per capita expenditure
Proportion of children <15 years	Proportion of children in the household at migrant's area of origin < 15 years	Ratio of individuals <15 years to total number of individuals in the household at migrant's area of origin
HH location	Whether or not household is located in a rural area	Bianry,1=rural; 0 otherwise
Migration destination	Whether a migrant lives in Kenya or in a foreign country	Binary, 1=yes; 0 otherwise
Multiple migrants	Household has more than one migrant	Binary, 1=yes; 0 otherwise

Source: Author's compilation

2.3.4 Data Type and Sources

The data used in this essay is drawn from the 2009 Migration and Remittances Household Survey for Kenya. The household survey is single-round and cross-sectional gathering data on households with domestic and international migrants. The survey also collected data on households without migrants. The survey was administered as a part of the African Migration Project to enhance understanding of migration, remittances and their impacts in Sub-Saharan Africa. The African Migration Project applied a similar methodology developed by World Bank for all the six countries studied (Kenya, Uganda, Nigeria, Senegal, Burkina Faso and South Africa). The Kenyan Household Survey was conducted by the University of Nairobi.

The household survey was based on two-stage sampling procedure drawn by the Kenya National Bureau of Statistics (KNBS). The household survey adopted the 1999 Kenya Housing and Population Census to map out the survey areas. To address population growth, migration and variations in the boundaries of the administrative units (such as districts) after the 1999 population census, the 2005/06 Kenya Integrated Household Budget Survey (KIHBS), the 2006 Financial Services Deepening Survey, and the existence of M-Pesa, Western Union and Money Gram service providers were considered in blueprinting the sampling frame. Further, the officials from KNBS, village elders and administrative officers also assisted in mapping out sampling clusters having larger concentration of international migrants.

In total, 17 districts comprising 91 clusters were selected. The selection of households to be interviewed begun with re-registering households in all clusters to determine internal, international, and households without migrants. All the three categories of households were considered as a separate sub-frame. Random sampling was consequently employed to choose households in each group. Eventually, 1,942 households in 17 districts spanning the eight regions of Kenya were surveyed. Of the surveyed households, 51% were drawn from rural areas while 49% were based in urban areas. Of the surveyed households, 37% had external migrants, 29% had internal migrants while 34% had non-migrants. Further, the data was gathered for 8,343 non-migrant and 2,245 migrant individuals.

The questionnaire gathered information on all individuals living in a household relating to age, gender, and association of the individual to the household head, ethnicity, marital status,

schooling, labour market situation, and the religion of household head. The questionnaire also collected data on movable and immovable assets possessed by household and amount of money (in Kenya shillings) spent on various expenditure items by household in the previous one week (for non-durable items) or six months (for durable items). Further, the household survey collected information on internal and external migrants and remittances sent by the migrants in the previous one year. Specifically, the household survey provided data on migrant's age, gender, relationship between migrant and the household head, migrants' place of residence, length of migration, work situation of migrant before and after departure, migrants' education before departure, and the frequency and quantity of remittances sent by migrants in the previous one year in Kenya shillings.

2.4 Empirical Results and Discussion

2.4.1 Descriptive Statistics

In this study, individual is the unit of analysis and it focuses on persons aged above 15 years. Beyond the age of 15 years, some migrants are likely to be in the job market. In Kenya, at the age of 15 years, individuals are likely to have finished primary level of education. Individuals who fail to proceed to secondary level, vocational or polytechnic training may opt to search for a job and consequently remit cash back home. The three columns of Table 2.2 report the summary statistics for non-remitters, remitters and for the entire sample, respectively. The last column outlines t-test for mean differences between remitters and non-remitters. Remitters are older (34.7 years) than non-remitters (30.5 years). Older migrants are likely to earn more in the labour market because of their higher work experience and thus remit more than younger migrants.

More men (64.8%) than women (35.2%) remit money back home. This finding may point to a higher success in the labour market for men relative to women. Probably more male migrants leave their families back home than their women counterparts. It is probable that male migrants have higher levels of education than women. Thus, they earn and remit more than female migrants. More remitters (64.3%) are married than non-remitters (41.3%). This result is unsurprising given that married individuals have to remit to meet financial obligations of their families back at home. More remitters (92.2%) are employed than non-remitters (46.8%). Being

employed may increase a migrant's earnings and hence their capacity to remit compared to unemployed migrant.

Table 2.2: Descriptive statistics of variables used in the remittances model

Variable	Non-remitters [N=1073] Mean s.d.	Remitters [N=1034] Mean s.d.	All migrants [N=2107] Mean s.d.	Difference in means
Amount remitted (Ksh '000')		140.1 (920.7)	68.7 (648.6)	
Age of migrant in years	30.503 (10.185)	34.703 (9.701)	32.564 (10.167)	-4.200***
Migrant has primary education	0.453 (0.498)	0.486 (0.500)	0.469 (0.499)	-0.123
Migrant has secondary education	0.080 (0.272)	0.094 (0.292)	0.087 (0.282)	-0.014
Migrant has tertiary education	0.406 (0.491)	0.365 (0.482)	0.386 (0.487)	0.042
Gender of the migrant	0.535 (0.499)	0.648 (0.478)	0.590 (0.492)	-0.113***
Marital status of migrant	0.413 (0.493)	0.643 (0.479)	0.5206 (0.499)	-0.230***
Migrant's length of stay at the migration destination in years	5.986 (7.240)	6.414 (6.153)	6.196 (6.730)	-0.428
Migrant staying abroad	0.585 (0.493)	0.462 (0.499)	0.525 (0.499)	0.123***
Migrant's employment status	0.468 (0.499)	0.922 (0.269)	0.691 (0.462)	-0.454***
Household size	4.154 (2.335)	4.375 (2.236)	4.237 (2.262)	-0.289**
Per capita household expenditure (Ksh '000')	25.595 (81.066)	12.389 (28.111)	19.114 (61.452)	13.206* **
Location of household	0.467 (0.499)	0.587 (0.493)	0.526 (0.499)	-0.120***
Age of household head in years	53.488 (17.705)	52.334 (18.966)	52.922 (18.340)	1.155
Gender of the household head	0.295 (0.456)	0.424 (0.494)	0.358 (0.480)	-0.128***
Employment status of household head	0.815 (0.388)	0.789 (0.408)	0.803 (0.398)	-0.0256
Proportion of children <15 years in the household	21.804 (24.767)	26.787 (25.898)	24.249 (25.445)	-4.983***
Household has multiple migrants	0.736 (0.441)	0.557 (0.497)	0.648 (0.478)	0.179***
Migration rate	63.412 (13.292)	68.247 (11.018)	65.351 (12.605)	-4.835***

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively. Standard deviations are in parenthesis*

The mean per-capita household expenditure for households receiving remittances is lower (Ksh 12,389) than for households without remittances (Ksh 25,589). More migrants from rural areas (58.7%) remit compared to migrants from urban areas (41.3%). This result may suggest that migrants originating from rural areas are more altruistic than their counterparts from urban areas. It may also be the case that rural households are more dependent on remittances relative to urban households. A lower proportion of non-remitters (29.5%) originate from women-headed households compared to men-headed households (70.5%). This result may suggest that migrants have higher chances of remitting to women-headed households than to men-headed households and to households with greater financial needs. In conclusion, the descriptive analysis appears to suggest that migrants with higher income (migrant's education and employment status used as a

proxy for migrant's income) remit more than lower-income migrants. Thus, altruism could be the main motivation for migrants sending remittances. As argued by Bouoiyour and Miftah (2015), descriptive analysis fails to take into account all characteristics of migrant and their households. Consequently, this study proposes an econometric approach which reveals the main factors that affect the probability of remitting and the levels remitted by migrants.

2.4.2 Estimation Results: Determinants of Remittances

Table 2.3 presents Heckman two-step estimates for the drivers of remittances in Kenya regardless of their origin. That is, the regression results in this section combine both external and internal remittances. As indicated earlier, household expenditure is endogenous to the remittance equation. Therefore, the predicted values of household expenditures are first computed and the parameter estimates are reported in Table A1. The Heckman regression results used to determine exclusion restriction are reported in Table A2. The appropriateness and robustness of the identifying variables (recipient's place of residence and gender of the household head) are tested by running a regression in which the identifiers are included both in the selection and level equations. It is worthwhile to note that the coefficients on the identifiers are statistically significant both in the selection and level equations. This means that the two identifiers are invalid in this framework. However, further scrutiny of the results reveals that migrant's marital status significantly affects the probability to remit but not amount is sent in all the three remittances equations (total remittances, external remittances and internal remittances). Accordingly, migrant's marital status is used as the identifier.

As cautioned by Bouoiyour and Miftah (2015), the inclusion of predicted values of household expenditures in the remittance equation may cause bias in the standard errors. Bootstrapped estimates for the standard errors of the parameter estimates of the remittance equation are therefore computed (50 replications). Table A3 reports Heckman regression results of the determinants of remittances obtained without bootstrapping the standard errors (uses robust standard errors).

Table 2.3: Heckman regression results for the determinants of remittances

Explanatory variables	Selection coefficient	Level coefficient	Probability	Cond. level	Uncond. level
Migrant age in years	0.0483**	0.1056**	0.0192***	0.0587	0.2164***
	(0.0220)	(0.0425)	(0.0088)	(0.0436)	(0.0809)
Age squared	-0.0005*	-0.0011**	-0.0002*	-0.0006	-0.0023**
	(0.0003)	(0.0005)	(0.0001)	(0.0005)	(0.0010)
Migrant gender	0.0268	0.1999	0.0106	0.1738*	0.1854
	(0.0734)	(0.1193)	(0.0306)	(0.1220)	(0.2858)
Marital status	0.2346***		0.0932***	-0.2279***	0.8127***
	(0.0787)		(0.0313)	(0.0759)	(0.2853)
Migrant has primary education	-0.0090	0.1159	-0.0036	0.1246	0.0224
	(0.1112)	(0.1735)	(0.0442)	(0.1666)	(0.4244)
Migrant has secondary education	0.2732**	0.3941*	0.1086**	0.1345	1.1400**
	(0.1236)	(0.2012)	(0.0489)	(0.1708)	(0.4909)
Migrant has tertiary education	0.1595	0.5906***	0.0634	0.4367***	0.8360*
	(0.1117)	(0.1794)	(0.0444)	(0.1557)	(0.4432)
Duration of migration in years	0.0117	0.0536***	0.0047	0.0422**	0.0656
	(0.0119)	(0.0201)	(0.0047)	(0.0200)	(0.0449)
Duration of migration squared	-0.0007*	-0.0014**	-0.0003	-0.0007	-0.0029
	(0.0004)	(0.0007)	(0.0002)	(0.0006)	(0.0015)
Employment status of migrants	1.1653***	1.2394**	0.4631***	0.1074	4.6127***
	(0.1068)	(0.4824)	(0.0418)	(0.4657)	(0.4220)
Household head age in years	-0.0019	-0.0088***	-0.0008	-0.0069**	-0.0107*
	(0.0019)	(0.0030)	(0.0007)	(0.0028)	(0.0072)
Household head gender	0.2444***	0.2214	0.0956***	-0.0133	0.9505***
	(0.0773)	(0.1483)	(0.0294)	(0.1440)	(0.2858)
Employment status of household head	-0.2441***	-0.2596	-0.0975***	-0.0225	-0.9662***
	(0.0915)	(0.1687)	(0.0318)	(0.1795)	(0.3513)
Number of household members	0.0072	0.0143	0.0029	0.0072	0.0317
	(0.0156)	(0.0224)	(0.0062)	(0.0203)	(0.0594)
Household income	-0.2410***	0.2310*	-0.0958***	0.4651***	-0.7272***
	(0.0550)	(0.1408)	(0.0218)	(0.1447)	(0.2176)
Proportion of children <15 years living in household	0.0010	0.0020	0.0004	0.0011	0.0043
	(0.0016)	(0.0028)	(0.0007)	(0.0026)	(0.0063)
Location of household	0.1681**	-0.2451**	0.0667	-0.4085***	0.4684*
	(0.0663)	(0.1102)	(0.0263)	(0.1190)	(0.2532)
International migrant	0.3748***	1.7113***	0.1490***	1.3472***	2.0941***
	(0.0665)	(0.1772)	(0.0265)	(0.1747)	(0.2733)
Household has multiple migrants	-0.3826***	-0.6316***	-0.1516***	-0.2671	-1.6312***
	(0.0659)	(0.1852)	(0.0258)	(0.1774)	(0.2490)
Constant	-1.5604**	0.2519			
	(0.6822)	(1.8113)			
Mills lambda	1.4825**				
	(0.6244)				
Rho (ρ)	0.8264				
Sigma (σ)	1.7940				
Number of observations	2108				
Censored observations	1074				
Uncensored observations	1034				
Wald $chi^2(20)$	574				
	(0.0000)				

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Bootstrapped Standard errors are in parenthesis*

The coefficients estimated using Heckman's sample selection model cannot be interpreted as elasticities (Hoffmann and Kassouf, 2005). To explore the effect of independent variables on the prospects of migrant remitting and on the levels of remittances sent, the marginal effects on the probability, conditional and unconditional levels of remittances are computed using the maximum likelihood estimates from the sample selection model. The marginal effects of the probability measure how non-remitters start to remit due to the effect of independent variables. The conditional marginal effects show how the level of remittances changes due to a given explanatory variable for migrants who send remittances. That is, the conditional marginal effects explain what makes a remitter send either more or less amounts. The unconditional marginal effect shows the effect of a regressor on the average level of remittances for all migrants.

The second and third column reports the estimates for the selection and level equations. The fourth column presents the marginal effects of the probit model. The fifth and sixth columns present the conditional and unconditional marginal effects, respectively. The Wald Chi-square test is significant at 1 per cent level, suggesting that the Heckman two-step model has a strong explanatory power. The parameter estimate of the IMR (covariance among the unobservables of the selection and level equation) is positive and significant at 5 per cent level. This indicates the existence of sample selection bias whose effect is addressed for by inclusion of IMR.

The VIF of IMR in the level equations is below threshold of 20 suggested by Puhani (2000). This means that there is no severe collinearity between IMR and explanatory variables in the level equations. Consequently, to analyze the determinants of remittances in Kenya, Heckman selection model is preferred over the alternative two-part/double hurdle model.

The results show that migrant's remittance behaviour is strongly related to migrant's life-cycle (age and marital status). Each additional year of migrant's age increases the likelihood of remitting by 1.9 percentage points and the unconditional remittance level by 126.6%. Holding other factors constant, older migrants may earn higher wages owing to their higher experience in the job market. Subsequently, they remit more than younger migrants. This finding is consistent with that of De la Briere et al. (2002) and Holst et al. (2011). The quadratic term is negative and significant, suggesting that remittances increase at a decreasing rate. Similar finding is reported by Gubert (2002) and Holst et al. (2008).

The coefficients of migrant's marital status and gender are positive and statistically significant. As opposed to being unmarried, being married increases the probability to remit by 9.3 percentage points, holding other factors constant. A married migrant may have a spouse and other dependants in the place of origin and, therefore, remit more to support them. Similar results are reported by Durand et al. (1996) and Collier et al. (2011). Among the migrants who do remit, a male migrant remits more than a female migrant. This result confirms the finding of Bredtmann et al. (2019). This finding is not surprising given that men, generally, have a stronger inheritance seeking behaviour. That is, a male migrant is likely to remit more than a female migrant to preserve favour with parents (Carling, 2008). A male migrant is also likely to earn a higher wage and enjoy more job opportunities than a female migrant and therefore remit more. The result is similar to that of Amuedo-Dorantes et al. (2006a) and Bouoiyour and Miftah (2015).

Migrant's education and employment status are vital determinants of remittances. Secondary education is positively and significantly associated with the odds of remitting and the unconditional level of remittances, while tertiary education significantly increases the conditional and unconditional level of remittances. These results suggest that migrant remittances may act as a refund of the expenditure the families incurred for migrant's education. Therefore, this finding is consistent with contractual agreement hypothesis. Employed migrant has 46.3 percentage point higher probability of remitting compared to unemployed migrant. Migrant being employed is positively related to the unconditional remittance level. Employment is likely to increase a migrant's income, which in turn increases migrant's capacity to remit. The finding relating to migrant's labour market status is in line with altruistic hypothesis and adds to similar findings by Funkhouser (1995), VanWey (2004), Holst et al. (2008) and Bredtmann et al. (2019). However, the finding is at variance with insurance motive, which postulates that uncertain situation of migrant should affect remittances positively.

Time since migration is positively related to the level of remittances but not incidence of remitting. Each additional year of migrant's stay at migration destination increases the conditional remittance level by 4.3%. However, the association between remittances and duration of stay is curvilinear, suggesting that sending of remittances follows an inverted-U relationship. That is, the level of remittances sent eventually declines with time. It is plausible to argue that migrant's earnings increase with work experience at the migration destination. This

induces migrants to remit higher amounts. However, migrant's social connectedness with community of origin weakens over time. Furthermore, a migrant's intention to return home will naturally diminish with migration span, resulting to an inverse relationship between remittances and time since migration. This finding is compatible with empirical results of Lucas and Stark (1985), Cracium (2006) and Bredtmann (2019) and is consistent with altruism motive.

Household head age is negatively and significantly related to the conditional and unconditional level of remittances. Holding other factors constant, a household with older household head is likely to have more migrants than a household with younger household head. This reduces the level of remittances per migrant. A household being headed by a female increases the probability to remit by 9.6 percentage points and the unconditional level of remittances by 108.6%. A household headed by a female is likely to have lower income, on average, than a household headed by a male. Therefore, it receives more remittances. The result may also indicate the strong ties that a migrant has with his or her mother than the father (Carling, 2008). The finding may also be explained by the fact that male migrants are more likely to leave a spouse and family back home. This finding is similar to that of Bouoiyour and Miftah (2015) and Biyase and Tregenna (2016).

Household head being employed is associated with 9.8 percentage point reduction in the probability to remit. Household head employment is also negatively related to the unconditional level of remittances. Employment may reduce household financial constraints. This, in turn, reduces the frequency and the level of remittances sent. Biyase and Tregenna (2016) found that in South Africa, remittances reduce if the household head is employed. This finding is consistent with altruistic theory. Having several migrants from a household is negatively and significantly associated with remittances. A migrant from a household with several migrants has 15.2 percentage points lower probability to remit than a migrant from a household with a sole migrant. Having several migrants in the family is negatively and significantly associated with the unconditional level of remittances. Migrants from the same household might share the obligation of supporting dependants, thereby reducing remittances per migrant. The negative relationship between remittances and the number of migrants from the same family is also obtained by previous studies (Funkhouser, 1995; Gubert, 2002). The result contradicts that of Hoddinot

(1994) who finds that in Kenya, the number of migrants in the family is positively associated with migrant's remittances, since migrants compete among themselves for bequest.

Household's income (standard of living) as measured by the level of household expenditure is a crucial driver of remittances. The probability to remit reduces by 9.6 percentage points in response to a one unit rise in household's income. This means that a migrant is less likely to remit to a higher-income household than to a lower-income household. This suggests that migrant's remittance behaviour is compatible with altruism. The marginal effects also show that household income is inversely related to the conditional and unconditional level of remittances. This indicates that remittances might also be motivated by self-interest.

A migrant living in rural area prior to migration is more likely to remit compared to a similar migrant from urban area. Specifically, a migrant from rural area has 6.7 percentage points higher likelihood to remit relative to a migrant from town and cities. Similarly, a migrant living in rural area prior to migration has a positive effect on the unconditional level of remittances. This finding concurs with that of Havolli (2009), and may imply that the level of development in a community affects migrant's remittance behaviour. On average, rural areas are less developed than towns and cities. Rural areas depend mainly on agriculture and have fewer job opportunities than urban areas. This could increase the frequency and amounts of remittances sent.

The estimated coefficients suggest that migration destination is a crucial determinant of remittances. Being a migrant residing abroad relative to being a domestic migrant increase the chances of remitting by 14.9 percentage points, holding other factors constant. The conditional and the unconditional marginal effects suggest that external migrants remit more at the extensive margin than domestic migrants. In line with this study, Nwosu et al. (2012) finds that in Nigeria, external migrants have a higher chance of remitting and remit higher levels than domestic migrants. The result is also consistent with that of Bredtmann (2019) who find that internal migrants in Sub-Saharan Africa remit significantly less amounts than external migrants. It is important to emphasize that the purpose of carrying out this regression (Table 2.3) is to determine whether the coefficients on the binary variable capturing migration destination (international migrant) are statistically significant or not. Since the estimated parameters (decision to remit and amount sent) are statistically significant, this implies that external and

internal remittances in Kenya may be driven by different factors. Consequently, this means that it is vital to separate the regressions for the determinants of international and internal remittances.

2.4.3 Determinants of International Remittances

The econometric results for the determinants of external remittances are presented in Table 2.4. The second column reports the coefficients of the selection while the third column reports the coefficients of the level equation. The marginal effects of the selection equation are reported in the fourth column while the conditional and unconditional marginal effects of Heckman sample selection model are reported in the fifth and sixth columns, respectively.

The Wald Chi-square statistic is significant at 1 per cent level. This suggests that Heckman two-step model has a robust explanatory power. The coefficient on the IMR is positive and statistically significant at 5 per cent level. The result indicates that selection into remitting is of major relevance in this context. Therefore, Heckman two-step estimator is required to correct for selection bias in external remittances equation. The results indicate that external remittances increase with age of the migrant. Each additional year of migrant's age increases the probability to remit by 1.7 percentage points and the unconditional level of external remittances by 125.1%. Migrants' wage is likely to increase with work experience, *ceteris paribus*. An increase in wage in turn increases migrant's capacity to remit.

A migrant being married is positively and significantly correlated to likelihood of remitting. Marriage is associated with 11.4 percentage point higher probability to remit compared to migrant being unmarried. This indicates that married migrants have a higher probability to remit money from abroad. This result is in line with Bredtmann et al. (2018) who also find that migrant's marital status is positively and significantly associated with the probability to remit, with no robust effect on the levels of remittances.

Migrant's level of education is an important determinant of international remittances. An external migrant with secondary (tertiary) education has 25.2 (15.5) percentage point higher probability to remit than a migrant without any formal education. Having secondary (tertiary) education is also positively associated with unconditional level of external remittances. Migrants with higher levels of education are likely to earn more and, if they are altruistic, they will subsequently remit more.

Table 2.4: Heckman regression results for the determinants of international remittances

Explanatory variables	Selection coefficient	Level coefficient	Probability	Cond. level	Uncond. level
Migrant age in years	0.0432*	0.0844*	0.0171*	0.0410	0.2067*
	(0.0267)	(0.0512)	(0.0105)	(0.0448)	(0.1134)
Age squared	-0.0005	-0.0009	-0.0002	-0.0004	-0.0024
	(0.0003)	(0.0007)	(0.0001)	(0.0006)	(0.0014)
Migrant gender	-0.0137	0.2533*	-0.0603	0.2671*	0.0894
	(0.0943)	(0.1500)	(0.0392)	(0.1477)	(0.3848)
Marital status	0.2882**		0.1140**	-0.2892**	1.0668**
	(0.1142)		(0.0451)	(0.1139)	(0.4641)
Migrant has primary education	0.1622	-0.0844	0.0636	-0.2444	0.5415
	(0.2296)	(0.3514)	(0.0893)	(0.2719)	(0.9620)
Migrant has secondary education	0.6716***	0.2172	0.2524***	-0.4120	2.4464***
	(0.2105)	(0.4301)	(0.0732)	(0.3678)	(0.8119)
Migrant has tertiary education	0.3972**	0.2598	0.1553*	-0.1335	1.5962*
	(0.2163)	(0.3692)	(0.0833)	(0.2904)	(0.9048)
Duration of migration in years	0.0053	0.0633*	0.0021	0.0580*	0.0545
	(0.0203)	(0.0346)	(0.0080)	(0.0267)	(0.0885)
Duration of migration squared	-0.0001	-0.0014	-0.0000	-0.0013	-0.0011
	(0.0007)	(0.0014)	(0.0003)	(0.0009)	(0.0032)
Employment status of migrants	1.1965***	1.3021	0.4731***	0.1017	5.1485***
	(0.1094)	(0.6813)	(0.0434)	(0.6737)	(0.5042)
Household head age in years	-0.0038	-0.0014	-0.0015	0.0024	-0.0148
	(0.0028)	(0.0045)	(0.0011)	(0.0040)	(0.0120)
Household head gender	0.1531	0.2542	0.0603	0.1022	0.7072
	(0.1000)	(0.1842)	(0.0392)	(0.1880)	(0.4150)
Employment status of household head	-0.1169	-0.0291	-0.0466	0.1045	-0.4486
	(0.1229)	(0.2214)	(0.0575)	(0.1719)	(0.5283)
Number of household members	0.0368	0.0268	0.0146*	-0.0101	0.1511
	(0.0258)	(0.0429)	(0.0102)	(0.0300)	(0.1134)
Household income	-0.2983***	0.4241*	-0.1179***	0.7234***	-0.8694**
	(0.0819)	(0.2777)	(0.0324)	(0.2187)	(0.3512)
Proportion of children <15 years living in household	0.0002	0.0070*	0.0001	0.0068*	0.0045
	(0.0030)	(0.0040)	(0.0012)	(0.0038)	(0.122)
Location of household	0.0578	-0.3959**	0.0229	-0.4539**	-0.0054
	(0.1081)	(0.1858)	(0.0427)	(0.1911)	(0.4406)
Household has multiple migrants	-0.4071***	-0.7350***	-0.1591***	-0.3325	-1.9057***
	(0.0987)	(0.2360)	(0.0376)	(0.2325)	(0.4080)
Constant	-0.5475	1.7840			
	(0.9613)	(2.2050)			
Mills lambda	1.6541**				
	(0.8340)				
Rho (ρ)	0.8941				
Sigma (σ)	1.8500				
Number of observations	1001				
Censored observations	445				
Uncensored observations	556				
Wald $chi^2(20)$	78.09				
	(0.0000)				

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Bootstrapped Standard errors are in parenthesis*

Educated migrants may also face lower remittance transaction fees since they have higher chances of being exposed to financial services (Bredtmann et al., 2018). Educated migrants could

also remit more because they are more likely to be documented migrants. Moreover, according to loan repayment theory of remittances, educated migrants may remit more to repay costs incurred by the household for his or her education (Poirine, 1997). A similar result is reported by Bollard et al. (2009) and Bredtmann et al. (2018) who find that the level of remittances increases with migrant's level of schooling.

Time since migration is positively and significantly associated with amount of money sent by external migrants. All else equal, an additional year in a foreign country increases the conditional remittances level by 6.0%. The coefficient on the quadratic term is negative and statistically insignificant. The results are somewhat similar to those of Hoti (2015) who find that in Kosovo, the incidence of remitting and the amount remitted increases with years of migration, and the association between years since migration and remittances is linear. The empirical finding that external remittances do not eventually diminish with time since migration is inconsistent with remittances decay hypothesis (Holst and Schrooten, 2006).

Employment status of a migrant is positively and significantly related to the prospects of remitting and the unconditional level of external remittances. Being an employed external migrant would increase the probability to remit money back home by 47.3 percentage points relative to migrant having a different labour market status. The positive relationship between employment and remittances aligns with altruistic hypothesis (VanWey, 2004; Bouoiyour and Miftah, 2015; Hoti, 2015). Conversely, migrant's employment status may signify precarious situation (uncertainty) of a migrant in a foreign country. This means that the results do not corroborate those of previous studies (Agarwal and Horowitz, 2002) who find that migrant's unemployment impact on remittances in a positive manner since transfers are motivated by insurance.

Household size at migrant's place of origin is positively associated with external remittances but this impact is significant only at the extensive margin. Each additional household member increases the likelihood of remitting by 1.5 percentage points. This shows that external remittances are responsive to high dependencies in the household back home. This result suggests that external remittances are motivated by altruism (Lucas and Stark, 1985). The finding is harmonious with that of Bredtmann et al. (2019) who find that in Sub-Sahara Africa, household size is positively related with the probability to remit.

External migrants from higher income households have lower chances of remitting but, conditional on remitting they do send higher amounts than migrants from lower-income households. All else equal, a unit increase in household income in the country of origin would reduce the chance of remitting by 11.8 percentage points. The parameter estimate therefore suggests that external remittances are motivated by altruism, since higher-income households have a lower chance of receiving external remittances. Conditional marginal effects suggest that remittances would increase by 106.1% in response to a one unit rise in household income. The negative coefficient on household income (the conditional marginal effect) suggests that external remittances could also be motivated by self-interest.

The number of individuals under the age of 15 years in the household is related to external remittances at the intensive margin. *Ceteris paribus*, each additional household member under the age of 15 years increases the conditional level of external remittances by 0.7%. Household location has a significant effect on the intensity of external remittances. Bouoiyour and Miftah (2015) found a comparable result in Morocco, that the number of inactive people in a family is positively and significantly related to levels of external remittances.

Being an external migrant from rural setting reduces the conditional level of external remittances by 36.9%. This suggests that among the sample of remitters, external migrants from rural areas remit lower levels than their urban counterparts. Probably, rural households prefer to send external migrants to lower-income countries due to prohibitive costs of migration to the higher-income countries and therefore acquire lower level of external remittances. Conversely, urban households choose to send migrants to higher-income countries as they can afford the higher costs of migration. Consequently, they receive higher levels of remittances.

Having several migrants in the family is inversely associated with the probability to remit and level of external remittances. An external migrant from a household with several migrants has 15.9 percentage point lower probability to remit compared to a similar migrant from a household with sole migrant. Being an external migrant from a household with multiple migrants is inversely and significantly associated with the unconditional level of external remittances. The result may reflect sharing of remitting responsibilities by migrants from the same household. The negative coefficient on the probability and levels of remittances sent is suggestive of altruism

motive of remittances. However, the results contradict those of Hoddinott (1994) and Agarwal and Horowitz (2002) who find that migrants from the same household compete and remit more to seek favour from parents. The result possibly suggests that bequest motive is a less important driver of external remittances in the Kenyan context.

2.4.4 Determinants of Internal Remittances

The results of the drivers of internal remittances in Kenya are presented in Table 2.5. The likelihood function of the Heckman two-step model is significant at 1 percent with a Wald Chi-square statistic of 125.68, suggesting that the Heckman sample selection model has a strong explanatory power. The coefficient on the Heckman's lambda (IMR) is positive and significant at 10 percent level, indicating that there is a significant sample selection bias in the data. Therefore, Heckman two-step approach is required to address selection bias. The second and third columns of Table 2.5 report the coefficients of the selection and level equations, respectively. The fourth column reports the marginal effects derived from the selection equation. The marginal effects are reported in the fifth and sixth columns, respectively.

Migrant's age (a proxy for work experience) has a positive and significant effect on the level of internal remittances. On average, the unconditional level of internal remittances increases by 12.1% for every additional year of migrant's age. Migrant's earnings are likely to increase with work experience. Thus, all other factors held constant, an older migrant will tend to remit more. Other authors (Bettin et al., 2011) report a similar result. The quadratic term has a negative and insignificant coefficient, suggesting that internal remittances do not eventually decline with migrant's age.

A migrant being married is associated with 6.7 percentage point increase in internal remittances compared to migrant being unmarried, holding other factors constant. Marriage is negatively related to the conditional level of internal remittances; nevertheless, marriage is positively associated with the unconditional level of internal remittances. A married migrant may leave his or her spouse at the place of origin, therefore increasing the frequency of domestic remittances. The coefficient on the conditional marginal effect suggests that, among remitters, married migrants send lower amounts of money relative to unmarried migrants. This finding is

unsurprising given that a married migrant may have a target to save money and eventually return home and thus remit lower amounts than his or her married counterpart.

Table 2.5: Heckman regression results for the determinants of internal remittances

Explanatory variables	Selection coefficient	Level coefficient	Probability	Cond. level	Uncond. level
Migrant age in years	0.0487	0.1613**	0.0186	0.0953	0.2032*
	(0.0337)	(0.0686)	(0.0129)	(0.0713)	(0.1093)
Age squared	-0.0004	-0.0015*	-0.0002	-0.0009	-0.0019
	(0.0004)	(0.0008)	(0.0002)	(0.0008)	(0.0014)
Migrant gender	0.1000	0.1727	0.1423***	0.0369	0.3549
	(0.0944)	(0.1852)	(0.0409)	(0.1983)	(0.3027)
Marital status	0.1766*		0.0673**	-0.2392*	0.5138**
	(0.0932)		(0.0356)	(0.1263)	(0.2567)
Migrant has primary education	-0.1287	0.3465	-0.0487	0.5217	-0.2470
	(0.1587)	(0.2863)	(0.0594)	(0.3249)	(0.4994)
Migrant has secondary education	-0.0488	0.6003***	-0.0185	0.6667*	0.0817
	(0.1675)	(0.3301)	(0.0633)	(0.3425)	(0.5565)
Migrant has tertiary education	-0.0013	1.1323***	-0.0005	1.1341***	0.4276
	(0.1687)	(0.3082)	(0.0643)	(0.3146)	(0.5747)
Duration of migration in years	0.0389**	0.0520	0.0148**	-0.0008	-0.0064***
	(0.0178)	(0.0416)	(0.0068)	(0.0019)	(0.0021)
Duration of migration squared	-0.0019***	-0.0018	-0.0007***	0.0008	-0.0064***
	(0.0006)	(0.0018)	(0.0002)	(0.0019)	(0.0021)
Employment status of migrants	1.2048***	1.8286*	0.4592***	0.1965	4.2023***
	(0.1535)	(1.0473)	(0.0550)	(1.0283)	(0.5277)
Household head age in years	-0.0003	-0.0210***	-0.0001	-0.0205***	-0.0090
	(0.0033)	(0.0055)	(0.0012)	(0.0055)	(0.0105)
Household head gender	0.3706***	0.2820	0.1423***	-0.2135	1.1903***
	(0.1061)	(0.3140)	(0.0409)	(0.3271)	(0.3554)
Employment status of household head	-0.3901***	-0.7551**	-0.1487***	-0.2267	-1.4229***
	(0.1254)	(0.3499)	(0.0480)	(0.3544)	(0.4380)
Number of household members	-0.0180	-0.0036	-0.0069	0.0208	-0.0538
	(0.0224)	(0.0427)	(0.0085)	(0.0457)	(0.0704)
Household income	-0.1840**	-0.3627	-0.0701**	-0.1134	-0.6736***
	(0.0976)	(0.2355)	(0.0373)	(0.2380)	(0.3218)
Proportion of children <15 years living in household	0.0005	-0.0069	0.0002	-0.0076*	-0.0011
	(0.0027)	(0.0049)	(0.0011)	(0.0047)	(0.0090)
Location of household	0.2796***	-0.0249	0.1056***	-0.4053*	0.8005**
	(0.0945)	(0.2101)	(0.0373)	(0.2118)	(0.3232)
Household has multiple migrants	-0.3855***	-0.5554**	-0.1492***	-0.0449	-1.3615***
	(0.0945)	(0.2730)	(0.0368)	(0.2982)	(0.3273)
Constant	-1.5668	5.3539*			
	(1.0326)	(3.2354)			
Mills lambda	1.9428*				
	(1.1782)				
Rho (ρ)	0.9782				
Sigma (σ)	1.9862				
Number of observations	1107				
Censored observations	629				
Uncensored observations	478				
Wald chi^2(20)	125.68				
	(0.0000)				

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Bootstrapped Standard errors are in parenthesis*

The marginal effects of the Heckman model indicate that migrant's education is a key driver of internal remittances. As shown by conditional marginal effects, secondary (tertiary) education level is positively related to intensity of internal remittances. The result may suggest that a domestic migrant remits to refund the education loan advanced to him or her by the family (Poirine, 1997). As per altruism, an educated migrant is also likely to send higher amounts of money back home because they earn higher wages. The positive association between migrant's education and amounts of remittances is also reported by Lucas and Stark (1985), Bollard et al. (2009) and Bredtmann et al. (2019).

Time since migration is positively associated with the possibility of remitting and the level of internal remittances. Each additional year of migrant's stay at the migration destination increases the probability to remit by 1.5 percentage point. An additional year stayed by a migrant at the destination would increase the unconditional level of internal remittances by 101.4%. This result may be explained by the fact that fixed cost of a migrant being established at the migration destination reduces with time (Mahuteau et al., 2010). This leads to an increase in remittances with time.

The results also show that remittances follow a curvilinear trajectory with length of a domestic migrant's absence. This result is consistent with remittances decay hypothesis. Social connectedness of a migrant with the family back home is predisposed to erode with time. Also, as argued by Carling (2008), a migrant may have a specific target level of remittances. These reasons could contribute to the observed decline in domestic remittances with time. Amuedo-Dorantes and Pozo (2006a) and Dustmann and Mestress (2010) find a dissimilar result.

Migrant's employment status has a positive effect on the decision on whether to remit or not and the amount of internal remittances remitted. Relative to a domestic migrant being unemployed, an internal migrant being employed increases the prospects of remitting by 45.9 percentage points. This result highlights the importance of migrant's employment in driving domestic remittances. Employment increases migrant's income and therefore the capacity to remit. This result suggests that internal remittances are motivated by altruism (VanWey, 2004). The result contradicts that of Amuedo-Dorantes and Pozo (2006a) and Agarwal and Horowitz (2002) whc

find that an employed migrant remits lower amounts because the migrant is not in need of insurance from the household.

Domestic migrants from well-off households have a lower probability to remit and send lesser amounts than their counterparts from worse-off families. The marginal effects indicate that a one unit increase in household income reduces the likelihood of sending domestic remittances by 7.0 percentage points. The unconditional level of domestic remittances would reduce by 83.2% due to a unit increase in household income, holding other factors constant. This result suggests that internal remittances are motivated by altruism, and it is comparable to that of Bouoiyour and Miftah (2015) who find that in Morocco, the probability to remit decreases with household income.

Age of household head is negatively linked to intensity of internal remittances. Each additional year of household head, *ceteris paribus*, reduces the conditional level of internal remittances by 2.0%. A household with older head is likely to have multiple migrants. This reduces the amounts of internal remittances per-migrant. This result indicates that internal migrants share the burden of supporting parents and is consistent with altruism.

Interestingly, the estimates show that female headship, compared to male headship, has positive and significant effect on migrants to remit or not and the unconditional level of internal remittances. This means that an internal migrant is more altruistic to a female household head than to a male household head. This may be because, on average, a migrant is likely to have stronger ties with his or her mother than the father (Carling, 2008). Additionally, a female-headed household may have a higher prospect of receiving intergenerational remittances than its male-headed counterpart. As noted by Cox et al. (1998), on average, women have a higher life expectancy than men, and thus they could receive more remittances as widows.

Being a migrant from rural area is associated with 10.6 percentage point higher probability to remit. Relative to being a migrant from town or city, being a migrant from rural area increases the unconditional level of internal remittances by 74.1% and reduces the conditional level of domestic remittances by 33.3%. Rural areas are likely to be endowed with fewer job and business opportunities than urban areas. As a result, a rural-based household is likely to send some of its members to urban areas (its labour markets are not correlated with rural labour

markets) to increase the probability of receiving remittances. Biyase and Tregenna (2016) report similar finding in South Africa in that a domestic migrant originating from rural area remits significantly more than an internal migrant from urban area.

The marginal effects of the Heckman model reveal that having several migrants from the same household is inversely related to the probability to remit and the unconditional level of internal remittances. As argued by Carling (2008), a migrant may remit less regularly or reduce amounts remitted if the family has several migrants. This is because the migrants can share the obligation of supporting the dependants. This result possibly indicates that internal migrants behave altruistically. The result also suggests that inheritance from parents may be a less important driver of domestic remittances. These results confirm findings of other studies that report negative association between number of migrants from the same family and remittances (Funkhouser, 1995; Gubert, 2002). However, the results in this study contradict those of Hoddinott (1992; 1994) who finds that levels of domestic remittances in Kenya increase with the number of migrants from the same household.

2.5 Summary and Conclusions

This essay analyzed the determinants of remittances in Kenya using cross-sectional data from the 2009 World Bank Household Survey for African Migration Project for Kenya. First, the essay analyzed the determinants of remittances irrespective of their origin. Subsequently, the determinants of external and internal remittances were estimated. To test and address for potential sample selection bias, Heckman's sample selection model, estimated using two-step procedure was applied. Heckman's approach requires the use of exclusion restriction to identify model parameters. Migrant's marital status significantly affects the decision to remit but not the levels of remittances, and therefore, was used as the identifier. The coefficient on IMR is positive and statistically significant, implying that there was sample selection bias in the data and should be corrected for. Accordingly, the Heckman's two-step approach was required to deal with sample selection bias.

The results showed that, compared to an internal migrant, a migrant residing in a foreign country has a higher chance of remitting, and also remit more at the intensive margin. Migrant's education prior to migration affects remittances depending on migrant's destination. Tertiary

education has a positive and significant effect on the decision on whether to remit or not to remit money from abroad. Tertiary education does not have a significant effect on the decision of how much is remitted by external migrants, while it is positively correlated with levels of internal remittances with no significant effect on the probability to remit. The positive correlation between migrant's education and remittances lends support to the hypothesis that migrants remit to reimburse loans used to fund migrant's human capital. This indicates that remittances are likely to be motivated by contractual agreement involving migrant and the household left behind.

It was also found that being an employed migrant increase the possibility of remitting and the levels of external (internal) remittances. The result suggests that migrants behave altruistically, and refutes the idea that remittances are motivated by insurance. The effect of length of migrant's absence on remittances varies with migration destination. On one hand, time since migration has a positive effect on the probability of sending internal remittances, while the amount remitted is uncorrelated with time spent at migration destination. The effect of years lived at migration destination on the likelihood of remitting is non-linear and suggests that domestic remittances are motivated by altruism. On the other hand, the length of stay at migration destination does not have a significant impact on the decision on whether external migrants remit or not, but is positively and significantly related to amounts of remittances sent from abroad. It was also found that the relationship between time since migration and levels of external remittances sent is linear.

The results further revealed that migrant household socio-economic level is an essential driver of internal and international remittances. The socio-economic attributes in this case include whether household head is employed or not, household head gender, household location, the number of migrants from same household and household income. Overall, the effect of household characteristics on migrant's remittance behaviour suggest that household's economic situation (at the area of origin) is a key driver of remittances. This finding provides some support for altruism motive of remittances. The results also show that as opposed to external migrants from lower income households, migrants from higher income remit more at the extensive margin. This finding highlights the fact that external remittances might also be motivated by self-interest.

2.5.1 Policy Implications

The results show that, on average, migrants in the diaspora remit significantly more compared to their internal counterparts both at the extensive and intensive margins. Therefore, policies geared towards promoting external migration are likely to have a favourable impact on external migrant's decision on whether to remit or not, and on the decision on how much to remit. This suggests that the government should encourage external migration by reducing the cost of migration. This can be achieved by incentives such as subsidizing travel passport/travel expenses. The results emphasized the importance of migrant's education in driving both external and internal remittances. Thus, policies that encourage migration among professionals/qualified individuals are needed to enhance remittances.

Employed internal (external) migrants have a higher chance of remitting and do send higher levels than their counterparts without jobs. Thus, policies that enhance migrant success in the domestic and foreign labour markets are required. This is attainable by reinforcing partnership between Kenya and host countries with regard to information sharing on requirements in the job market abroad and also in respect of ameliorating the acceptance of foreign professional qualifications. This may help to boost migrant's economic status abroad and consequently remit more.

The results indicate that external and internal remittances are largely motivated by altruism and, consequently, they are important for household welfare. Thus, policies ought to be put in place to boost the flow of internal and external remittances. Since the costs for remittance services are highest within Sub-Saharan Africa region, the government should strive to reduce the transaction costs of remittances. This is achievable by increasing competition in the remittance transfer market, reducing regulatory obstacles, leveraging on better technologies in money transfer market and increasing transparency in the remittance market. Another policy for maximizing remittances inflow is to reduce or abolish illegal fees charged by migrant recruitment agencies. Ordinarily, recruitment agencies impose high fees on migrants, which place a financial burden on remitters and on recipients. As a result, the government ought to regulate and monitor migrant recruitment agencies. The government should also encourage external remittances by offering incentives. For instance, the Kenya Revenue Authority should consider extending tax amnesty for migrants to remit assets held abroad that was due to expire on 30th June 2019.

In addition, external remittances were found to be motivated by migrant's self-interest. Policies that improve domestic business climate are therefore required. A favourable business climate is likely to increase returns from business. This in turn leads to higher external remittances.

2.5.2 Limitations of the Study

This essay analyzes the determinants of remittances in Kenya using cross-sectional data due to scarcity of panel data on migration and remittances. The levels of remittances sent and the probability to remit were regressed on a set of explanatory variables. However, it can be difficult to empirically disentangle the different motivations to remit when using cross-sectional dataset because the signs on the key coefficients, for instance household income, may be interpreted in several ways.

The household dataset used in this study lacked data about migrant's earnings at the destination, yet migrant's income is one of the key drivers of remittances. This study addresses this drawback by including variables that are greatly associated with migrant's earnings, thereby acting as a proxy for migrant's unobserved income potential. In this case, the study included migrant's education level and employment status, differentiating between employed (migrants on full employment, migrants on part-time employment and self-employed migrants) and unemployed migrants. Given that this study controlled for migrant's education and labour market status in the remittance equations, migrant's income might possibly have a trivial effect on migrant's remittance behaviour.

Furthermore, this study used total household expenditure as a proxy for household income. However, the time base or recall period for different expenditures differs with expenditure items. To address this issue, the study aggregated weekly, monthly and semi-annual figures to annual figures, with a purpose of getting a criterion for household aggregate expenditure.

2.5.3 Areas for Further Research

Migration can create information asymmetry. Neither a household nor a migrant can precisely observe each other's action. While a household may not precisely know the migrant's occupation or income, a migrant may not perfectly observe the household's actual need and use of remittances. It may be important to analyze the impact of information flows between a migrant

ınd the household in shaping migrant's remittance behaviour. In this study, the level of ıousehold income was included as a regressor. However, in developing countries such as Kenya, ıousehold income may be uncertain and, therefore, it is important to investigate its effect on the ɔrobability to remit and amount of remittances. Empirical investigation of the impact of ıigrant's intention to return home and migrant's legal status on migrant's remittance behaviour ıould also be indispensable.

CHAPTER THREE

EFFECT OF REMITTANCES ON HOUSEHOLD EXPENDITURE ALLOCATION IN KENYA

3.1 Introduction

The amounts of remittances received by developing countries, Kenya included, have triggered discourse on the impact of remittances on economic development. In turn, this has ignited a debate on how remittances are spent by recipients. The economic contribution of remittances is shaped by how they are viewed by recipient households. First, households may perceive remittances as a transitory income/windfall gain, and therefore spend them on human and physical capital investments. In this scenario, remittances will have a more permanent impact on economic development of the recipient country (Randazzo and Piracha, 2014; 2017). Secondly, households may view remittances as a compensatory income and, therefore, devote them mainly on present consumption. Though the higher expenditure on immediate consumption may boost domestic production, it may generate an indirect impact on inflation (Narayan et al., 2011). Finally, households may treat remittances like any other income. As a result, there will be no variation in household expenditure behaviour (Randazzo and Piracha, 2014; 2017).

The debate on how remittances affect household expenditure is not conclusive. It is unclear how remittances affect household spending and therefore how they impact on economic development. Existing empirical works analyzing the impact of remittance income on expenditure allocation in Kenya have shortcomings. For instance, Ratha et al. (2011) and Odipo et al. (2015) apply direct approach based on household survey question, which enquires how remittances are spent by recipient household. The adoption of direct method (based on the question how recipient used remittances) to draw inferences has the advantage of being simple but it yields partial and incorrect conclusions since money from migrants and non-migrants is fungible (Taylor and Mora, 2006). This study uses a regression approach whereby remittances are included as an explanatory variable, besides total household income and other control variables. The advantage of a regression approach is that it allows the assessment of whether remittances impact on household expenditure in a way that is independent of their contribution to total income (Taylor and Mora, 2006).

Simiyu (2013) explores the association between remittances and household spending behaviour in Kenya. However, the study fails to consider expenditure allocated to consumer durables, physical investments, and housing and land. The study also fails to account for the source of remittances, internal or international, yet the effect on household spending may vary with origin of remittances. It is essential to analyze the association between domestic and international remittances and household spending separately because the higher-income households may have higher prospects of receiving remittances from abroad relative to lower income households. This suggests that households with remittances from internal or external sources would allocate expenditure differently.

Therefore, there is a research gap which this study seeks to address. Thus, this study attempts to answer the following research questions: What is the effect of international remittances on household expenditure allocation? What is the effect of internal remittances on household expenditure allocation?

The main objective of this study is to investigate the effect of remittances on household expenditure allocation. Specifically, the study aims at:

a) Analyzing the effect of international remittances on household expenditure allocation.
b) Examining the effect of internal remittances on household expenditure allocation.

This study contributes and broadens debate on the way remittances are spent by examining the impact of remittances on household spending behaviour in Kenya. Since the relationship between remittances and household spending may vary with source of remittance, this study distinguishes the effect of internal from international remittances. The study focuses on a wider range of expenditure items: food, education, health, consumption and durable goods, physical investments, housing and land, and discretionary goods and therefore provides a more complete picture of the link between remittances and household expenditure allocation. To assess the effect of remittances, this study applies fractional multinomial logit estimator to address the fact that budget shares are bounded within [0, 1] interval and for each observation, the shares must add up to one. Finally, the study applies instrumental variable estimation method to adjust for endogeneity arising from receipt of remittances to avail unbiased and consistent estimates.

The findings of this study will be important to policy makers seeking to achieve higher levels of economic growth and development. This is because the effect of remittances on economic development depends on how recipients perceive and therefore utilize remittances. For remittances to have a long-term impact on households and economy, they would have to be allocated to human and physical capital investments. Based on the findings of this study, it will become clearer to policy makers if recipients of remittances spend more on present consumption or on human and physical capital (investment) goods. If the study finds that remittances increase immediate consumption, then policy makers will have to devise policy to encourage households to spend more on investments. For instance, the government may craft policies to improve access to basic needs to encourage recipients to spend remittances on human and physical investments.

3.2 Literature Review

3.2.1 Theoretical Literature

In the literature on remittances, there are three views that seek to explain how recipients spend remittances (Cuecuecha and Adams, 2016). The first view treats a migrant as a part of the household, and migrant's income as a component of pooled family income. In this view, remittances are treated as fungible; that is, remittances are perceived and used by households like money from any other source. This theory predicts that households with or without remittances will have identical expenditure allocation behaviour.

The second view advances that remittances reduce liquidity constraints in the household and induce behavioural change. This theory posits that remittances are mainly spent or allocated to present consumption. Additionally, migrants may fail to perfectly monitor how recipients spend remittances (De and Ratha, 2012). As a result, migrants have little control on how remittances are spent. This gives rise to moral hazard problem; that is, remitters may not perfectly monitor recipients and therefore the recipients spend more on undesirable goods. This theory suggests that recipients will spend remittances mainly on immediate consumption and leisure rather than on investment (Chami et al., 2008). Therefore, this theory predicts that remittances will contribute negatively to economic development of the receiving country.

A third and a more optimistic hypothesis postulate that remittances are a transitory type of income. The hypothesis also argues that remittances reduce household liquidity constraints and allow households to spend the receipts on investment in human and physical capital (Adams, 1998). Consequently, this hypothesis predicts that remittances will contribute positively to economic development.

Shefrin and Thaler (1988) developed an alternative model known as mental accounting theory. This theory postulates that money is not fungible. Individuals compartmentalize money into different financial accounts from which different items are financed. Money is placed in a given account depending on its source. A change in income in a given mental account, for instance, a windfall, is an imperfect substitute for income variation in another account, for example, wage income. Subsequently, this leads to a change in the marginal propensity to consume on different goods depending on the source of the money.

Building on the work of Shefrin and Thaler (1988), Davies et al. (2009) argue that remittances may be put into a separate mental accounting compartment because of three reasons. First, migrants may request remittances to be treated differently. Second, since the money is earned by another individual, households may perceive remittances as a sacrifice on the part of the remitter. Consequently, households will possibly save remittances or allocate them to investment on schooling, health and nutrition. Conversely, if remittances are perceived as a gift from the migrant, they are likely to be spent on luxury goods. Finally, remittances may be perceived as unpredictable source of household income. This increases the probability of the receipts being saved and reduces the probability of them being used for consumption.

3.2.2 Empirical Literature

In the literature, there is no consensus on how remittances affect recipient's household expenditure behaviour. Several works find that remittances are positively and significantly related to household spending on investment. For instance, Taylor and Mora (2006) examine the effect of external and internal migration on household expenditures in Mexico and find that relative to households without migrants, households with external migrants have a higher marginal spending on investments. Similarly, households with domestic migrants allocate a higher share of expenditure to services, health and housing than households without migrants.

Similar findings are reported in Mexico by Rivera and Gonzalez (2009). The authors examine the association between external and internal remittances on expenditure allocation and find that a household with internal or external remittances allocates a higher share of expenditure to education, health, savings and durable goods than a household without remittances. This study does not address for potential endogeneity of remittance. Failure to control for endogeneity may result to biased and inconsistent estimates (Cameron and Trivedi, 2005). Taylor and Mora (2006) and Rivera and Gonazalez (2009) estimate Engel curve using three-stage least squares (3SLS) and seemingly unrelated regression (SUR) estimators, respectively. However, the authors fail to take into account the fact that expenditure shares are bounded between zero and one. Failure to account for the fractional nature of the expenditure shares may lead to inconsistent parameter estimates (Papke and Wooldridge, 1996). Adams and Cuecuecha (2010a) control for different sources of remittances and report a comparable finding in Guatemala. The estimates indicate that a household receiving internal and external remittances simultaneously allocates a higher share of expenditure at the margin on education and housing (investments), and less at the margin on food than a household without remittances.

Some studies find that remittances have a positive effect on immediate consumption. The findings of these studies therefore suggest that remittances have no positive effect on economic development. For instance, Demurger and Wang (2016) find that in China, households allocate internal remittances mainly to consumption and less to education and family businesses. The argument that recipients use remittances unproductively is also supported by Clement (2011). Clement (2011) examines the relationship between remittances and household spending in Tajikistan and finds that while external remittances affect household consumption level positively, they adversely impact on household spending on investment. Nevertheless, the link between domestic remittances and expenditure allocation is ambiguous because they affect investment goods in opposing directions. Specifically, internal remittances reduce expenditure devoted to housing and agriculture while increasing expenditure on health. The estimates also indicate that remittances have no significant impact on other key investment expenditure categories such as education. The author rationalizes that health expenditure is a transient priority but schooling and farming constitute long-run investment. Thus, this study notes that domestic remittances assist recipients to accomplish basic consumption. Though informative,

this study fails to consider other investment expenditure items such as housing and land, which this study also focuses on.

Some empirical works find that remittances have no impact on household expenditure allocation. For example, Castaldo and Reilly (2007) find that a household with both internal and external remittances has identical expenditure allocation to a household without remittances. The study fails to focus on education, health and housing and land expenditure categories. In Ghana, Adams et al. (2008) analyze the effect of external and internal remittances on household expenditure allocation on a broad array of expenditure items. The estimated parameters indicate that a recipient household treats external and internal remittances simply like any other source of income, such that it does not allocate a higher share of expenditure to food, education and housing in comparison to a similar household without remittances. A comparable finding is found in Senegal by Randazzo and Piracha (2014) who estimate the effect of household receiving external, internal and both external and internal remittances simultaneously on household expenditure behaviour. Initially, the results show that external remittances are spent productively. However, the results also indicate that remittances have no impact on household expenditure when marginal spending is taken into account. Yet, Tabuga (2008) using data from Philippines finds mixed results. Specifically, being a recipient household is positively related to expenditure assigned to consumption, education, in addition to housing relative to a household not receiving remittance.

Studies analyzing the relationship between remittances and household expenditure use different methodologies. For instance, some studies apply OLS estimator in their analysis (Castaldo and Reilly, 2007). Castaldo and Reilly (2007) find that in Albania, households with external remittances allocate a lower share of total expenditure to food and more to durable goods than a household without remittances. However, the study does not address for potential endogeneity of remittances. This means that the parameter estimates on the impact of remittances on expenditure allocation may be biased and inconsistent. To address for potential endogeneity of remittances, some studies (Clement, 2011; Randazzo and Piracha, 2014; and Demurger and Wang, 2016) use propensity score matching (PSM) approach. However, PSM adjusts for selection bias associated with observable differences between households with and those without remittances but does not address for unobservables.

Few studies use instrumental variable (IV) estimation strategy to address selection bias and endogeneity of remittances. Adams and Cuecuecha (2010b) use three-step nested logit model with instrumental variables and find that recipient households allocate a higher share of expenditure at the margin on food and less on housing relative to counterfactual scenario (of household expenditure without remittances). The authors rationalize that households with external remittances in Indonesia are poorer than other types of households and, therefore, allocate more remittances to consumption than to investments.

To address for many zero expenditure observations on household expenditure, some authors use Tobit (Tabuga, 2008) and two-part (Amuedo-Dorantes and Pozo, 2014) estimators. For instance, Amuedo-Dorantes and Pozo (2014) find that in Mexico, uncertainty and level of international remittances are positively related to household spending on physical, human and financial investments. The study focuses on household spending on human and physical capita but does not consider expenditure allocated to food item.

Some studies explore how bargaining power of individuals in recipient households influence allocation of expenditure. Guzman et al. (2008) and Pajaron (2011) use fractional logit estimator to investigate how bargaining power of individuals in a recipient household affects expenditure behaviour in Ghana and Philippines, respectively. Guzman et al. (2008) find that remittances have no impact on household expenditure allocation in a male-headed household. The results also indicate heterogeneity in expenditure allocation within female-headed households. Specifically, a female-headed household with external remittances devotes a lower share of household expenditure share to food and higher share of expenditure to education, health, consumer and durable goods, and other goods while a female-headed household with internal remittances has a higher expenditure share on health and education. The study does not address for potential endogeneity of remittances and, therefore, the results could be biased and inconsistent. Pajaron (2011) find that a female-headed household spends more on food and expenditure on 'others' and less on medical goods, alcohol, tobacco and household operations compared to a male-headed household. Dissimilar findings are reported by Gobel (2013) in Ecuador. The study finds that a female-headed household allocates a higher share of expenditure to food, housing, education and health and less on consumer durables and investments than a male-headed household.

Few studies investigate the association between remittances and household expenditure allocation using panel (Cuecuecha and Adams, 2016) and cross-sectional data (Thapa and Acharya, 2017; Randazzo and Piracha, 2017). Cuecuecha and Adams (2016) use the same data as Adams and Cuecuecha (2010b) to estimate the effect of external remittances on household investment in Indonesia. The regression results indicate that a household with remittances assigns a higher share of expenditure at the margin to food and education than the counterfactual scenario (of household without remittances). Applying data from Nepal, Thapa and Acharya (2017) investigate the relationship between external, internal and combination of external and internal remittances on household spending and find that external remittances are positively and significantly related to the share of total household expenditure dedicated to durable goods. A household with internal remittances allocates a higher share of expenditure to food while a household receiving external and internal remittances simultaneously devotes a higher share of expenditure to non-food items and health. A dissimilar finding is reported in Senegal by Randazzo and Piracha (2017). The study finds that external (internal) remittances have insignificant impact on household expenditure behaviour.

3.2.3 Overview of Literature

Theoretical literature identifies three main views on how recipients spend remittances. One view postulates that recipients use remittances the same way other household income is spent. The pessimistic view hypothesizes that recipients spend remittances on present consumption. The optimistic view postulates that recipients use remittance on human and physical capital investments. Thus, theoretically, there is no consensus on how remittances are used by recipients. Empirical literature shows that the relationship between remittances and household expenditure allocation varies with source of remittances (Adams and Cuecuecha, 2010a; Adams and Cuecuecha, 2010b). This means that in examining remittances-expenditure allocation nexus, it is important to provide separate analyses according to the source of remittances.

Only few studies examine how domestic and international remittances affect household spending using African dataset (Adams et al., 2008; Randazzo and Piracha, 2014; Randazzo and Piracha, 2017). Nevertheless, studies focusing on Africa fail to address the bounded nature of expenditure allocations/budget shares. Failure to account for fractional nature of budget shares can generate biased parameter estimates of the impact of remittances. Furthermore, Adams et al. (2008) omit

other important expenditure categories: housing and land in the analysis. This study contributes to debate on how recipients use remittances by examining the relationship between domestic and international remittances on household spending in Kenya. Unlike previous studies, this essay applies fractional multinomial logit estimator with instrumental variable to address for the fractional nature of expenditure shares and endogeneity of remittances.

3.3. Methodology

3.3.1 Theoretical Framework

Following Maitra and Ray (2003), assume a household of N members, each with utility U'' that depends on commodity consumption of all household members: $x = \sum_{i=1}^{I}\sum_{n=1}^{N} x_{in}$ where i indexes commodity while n indexes the individual. The individual household member utility is given by: $U'' = U''(x; Z, \varepsilon)$ where Z, ε represents the set of household and individual level characteristics. The household maximizes the welfare:

$$W = W[(U''(x, Z, \varepsilon))_{n=1}^{N}] \tag{3.1}$$

Subject to the income constraint

$$p'X = \sum_{n=1}^{N} Y_n \tag{3.2}$$

where p is a vector of commodity prices faced by the household and is taken as fixed and exogenous. X is a vector of total household demand given by $X = \sum_{in} x_{in}$ while Y_n is the household income associated with individual n. The solution to the maximization problem is a set of reduced form demand equations for:

$$x_{in}; x_{in} = x_{in}(Y_1, \ldots, Y_n, p, Z, \varepsilon_{in}) \tag{3.3}$$

Aggregating the reduced demand functions (x_{in}) over N individuals in the household,

$$x_i = \sum_{n=1}^{N} x_{in} = x_i(Y_1, \ldots, Y_n, p, Z, \varepsilon) = x_i(\sum_{n=1}^{N} Y_n; p, Z, \varepsilon) \tag{3.4}$$

Remittance variable (R) could be included in the demand function (Zarate-Hoyos, 2004; Taylor and Mora, 2006). Equation 3.3 can be re-expressed as:

$$x_i = x_i(Y, R; p, Z, \varepsilon) \tag{3.5}$$

In cross-section data, the price vector p is assumed to be fixed and exogenous. Equation 3.5 can be written in form of a budget share as:

$$w_{ih} = f(E_h, R_h, Z_h) + u_{ih} \tag{3.6}$$

where w_{ih} is the budget share of commodity i in household h, such that:

$$w_{ih} = x_{ih} / x_h, x_h = \sum_i X_{ih} \tag{3.7}$$

E_h is the total household expenditure, a proxy for household income in this study. Z_h is a vector of household and community characteristics influencing household expenditure and u_{ih} is the error term assumed to be normally distributed with mean zero and variance σ^2.

3.3.2 Model Specification

The model of household demand is specified as a function of prices, income, socio-demographic covariates and whether a household receives remittances or not. Household demand is proxied by household expenditure, which measures both resource constraints and household preferences. The suitable functional form for household expenditure should satisfy the following criteria put forth in Adams (2005): first, it should not impose identical marginal budget shares (slope) for every level of expenditure; second, it should provide a good statistical fit for the diverse set of goods; lastly, it should fulfill the additivity criterion, specifically the sum of the marginal propensities for all goods should equal to unity. The Working-Leser specification of the budget share equation satisfies the three criteria (Working, 1943; Leser, 1963). According to Castaldo and Reilly (2007), the Working-Leser functional form relates budget shares (w_{ih}) linearly to the logarithm of total household expenditure (E_h). The Working-Lesser budget share equation is given by:

$$w_{ih} = \alpha_i + \beta_i \log E_h + \mu_{ih} \tag{3.8}$$

To guarantee theoretical consistency, it is essential to impose additivity criterion on the Engel curve given by equation 3.8 (Fabiosa and Soliman, 2008). The adding-up requires that $\sum w_{ih} = 1$ which is fulfilled as long as $\sum \alpha_i = 1, \sum \beta_i = 0$. Additivity criterion ensures that total expenditure is identical to the sum of expenditures on different commodities. If the system of

budget share equations is estimated through OLS estimator, the parameter estimates $\hat{\alpha}_i$ and $\hat{\beta}_i$ attains this restriction automatically (Deaton and Muellbauer, 1980). As suggested by Deaton and Muellbauer (1980), this functional form of Engel curve may be used for time series analysis by including the effects of prices in the model. The resulting model is known as the Almost Ideal Demand System (AIDS).

Following Castaldo and Reilly (2007), the Working-Leser specification is extended to include other covariates likely to influence budget share of different expenditure items. Adding binary variables to account for different remittance sources, the Working-Leser specification is re-written as:

$$w_{ih} = \alpha_i + \beta_i \log(E_h) + \gamma_i Z_h + \theta_i R_h + \beta_i^* \log(E_h) R_h + \mu_{ih} \tag{3.9}$$

where $\alpha_i, \beta_i, \gamma_i, \theta_i$ and β_i^* are the vectors of unknown parameters to be estimated. μ_{ih} is the error term, β_i^* is a vector of interaction between remittances and household expenditure γ. $R_h \log E_h$ is a vector of interaction between remittances and household expenditure and shows the effect of different types of remittances on the slope of the Engel curve.

Two econometric issues arise in estimating equation 3.8. First, the dependent variable is a proportion or a share of total household expenditure allocated to each category of good (food, education, health, consumer durables, investments, housing and land, and 'others') and therefore bounded within the [0, 1] interval. According to Becker (2014), the popular approach is to apply OLS to estimate the conditional mean as a linear combination of the explanatory variables. This approach is simple and the coefficients on β can be easily interpreted as marginal effects but it fails to take into account the bounded nature of the dependent variable. Also, the predicted values of the dependent variables are not guaranteed that they will lie within the[0,1]interval. Additionally, equation 3.8 may be mis-specified because of many zero expenditure observations (Stephenson, 2011).

One way of handling the bounded nature of the dependent variable is to use beta regression model or inflated beta regression (Becker, 2014). However, beta regression and inflated beta model may yield inconsistent parameter estimates because they are sensitive to misspecification of the distributional assumptions (Papke and Wooldridge, 1996). Another approach is to use

censored normal regression/Tobit. Stephenson (2011) cautions that this approach is inappropriate to model budget shares because it does not guarantee that the dependent variable will lie within the [0,1] boundaries. This approach is also restrictive since it is based on the assumptions of normality and heteroskedasticity. Consequently, Tobit estimator may yield inconsistent estimates if the assumptions are violated (Calabrese, 2012). Two-limit Tobit estimator bounded at [0,1] could also be used to address the non-linear nature of the conditional mean. However, Stavrunova and Yerokhin (2012) caution against the use of two-limit Tobit estimator due to model-sensitivity. Heckman sample selection model is also unsuitable because it is meant for a situation where the dependent variable is observable, only conditional on selection (Becker, 2014).

To overcome these limitations, Papke and Woodridge (1996) developed a fractional logit estimator. According to Becker (2014), a fractional logit estimator has several desirable properties. First, it assumes that the estimated shares are bounded within the [0,1] interval; that is, it addresses for non-linearity in the data. Second, fractional logit estimator does not assume a conditional distribution of the dependent variable. Consequently, it avoids distributional failures and functional form misspecifications. Third, this approach does not require special treatment of values observed at the bounds. Lastly, the quasi-maximum likelihood estimator is easy to calculate; it is consistent and efficient irrespective of the feature and distribution of the dependent variable as long as the transformation of the likelihood function is in the linear exponential family.

Therefore, to estimate equation 3.8, the quasi-maximum likelihood method is used. Following Papke and Wooldridge (1996), assume w is a fractional variable bounded between zero and one. Let $\{(X_i, w_i) : i = 1,2.....,N\}$ represent budget shares (w) and values of regressors (X) in a household (i). The expected expenditure allocation to category j by household i, given some observable characteristics X_i can be expressed as:

$$E[w_{ij} \mid X_i] = G[X_i\beta] \tag{3.10}$$

where E is the expectation operator, w_{ij} is the proportional share for jth expenditure allocation by the ith household, β is the vector of parameters to be estimated, $G(.)$ is a known function that

makes the predicted dependent variable w lie between zero and one with $0 < G(z) < 1$. The functional form of $G(z) \equiv \wedge(z) \equiv \exp(z)/(1+\exp(z))$ is the logistic function or $G(z) \equiv \Phi(z)$ for the standard normal cumulative distribution function that limit the range of the predicted value of w. This study uses logistic functional form for $G(.)$ because it allows a simple estimation approach. Papke and Wooldridge (1996) propose that fractional logit model be estimated through a quasi-likelihood approach, which maximizes Bernoulli log-likelihood function expressed as follows:

$$l_i(\beta) \equiv w_i \log[G(X_i\beta)] + (1-w_i)\log[1-G(X_i\beta)] \tag{3.11}$$

The fractional logit method represents the case of a household that allocates one expenditure item at a time. The budget shares for a given household are related across expenditure categories. An increase in a given share will require a decrease in another share. To accommodate the interdependency across budget shares, this study analyzes the effect of remittances on expenditure allocation using fractional multinomial logit model (FMLM/FMlogit) developed by Buis (2012). Fractional multinomial logit generalizes the univariate fractional logit estimator and focuses on the conditional mean allocation of the budget shares across the expenditure categories. Although Dirichlet Multinomial (DM) regression model (a multivariate extension of the beta-binomial model) developed by Buis et al., (2006; 2010) handles values bounded between [0, 1] interval and ensures that the shares add up to one, this study does not use DM model. This is because DM model is parametric, less robust to distributional misspecifications and does not handle boundary values [0, 1] (Murteira and Ramalho, 2016). The conditional mean for budget share allocation with J expenditure categories can be written as:

$$E[w_{ij} \mid X_i] = G(X_i,\beta) = \frac{\exp(X_i\beta_j)}{\sum_{k=1}^{J}\exp(X_i\beta_k)}, \qquad j = 1,2...,J \tag{3.12}$$

where w_{ij} is the share of total household expenditure allocated by household i on different items j such that $j = 1,2.....J$ and J is the total number of expenditure categories. All β's, cannot be estimated separately under the multinomial quasi-likelihood method (Mullahy, 2015). Therefore, normalization is used to set the coefficients of one expenditure item to be zero; that is, fractional multinomial logit model is normalized by setting the parameter estimates of the first equation to zero so that $\beta_1 = 0$. The conditional expectation of the equations can be expressed as:

$$E[w_{ij} \mid X_i] = G_j(X_i,\beta) = \frac{\exp(X_i,\beta_j)}{1+\sum_{k=1}^{J-1}\exp(X_i,\beta_k}, \quad j = 1,\ldots\ldots,J-1 \tag{3.13}$$

$$E[w_{ij} \mid X_i] = G_j(X_i,\beta) = \frac{1}{1+\sum_{k=1}^{J-1}\exp(X_i,\beta_k)} \tag{3.14}$$

Estimation of equation 3.13 and 3.14 enforces the property that the conditional mean ranges between zero and one (equation 3.15) and the conditional means of all dependent variables add up to one (equation 3.16). Further, it allows the dependent variables to take on the values zero and one with non-zero probability ($w_i \in [0,1]$) (equation 3.17 and 3.18):

$$E[w_i \mid X] = G_j(X;\beta) \in (0,1), j = 1,\ldots\ldots,J-1 \tag{3.15}$$

$$\sum_{k=1}^{J-1} E[w_k \mid X] = 1 \tag{3.16}$$

$$\Pr(w_j = 0 \mid X) \geq 0, \quad j = 1,2\ldots\ldots,J \tag{3.17}$$

$$\Pr(w_i = 1 \mid X) \geq 0, \quad j = 1,2\ldots\ldots,J \tag{3.18}$$

Given the multinomial logit specification, the quasi-maximum likelihood function is defined as:

$$L = \prod_{i=1}^{N}\prod_{j=1}^{J} G(X_i;\beta_j)^{w_{ij}} \tag{3.19}$$

From equation 3.19, the log quasi-likelihood function of the predicted dependent variable may be written as:

$$l_i(\beta) = w_{i1}\log[G(X_i;\beta_1)] + w_{i2}\log[G(X_i;\beta_2)] + \ldots\ldots + w_{iJ}\log[G(X_i;\beta_J)] \tag{3.20}$$

Maximizing the log-likelihood function yields the following first order condition that can be solved to give parameter estimates:

$$\frac{\partial l_i(\beta)}{\partial \beta_j} = \sum_{i=1}^{N} X'_i\left[w_{ij} - G_j(X_i;\beta)\right] = 0 \tag{3.21}$$

If the model is correctly specified, the quasi-maximum likelihood estimator provides consistent estimates of β because the log-likelihood function is a member of the linear exponential family (Gourieroux et al., 1984). The fractional multinomial logit regression does not suffer from the problem of independence of irrelevant alternatives (IIA), which is common in the standard multinomial logit. This is because the fractional multinomial logit model identifies the ratio of

the conditional means between alternatives (Murteira and Ramalho, 2016). Specifically, $G_j / G_k = \exp(X,\beta_j)/\exp(X,\beta_k) \quad (j \neq k)$, which is functionally independent from the ratio of the other pairs.

Papke and Wooldridge (1996) caution that when using quasi-maximum likelihood estimator, there is a need to ensure that the standard errors are heteroskedasticity-robust. Heteroskedasticity occurs because variance of $(w_i \mid X_i)$ is not likely to be constant when $0 \leq w_i \leq 1$. Consequently, heteroskedastic-robust standard errors are computed to make the standard errors robust to misspecification of conditional variance.

Given that the fractional multinomial logit estimator requires some normalization, the coefficients give relative change to the reference group. As a result, the quasi maximum likelihood produces parameter estimates that are difficult to interpret (Mullahy, 2011). The size of coefficients varies among each model. Therefore, the coefficients cannot be compared in size but just in terms of signs. To compare the size of different models, this study calculates average marginal effects. The average marginal effects show the effect of a change in one of the explanatory variable on the expected conditional mean of the budget share. The average marginal effects may be calculated from the budget shares, depending on whether the explanatory variable is continuous or discrete. For a continuous explanatory variable, the average marginal effect of $m-th$ regressor on the expected probability of budget share for good j is calculated as the mean of marginal effects evaluated at each observation and is calculated as:

$$\frac{\partial E\left[w_{ij} \mid X_i\right]}{\partial x_i^m} = N^{-1}\sum_{i=1}^{N}\left(\beta_j^m G_j(X_i;\beta) - G_j(X_i;\beta)\sum_{k=1}^{J-1} G_k(X_i;\beta)\beta_k^m\right) \tag{3.22}$$

where w_{ij} is the observed budget share for item j in household i and x_i^m is the value of a given continuous explanatory variable in household i. For a discrete explanatory variable, the average marginal effect is expressed as:

$$\frac{\Delta E\left[w_{ij} \mid X_i\right]}{\Delta x_i^m} = N^{-1}\sum_{i=1}^{N}\left(G\left(X_i^{-m}\beta_j^{-m} + \beta_j^m\right) - G\left(X_i^{-m}\beta_j^{-m}\right)\right) \tag{3.23}$$

where X_i^{-m} is the other explanatory variables excluding x_i^m in household i. The average marginal effects and the standard errors are calculated using the delta method.

The second econometric problem is that remittances are potentially endogenous to equations 3.8. Endogeneity may arise from the correlation between remittances and the error term. That is, remittances may be correlated with unobserved household characteristics, which also influence how the household allocates expenditure. Also, the effect of remittance income on expenditure allocation may run on the reverse direction (Amuedo-Dorantes and Pozo, 2014). Therefore, to reveal the true impact of remittances on expenditure allocation, this study uses instrumental variable estimation strategy.

Instrumental variable estimation requires valid instruments (McKenzie and Sasin, 2007). A valid instrument should be relevant (correlated to remittances) and exogenous (uncorrelated with household expenditure function other than through remittances) (McKenzie and Sasin, 2007). This study instruments remittances using migration networks. Migration networks are proxied by the share of households in a district with migrants (Acosta, 2006). Migration networks encourage migration by reducing migration costs and impediments associated with migration and also by providing contacts and sharing of information on potential employment opportunities in migration destination (Sherpa, 2011).

3.3.3 Definition and Measurement of Variables

The definition and measurement of variables used in this study are reported in Table 3.1. Further description of the variables is reported in Table A8.

Table 3.1: Description of variables and their measurements

Variable	Definition	Measurement
	Dependent variables	
Food	Share of expenditure on food to total household expenditure	Ratio of expenditure on food to total household expenditure
Health	Share of expenditure on health to total household expenditure	Ratio of expenditure on health to total household expenditure
Education	Share of expenditure on education to total household expenditure	Ratio of expenditure on education to total household expenditure
Consumer Durables	Share of expenditure on consumer durables to total household expenditure	Ratio of expenditure on consumer durables to total household expenditure
Investment	Share of expenditure on investment to total household expenditure	Ratio of expenditure on investment to total household expenditure
Housing and land	Share of expenditure on housing and land to total household expenditure	Ratio of expenditure on housing and land to total household expenditure
'Other' goods	Share of expenditure on 'other' goods to total household expenditure	Ratio of expenditure on 'other' goods to total household expenditure
	Explanatory variables	
Prop of children (0-5)	Proportion of children (0-5) years	Ratio of children (0-5) years to total number of individuals in the household
Prop of children (6-15)	Proportion of children (6-15) years	Ratio of children (6-15) years to total number of individuals in the household
Prop male>15 years	Proportion of male >15 years	Ratio of male >15 years to total number of individuals in the household
Prop female>15 years	Proportion of female >15 years	Ratio of female >15 years to total number of individuals in the household
Prop HH>15 years primary	Proportion of household members >15 years having primary education	Ratio of household members >15 years having primary education to total number of individuals in the household
Prop HH>15 years secondary	Proportion of household members >15 years having secondary education	Ratio of household members >15 years having secondary education to total number of individuals in the household
Prop HH>15 years tertiary	Proportion of household members >15 years having tertiary education	Ratio of household members >15 years having tertiary education to total number of individuals in the

		household
Prop HH>65 years	Proportion of elderly in the household (>65 years)	Ratio of individuals >65 years to total number of individuals in the household
Age of household head	Age of the household head in years	Years
Gender of HH	Whether or not household head is a male	Binary,1=male; 0 otherwise
Household head working status	Whether or not household head is working	Binary, 1=employed; 0 otherwise
HH location	Whether or not household is in rural area	Bianry,1=rural; 0 otherwise
HH owns agricultural land	Whether or not households owns agricultural land	Binary, 1=yes; 0 otherwise
HH size	Household size	Total number of individuals living in a household
Internal remittance	Whether or not household receive internal remittances	Binary, 1=yes; 0 otherwise
External remittance	Whether or not household receive external remittances	Binary, 1=yes; 0 otherwise
Per-capita exp	Total per-capita expenditure	Log total per-capita household expenditure in Kenya shillings (Ksh)
Migration network	Migration network	Ratio of household in a district having a migrant

Source: Author's compilation

3.3.4 Data Type and Sources

The data used in this essay is drawn from the 2009 Migration and Remittances Household Survey for Kenya. The household survey is cross-sectional and gathered data on households with internal and international migrants. The survey also collected information on households without migrants. The survey was administered as a part of the African Migration Project to enhance understanding of migration, remittances and their impacts in Sub-Saharan Africa. The African Migration Project applied a similar methodology developed by World Bank for all the six countries studied (Kenya, Uganda, Nigeria, Senegal, Burkina Faso and South Africa) and the Kenyan Household Survey was conducted by the University of Nairobi. The household survey was based on two-stage sampling procedure drawn by the Kenya National Bureau of Statistics (KNBS). The household survey adopted the 1999 Kenya Housing and Population Census to map out survey areas.

To address population growth, migration and variations in the boundaries of the administrative units (such as districts) after the 1999 population census, the 2005/06 Kenya Integrated Household Budget Survey (KIHBS), the 2006 Financial Services Deepening Survey, and the existence of M-Pesa, Western Union and Money Gram service providers were considered in blueprinting the sampling framework. Further, officials from KNBS, village elders and administrative officers also assisted in mapping out sampling clusters having more international migrants.

A total of 17 districts comprising 91 clusters were selected. The selection of households to be interviewed begun with re-relisting households in all clusters to determine internal, international and households without migrants. All the three categories of households were considered as a separate sub-frame. Random sampling was consequently used to choose households in each group. Eventually, 1,942 households in 17 districts spanning the eight regions of Kenya were surveyed. Of the surveyed households, 51% were drawn from rural areas while 49% were based in urban areas. Of the surveyed households, 37% had external migrants, 29% had internal migrants while 34% had non-migrants. Further, the data was gathered for 8,343 non-migrant and 2,245 migrant individuals.

The survey collected data on characteristics of all individuals living in a household: age, gender, association of the individual to the household head, ethnicity, marital status, schooling, labour market situation, and religion of household head. It also collected data on movable and immovable assets possessed by a household and the amount of money (in Kenya shilling) spent on various expenditure items in the previous one week (for non-durable items) or six months (for durable items). Additionally, the survey collected data on internal and external migrants, frequency and amount of remittances sent by the former household member/migrant in the previous 1 year (in Kenya shilling).

3.4 Empirical Results and Discussion

3.4.1 Descriptive Statistics

The descriptive statistics for the average budget shares for the seven expenditure categories based on household's remittance status are reported in Table 3.2. The Table also reports summary statistics for the explanatory variables included in the analysis. On average, the surveyed households spent the largest share of total household expenditure (46%) on food. This finding is somewhat less than that of national average: 51.1% between 2005 and 2006 (Republic of Kenya, 2007) and, 54.3% between 2015 and 2016 (Republic of Kenya, 2018). This is followed by consumer durables (27%) while only 1.5% is devoted to physical investment. This finding is expected in a low-income country such as Kenya. According to Engel's law, lower-income households have higher prospects of allocating a higher share of budget to basic needs, and a smaller share of expenditure is likely to be devoted to basic needs as household income increases. The statistics also shows that households without remittances allocate a higher share of expenditure to food items than households without remittances. In particular, households with remittances allocate around 5 percentage points less on food than households without remittances.

Table 3.2: Descriptive statistics of variables used in household expenditure model

Variable	Households without remittances (N=1156)	Households with remittances (N=773)	All households (N=1929)	Difference in means
	Mean s.d	Mean s.d	Mean s.d	
Food	0.477 (0.259)	0.432 (0.255)	0.459 (0.046)	0.046***
Education	0.076 (0.134)	0.087 (0.140)	0.080 (0.137)	-0.011
Health	0.031 (0.071)	0.044 (0.094)	0.036 (0.081)	-0.013***
Investment	0.013 (0.059)	0.017 (0.074)	0.015 (0.065)	-0.004
Consumer durables	0.268 (0.212)	0.266 (0.221)	0.267 (0.216)	0.002
Housing and land	0.118 (0.165)	0.128 (0.174)	0.122 (0.169)	-0.010
Others	0.017 (0.054)	0.026 (0.087)	0.021 (0.069)	-0.010***
Proportion of children (0-5) years	10.410 (15.324)	8.840 (14.575)	9.782 (15.045)	1.570**
Proportion of children (6-15) years	16.867 (20.150)	18.708 (21.420)	17.603 (20.681)	-1.841*
Proportion of male >15 years	36.564 (28.570)	29.983 (26.375)	33.933 (27.893)	6.554***
Proportion of female >15 years	34.240 (24.437)	39.243 (23.258)	36.240 (24.091)	-5.115***
Proportion of household members >15 years having primary education	61.321 (30.446)	57.526 (31.764)	59.803 (31.027)	3.795**
Proportion of household members >15 years having secondary education	40.725 (37.048)	35.675 (34.333)	38.706 (36.063)	5.050***
Proportion of household members >15 years having university education	9.298 (24.586)	5.455 (17.381)	7.761 (22.066)	3.843***
Proportion of elderly in the household (>65 years)	6.135 (15.629)	11.395 (20.965)	8.238 (18.132)	-5.260***
Age of the household head in years	44.936 (14.512)	51.929 (16.725)	47.732 (15.806)	-6.993***
Gender of the household head	0.766 (0.424)	0.545 (0.498)	0.678 (0.467)	0.220***
Household head working status	0.777 (0.417)	0.582 (0.494)	0.699 (0.459)	0.195***
Location of household	0.465 (0.499)	0.579 (0.494)	0.511 (0.500)	-0.114***
Households owns agricultural land	0.571 (0.495)	0.712 (0.453)	0.627 (0.484)	-0.141***
Household size	4.202 (2.381)	4.432 (2.270)	4.294 (2.339)	-0.230**
Total per-capita expenditure (Ksh '000)	16.922 (56.746)	11.342 (27.730)	14.691 (4.751)	5.581**

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively. Standard deviations are in parenthesis*

To gain more insights on the link between remittances and household expenditure allocation, the average budget shares are further disaggregated according to the source of remittance income (internal or international) (Table A9). The statistics shows that households receiving internal remittances spend more on food by 16% percentage points than households with international remittances. Regarding the average budget share allocated to education, investments, consumer durables, housing and land, the descriptive statistics indicate that there are no marked differences across households with or without internal remittances. This result may suggest that households mainly use internal remittances on present consumption rather than investments in human and

physical capital. On the other hand, the data also show that households with external remittances spend approximately 8 percentage points less on food and 5 percentage points more on consumer durables relative to households without remittances. Thus, the descriptive statistics provide initial evidence that households spend external remittances productively. However, given that the statistics do not account for household differences, the findings are only suggestive and therefore econometric analysis will be applied to identify the impact of remittances on household expenditure allocation behaviour.

The descriptive statistics for household characteristics show that a household with internal remittances, on average, has slightly fewer infants (children under the age of 5 years), more school going children (children between the age of 6 years and 15 years) and lower education levels relative to a household without remittances. Moreover, a household with remittances has a lower per-capita income, suggesting that such a household may be financially constrained compared to a household without remittances and, therefore, prioritize present consumption relative to investment.

3.4.2 Estimation Results

In this study, the share of expenditure allocated to 'others' (wedding, engagement and funeral) is chosen as the base or comparison group. The results from fractional multinomial estimator, assuming that external remittances are exogenous, are reported in Table A10. The estimates show that the fractional multinomial model converged on a log pseudo-likelihood of -1884.3 with a Wald chi-square of 1441.76 that is significant at 1 percent level, suggesting that the fractional multinomial logit model has a robust explanatory power. The average marginal effects on expenditure allocation due to a change in various explanatory variables are presented in Table 3.3. The coefficients of the average marginal effects for a continuous variable represent the mean of change in expenditure share due to a marginal change in the explanatory variables for all observations. The coefficient on a binary variable of the average marginal effects from the multinomial logit estimator shows the average change in budget share emanating from a shift in a variable from minimum to its maximum value.

The results show that household composition is a vital determinant of expenditure allocation. While the share of young children (0 to 5 years) in a household is negatively related to household spending on education, the variable has a positive effect on expenditure devoted to health. The proportion of the school going children (6 to 15 years) in a household affects positively the expenditure on health and, housing and land. The proportion of men and women above the age of 15 years is negatively related to household expenditure on education but positively affects household spending on housing. Expenditure on education and consumer durables is positively affected by the share of household members with secondary education. Conversely, the proportion of individuals in a household with secondary education has a negative impact on expenditures devoted to food and health. Having a higher proportion of individuals beyond age of 65 years in a household is negatively (positively) related to expenditure share on education (health). A household with an older head spends more on education and health and less on consumer durable goods than a household with younger head.

Table 3.3: Average marginal effects of FMNL: Effect of international remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.	Others
Proportion of children (0-5) years	0.0002	-0.0020***	0.0009**	-0.0005	0.0005*	0.0012*	-0.0003
	(0.0008)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0007)	(0.0003)
Proportion of children (6-15) years	0.0001	-0.0008	0.0007*	0.0015*	0.0005*	0.0013**	-0.0004
	(0.0008)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0007)	(0.0003)
Proportion of male >15 years	0.0016**	-0.0022***	0.0002	-0.0008	0.0002	0.0011*	-0.0002
	(0.0008)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0007)	(0.0003)
Proportion of female >15 years	0.0008	-0.0019***	0.0004	-0.0006	0.0003	0.0012*	-0.0003
	(0.0008)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0007)	(0.0003)
Proportion of HH members >15 years with primary educ.	0.0005	0.0002	0.0002	-0.0001	6.0001	0.0002	-0.0000
	(0.0004)	(0.0003)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0001)
Proportion of HH >15 years with secondary education	-0.0006**	0.0007***	-0.0003**	0.0005**	0.0001	-0.0003	-0.0001**
	(0.0002)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with tertiary education	0.0003	0.0003	0.0005	-0.0004	-0.0002*	0.0001	0.00001
	(0.0003)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >65 years	0.0005	-0.0011***	0.0003**	0.0007	0.0000	-0.0003	-0.0001
	(0.0005)	(0.0003)	(0.0002)	(0.0004)	(0.0001)	(0.0003)	(0.0001)
Age of the household head in years	0.0004	0.0008**	0.0007***	-0.0021***	-0.0002	-0.0000	0.0003**
	(0.0005)	(0.0003)	(0.0002)	(0.0004)	(0.0001)	(0.0004)	(0.0001)
Gender of the household head	0.0054	-0.0091	0.0028	0.0067	0.0008	-0.0054	-0.0009
	(0.0143)	(0.0094)	(0.0065)	(0.0147)	(0.0045)	(0.0128)	(0.0047)
Household head working status	0.0003	0.0000	-0.0002*	-0.0004	0.0001	0.0001	0.0001
	(0.0005)	(0.0003)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0001)
Location of household	-0.0137	0.0160	0.0117**	-0.0139	0.0095	-0.0185	0.0089**
	(0.0119)	(0.0081)	(0.0056)	(0.0124)	(0.0047)	(0.0109)	(0.0042)
Households owns agricultural land	-0.0787)***	0.0060	0.0128**	-0.0188	0.0115**	0.0415	0.0258***
		(0.0080)	(0.0061)	(0.0119)	(0.0051)	(0.0109)	(0.0052)
Household size	-0.0194***	0.0090***	0.0000	0.0079***	0.0009	0.0010	0.0005
	(0.0030)	(0.0018)	(0.0012)	(0.0030)	(0.0009)	(0.0026)	(0.0008)
Log of total per-capita expenditure	-0.1473***	0.0149	0.0120	0.0664***	0.0077***	0.0407***	0.0057***
	(0.0060)	(0.0042)	(0.0029)	(0.0062)	(0.0019)	(0.0049)	(0.0018)
Receive external remittance	-0.3599***	0.1091**	0.0331	0.1979**	-0.0505*	0.0846***	-0.0142
	(0.1011)	(0.0515)	(0.0366)	(0.0977)	(0.0030)	(0.0775)	(0.0026)
Log of total per-capita expenditure*external remittance	0.0418***	-0.0123**	-0.0034***	-0.00224**	0.0050*	-0.0105***	0.0018
	(0.0118)	(0.0059)	(0.0043)	(0.0110)	(0.0030)	(0.0087)	(0.0026)

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Robust standard errors are in parenthesis*

A household located in a rural area devotes a higher fraction of total expenditure to health and 'others', which includes expenditure on engagement, wedding and funeral than a household in an urban area. This result is unsurprising given that traditions are possibly stronger in rural setting compared to urban areas. Ownership of agricultural land is positively related to expenditure allocated to health, investment and wedding and engagement, and negatively associated with

expenditure on food. Household size is negatively (positively) related to share of total expenditure assigned to food (education and consumer durables). Household income is a significant determinant of household expenditure allocation. A unit rise in per-capita household income reduces expenditure allocation on food by 14.7% and increases the share of expenditure on consumer durable (6.6%), investment (0.8%), housing (4.1%) and wedding and engagement (0.6%).

External remittances are negatively and significantly related to the share of household expenditure allocated to food items and investment in physical capital. Having international remittances reduces the share of household expenditure allocated to food and investments by 36.0% and 6.0%, respectively. Also, international remittances are positively and significantly correlated to the share of total household expenditure devoted to education, consumer durables, and housing and land. External remittances are positively and significantly associated with the proportion of total household expenditure assigned to education, consumer durables, and housing and land by 11.0%, 19.8% and 8.5%, respectively. The result lends support to the findings by Castaldo and Reilly (2007), who treat external remittances as exogenous and find that they are negatively (positively) related to household spending on food (durable goods). The coefficients on the interaction term are significant for the entire expenditure categories apart from expenditure on wedding, engagement and funeral. This means that the impact of international remittances on household spending on food and investments is larger for a household with a higher per-capita income. Conversely, the impact of international remittances on the share of expenditure on education, health, and housing and land is less for a household with higher per-capita income.

The parameter estimates for the quasi-maximum fractional multinomial estimator, which estimated the effect of external remittances (assumed to be exogenous) on household expenditure, are reported in Table A10. The fractional multinomial model converged on a log pseudo-likelihood of -1554.66 with a Wald chi-square of 1369.66, which is significant at 1 percent level.

Regression results of the effect of internal remittances on household spending are reported in Table 3.4. They show that households' demographic characteristics are important determinants of household expenditure allocation. A higher share of children aged 5 years and below, and

children aged between 6 and 15 years in the household, is negatively and significantly correlated with expenditure on education. Higher proportion of men and women above the age of 15 years in the household is inversely and significantly related with the share of total household expenditure allocated to education, and positively and significantly related to household spending on food.

Table 3.4: Average marginal effects of FMNL: Effect of internal remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.	Others
Proportion of children (0-5) years	0.0007 (0.0008)	-0.0022*** (0.0005)	0.0005 (0.0002)	0.0011 (0.0009)	0.0002 (0.0003)	0.0016 (0.0008)	0.0002 (0.0002)
Proportion of children (6-15) years	0.0003 (0.0008)	-0.0009** (0.0004)	0.0004 (0.0002)	-0.0011 (0.0008)	0.0000 (0.0003)	0.0014* (0.0008)	-0.0000 (0.0002)
Proportion of male >15 years	0.0016* (0.0009)	-0.0018*** (0.0005)	0.0003 (0.0002)	-0.0006 (0.0008)	0.0001 (0.0003)	0.0008 (0.0008)	-0.0002 (0.0003)
Proportion of female >15 years	0.0015* (0.0008)	-0.0019*** (0.0005)	0.0003 (0.0002)	-0.0004 (0.0009)	0.0001 (0.0003)	0.0006 (0.0008)	-0.0001 (0.0002)
Proportion of HH >15 years with primary education	-0.0007 (0.0003)	-0.0000 (0.0003)	0.0000 (0.0001)	-0.0001 (0.0003)	0.0000 (0.0001)	0.0002 (0.0003)	0.0000 (0.0001)
Proportion of HH >15 years with secondary education	-0.0009*** (0.0002)	0.0008*** (0.0002)	-0.0002 (0.0001)	0.0001 (0.0002)	0.0000 (0.0001)	0.0001 (0.0002)	0.0000 (0.0001)
Proportion of HH >15 years with tertiary education	0.0005 (0.0004)	0.0000 (0.0002)	0.0001 (0.0001)	-0.0006** (0.0003)	-0.0002* (0.0001)	0.0002 (0.0002)	0.0001 (0.0001)
Proportion of HH >65 years	0.0005 (0.0005)	-0.0010*** (0.0003)	0.0001 (0.0001)	0.0001 (0.0004)	-0.0002 (0.0002)	0.0001 (0.0004)	-0.0001 (0.0001)
Age of the household head in years	0.0008* (0.0005)	0.0012*** (0.0003)	0.0005 (0.0002)	-0.0031*** (0.0004)	-0.0001 (0.0002)	0.0002 (0.0004)	0.0004*** (0.0001)
Gender of the household head	0.0292 (0.0157)	-0.0094 (0.0094)	0.0012 (0.0053)	-0.0233 (0.0153)	0.0121** (0.0049)	-0.0081 (0.0124)	-0.0016 (0.0044)
Household head working status	-0.0005 (0.0006)	0.0005* (0.0002)	-0.0000 (0.0000)	-0.0007 (0.0005)	0.0001 (0.0001)	0.0007*** (0.0003)	-0.0001 (0.0001)
Location of household	-0.0270** (0.0122)	0.0123 (0.0077)	0.0128 (0.0040)	-0.0027 (0.0119)	0.0016 (0.0042)	-0.0061 (0.0095)	0.0091** (0.0040)
Households owns agricultural land	-0.0640*** (0.0129)	0.0076 (0.0081)	0.0068 (0.0042)	0.0088 (0.0117)	0.0182*** (0.0053)	0.0044 (0.0096)	0.0181*** (0.0042)
Household size	-0.0189*** (0.0033)	0.0092*** (0.0019)	-0.0005 (0.0010)	0.0091*** (0.0030)	0.0013 (0.0010)	-0.0003 (0.0025)	0.0001 (0.0008)
Log of total per-capita expenditure	-0.1455*** (0.0070)	0.0071 (0.0043)	0.0043 (0.0019)	0.0831*** (0.0067)	0.0128 (0.0028)	0.0343 (0.0055)	0.0039** (0.0017)
Receive internal remittance	0.2408** (0.1057)	-0.0660 (0.0527)	-0.0034 (0.0260)	-0.0788 (0.1053)	0.0106 (0.0316)	-0.0665 (0.0858)	-0.0368 (0.0268)
Log of total per-capita expenditure*internal remittance	-0.1455* (0.0070)	0.0082 (0.0064)	-0.0004 (0.0033)	0.0096 (0.0127)	-0.0005*** (0.0038)	0.0088*** (0.0103)	0.0047 (0.0034)

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Robust standard errors are in parenthesis*

The share of household members with secondary education is negatively associated with household spending on food and positively related to expenditure on education. Having a high proportion of household members with tertiary education is negatively and significantly associated with share of expenditure on consumer durables and investments. The results also show that households residing in rural areas spend more on wedding, engagement and funeral.

Older household headship is positively and significantly related to expenditure on food and education, and negatively related to expenditure on consumer durables. Men-headed households allocate a higher share of total expenditure to physical investments relative to women-headed households. A household being located in a rural area is negatively related to the share of expenditure allocated to food. Ownership of agricultural land is negatively associated with the share of expenditure on food and positively related with expenditure on physical investments. Household size is negatively and significantly related to the share of expenditure on food. A possible explanation for this finding is that larger households could be enjoying economies of scale, for instance in purchasing and preparing food (Deaton and Muellbauer, 1980). Similarly, household size has a positive and significant effect on the share of household expenditure assigned to education and consumer durable goods.

Household per-capita income has a negative and significant effect on the share of total expenditure allocated to food. A unit increase in per-capita household income reduces the share of household expenditure on food by 14.6%. The finding that a larger household spends less on food is consistent with Engel's law, which postulates that as household total expenditure increases, the average budget share devoted on food declines. A comparable result is reported by Shahzadi (2010) in a similar study in Pakistan. Household income is negatively related to the share of total expenditure on consumer durables and wedding and engagement. The coefficient on the variable of interest, internal remittances, is significant only on the food expenditure item; a household with internal remittances allocates 24.1% more to food than a household without remittances. Demurger and Wang (2016) found a similar finding in China that domestic remittances are positively and significantly related to expenditure share on immediate consumption. Further, the results indicate that interaction term is positively (negatively) and significantly related to the budget share on housing (food and investment). This suggests that the

impact of internal remittances on housing is more robust (weaker) for higher (lower)-income households.

As indicated earlier, remittances are potentially endogenous due to correlation with the error term and reverse causality. For this reason, this study uses instrumental variable estimation to control for endogeneity. Table A12 and Table A13 report the results of probit first stage regression of the endogenous variables, external and internal remittances, on the exogenous explanatory variables and the instrument, respectively. The predicted values from the probit regression are added as an explanatory variable in the budget share equations and then estimated using fractional multinomial logit model. To improve the standard errors due to the use of predicted values, the study uses bootstrapped standard errors (50 replications). The regression results of the effect of external remittances on expenditure allocation are reported in Table 3.5. The model returned a log pseudo-likelihood value of 1,844.92. The results suggested a good fit with Wald chi-square statistic of 1,407.33, which is significant at 1% level. The regression results (Table 3.5) are very similar to results obtained without bootstrapping the standard errors (Table A15).

The results show that the composition of a household has an important effect on expenditure allocation decision. For instance, a household with a higher proportion of young (0-5 years) and school-going children (6-15 years) spend more on health and less on education. The share of household members with secondary education has a positive and significant effect on expenditure devoted to education and consumer durables, and negatively associated with expenditure on food, health and housing. The share of individuals in the family beyond age of 65 years is positively related to household's expenditure on health. Similarly, a household headed by an older person spends significantly more on education and health, and less on consumer durables and investment compared to a household with younger head.

A household in a rural area spends more on health and education and 'others' relative to a household based in an urban area. As expected, expenditure on food is negatively associated with household ownership of agricultural land. Further, compared to a household not in possession of agricultural land, households holding agricultural land spend more on health. It can be assumed that for such households, agriculture is the main activity and healthy status of members is important for productivity and, therefore, income of the household. Having several individuals in

a household reduces the share of household spending dedicated to food and reduces the share allocated to education and consumer durables.

Table 3.5: Average marginal effects of FMNL: Effect of international remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.	Others
Proportion of children (0-5) years	0.0004 (0.0009)	-0.0020*** (0.0005)	0.0010** (0.0004)	-0.0005 (0.0007)	0.0006* (0.0003)	0.0009 (0.0008)	-0.0003 (0.0003)
Proportion of children (6-15) years	0.0003 (0.0008)	-0.0008* (0.0005)	0.0008** (0.0004)	-0.0016** (0.0007)	0.0006* (0.0003)	0.0010 (0.0007)	-0.0003 (0.0003)
Proportion of male >15 years	0.0018** (0.0009)	-0.0021*** (0.0005)	0.0003 (0.0004)	-0.0008 (0.0008)	0.0002 (0.0003)	0.0009 (0.0008)	-0.0002 (0.0003)
Proportion of female >15 years	0.0010 (0.0009)	-0.0019*** (0.0005)	0.0005 (0.0004)	-0.0006 (0.0008)	0.0003 (0.0003)	0.0001 (0.0003)	-0.0002 (0.0003)
Proportion of HH >15 years with primary education	-0.0004 (0.0004)	0.0002 (0.0003)	0.0002 (0.0002)	-0.00001 (0.0004)	0.0001 (0.0001)	-0.0003 (0.0002)	-0.0000 (0.0001)
Proportion of HH >15 years with secondary education	-0.0006*** (0.0002)	0.0007*** (0.0002)	-0.0003** (0.0001)	0.0005** (0.0002)	0.0000 (0.0001)	-0.0003* (0.0002)	-0.0001** (0.0001)
Proportion of HH >15 years with tertiary education	0.0003 (0.0003)	0.0003 (0.0002)	0.0001 (0.0001)	-0.0005 (0.0003)	-0.0002 (0.0001)	-0.0002 (0.0002)	0.0001 (0.0001)
Proportion of HH >65 years	0.0004 (0.0006)	-0.0011*** (0.0003)	0.0003 (0.0002)	0.0007 (0.0005)	-0.0001 (0.0001)	-0.0001 (0.0004)	-0.0001 (0.0001)
Age of the household head in years	0.0002 (0.0004)	0.0008** (0.0004)	0.0007*** (0.0002)	-0.0020*** (0.0005)	-0.0003* (0.0002)	0.0003 (0.0026)	0.0003** (0.0001)
Gender of the household head	0.0118 (0.0162)	-0.0087 (0.0114)	0.0055 (0.0076)	0.0027 (0.0168)	0.0074 (0.0055)	-0.0186 (0.0125)	-0.0000 (0.0047)
Household head working status	0.0000 (0.0006)	-0.0000 (0.0004)	-0.0003** (0.0001)	-0.0002 (0.0005)	0.0000 (0.0007)	0.0004 (0.0003)	0.0001 (0.0001)
Location of household	-0.0177 (0.0123)	0.0140* (0.0075)	0.0099* (0.0055)	-0.0112 (0.0144)	0.0070 (0.0047)	-0.0106 (0.0113)	0.0087* (0.0052)
Households owns agricultural land	-0.0775*** (0.0134)	0.0060 (0.0090)	0.0126* (0.0068)	-0.0192 (0.0130)	0.0103* (0.0059)	0.0421*** (0.0099)	0.0258*** (0.0050)
Household size	-0.0207*** (0.0035)	0.0086*** (0.0015)	-0.0007 (0.0014)	0.0087*** (0.0030)	0.0002 (0.0010)	0.0034 (0.0026)	0.0004 (0.0010)
Log of total per-capita expenditure	-0.1534*** (0.0096)	0.0055 (0.0070)	0.0087 (0.0040)	0.0732*** (0.0098)	0.0097*** (0.0033)	0.0479*** (0.0081)	0.0084*** (0.0033)
Receive external remittance	-0.2868 (0.3611)	-0.0517 (0.1882)	0.0935 (0.1454)	0.2361 (0.3768)	0.2187** (0.0988)	-0.2979 (0.2847)	0.0880 (0.1010)
Log of total per-capita expenditure*external remittance	0.0460 (0.0361)	0.0102 (0.0161)	-0.0052** (0.0139)	-0.0345 (0.0330)	-0.0179** (0.0088)	0.0106 (0.0273)	-0.0092 (0.0094)

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Bootstrapped standard errors are in parenthesis*

Turning to the key variable of interest, external remittances affect the share of total expenditure allocated to physical investment positively and significantly. A household with external remittances, on average, spends 21.9% more on physical investment compared to a similar

household without remittances. Previous authors (Adams, 1998; Taylor and Mora, 2006; Adams and Cuecuecha, 2010b; Adams and Cuecuecha, 2013; Amuedo-Dorantes and Pozo, 2014) found a similar result. This finding suggests that recipients treat external remittances as a windfall gain/transitory income and allocate them on accumulation of physical capital. The result supports the contention that recipients use remittances productively.

The coefficient on the interaction between household per-capita income and the predicted probability of household obtaining international remittances is negative on the budget share on health and investment. This suggests that the association between international remittances and the share of expenditure allocated to health in addition to investment is smaller for a higher-income household.

Table 3.6 presents the average marginal effects results derived from the quasi-maximum likelihood fractional multinomial logit (Table A16) regression results of the effect of internal remittances (treated as endogenous) on household expenditure allocation. The parameter estimates (Table A16) indicate that the fractional multinomial model converged on a log pseudo-likelihood of -1553.37. The model returned a Wald chi-square of 1,403.18, which is significant at 1 percent level, implying that the fractional multinomial logit model has a strong explanatory power. Table A17 reports the regression results generated without bias-corrected standard errors.

The estimates show that the influence of control variables on expenditure allocation is similar to those reported in Table 3.5. For instance, the results show that a household with a higher proportion of children aged 5 years and below allocates a lower (higher) share of expenditure to education (health). The share of aggregate household expenditure on education is negatively and significantly affected by the share of men and women beyond the age of 15 years in the household. A household with an older head, on average, spends more on education and less on consumer durables than a household with younger household head. A household in a rural area allocates significantly a higher share of total expenditure to health and wedding and engagement and less to food compared to a household in an urban setting. The results also reveal that per-capita household income is an important driver of household expenditure allocation behaviour. A unit increase in per-capita household income reduces the expenditure on food by 14.2% and increases the expenditure allocated to health (0.5%), consumer durables (9.3%), investments (1.5%), and housing and land (3.6%).

Table 3.6: Average marginal effects of FMNL: Effect of internal remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.	Others
Proportion of children (0-5) years	0.0011	-0.0020***	0.0008**	-0.0019**	0.0002	0.0013*	0.0005*
	(0.0009)	(0.0005)	(0.0003)	(0.0010)	(0.0003)	(0.0008)	(0.0003)
Proportion of children (6-15) years	0.0008	-0.0008	0.0006*	-0.0019**	0.0000	0.0011	0.0001
	(0.0009)	(0.0005)	(0.0003)	(0.0009)	(0.0004)	(0.0008)	(0.0002)
Proportion of male >15 years	0.0023**	-0.0016***	0.0006	-0.0017	-0.0001	0.0004	0.0001
	(0.0011)	(0.0006)	(0.0004)	(0.0011)	(0.0004)	(0.0008)	(0.0003)
Proportion of female >15 years	0.0025	-0.0017***	0.0007*	-0.0017	-0.0001	0.0001	0.0003
	(0.0011)	(0.0006)	(0.0004)	(0.0011)	(0.0004)	(0.0009)	(0.0003)
Proportion of HH >15 years with primary education	-0.0003	-0.0001	-0.0001	0.0002	-0.0000	0.0004	-0.0001
	(0.0003)	(0.0002)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0001)
Proportion of HH >15 years with secondary education	-0.0007***	0.0008***	-0.0001	-0.0001	-0.0000	0.0000	0.0001
	(0.0002)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with tertiary education	0.0007	0.0003	0.0002*	-0.0012***	-0.0003	-0.0000	0.0003**
	(0.0005)	(0.0003)	(0.0001)	(0.0004)	(0.0002)	(0.0002)	(0.0002)
Proportion of HH >65 years	0.0006	-0.0010***	0.0002	-0.0001	-0.0002	0.0005	-0.0000
	(0.0005)	(0.0003)	(0.0001)	(0.0004)	(0.0002)	(0.0004)	(0.0001)
Age of the Household head in years	0.0002	0.0012***	0.0003	-0.0023***	-0.0000	0.0006	0.0002
	(0.0007)	(0.0003)	(0.0002)	(0.0006)	(0.0003)	(0.0004)	(0.0002)
Gender of the household head	0.0762**	-0.0047	0.0203	-0.0884**	0.0131	-0.0352	0.0172*
	(0.0408)	(0.0221)	(0.0133)	(0.0408)	(0.0147)	(0.0274)	(0.0093)
Household head working status	-0.0006	0.0006*	-0.0001	-0.0006	0.0001	0.0008***	-0.0001
	(0.0008)	(0.0003)	(0.0001)	(0.0005)	(0.0009)	(0.0003)	(0.0001)
Location of household	-0.0276**	0.0121*	0.0124***	-0.0022	0.0020	-0.0056	0.0089***
	(0.0138)	(0.0063)	(0.0046)	(0.0115)	(0.0043)	(0.0100)	(0.0032)
Households owns agricultural land	-0.0778***	0.0058	0.0014	0.0274**	0.0183**	0.0120	0.0128***
	(0.0159)	(0.0095)	(0.0047)	(0.0135)	(0.0088)	(0.0110)	(0.0040)
Household size	-0.0170***	0.0094***	0.0002	0.0067**	0.0013	-0.0013	0.0008
	(0.0036)	(0.0019)	(0.0012)	(0.0030)	(0.0010)	(0.0026)	(0.0011)
Log of total per-capita expenditure	-0.1423***	-0.0057	0.0052*	0.0928***	0.0146***	0.0363***	-0.0009
	(0.0107)	(0.0070)	(0.0030)	(0.0097)	(0.0048)	(0.0079)	(0.0030)
Receive internal remittance	0.4115	-0.8387***	0.0368	0.6226	0.1129	0.0164	-0.3616**
	(0.4732)	(0.3042)	(0.1210)	(0.4714)	(0.1493)	(0.3559)	(0.1749)
Log of total per-capita expenditure*internal remittance	-0.0156	0.1095***	0.0082	-0.1283*	-0.0107	-0.0218	0.0588**
	(0.0702)	(0.0398)	(0.0177)	(0.0696)	(0.0239)	(0.0468)	(0.0242)

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10% respectively. Bootstrapped standard errors are in parenthesis*

Domestic remittances are negatively and significantly linked to the household expenditure allocation on education. Households receiving internal remittances spend 83.9% less on education compared to similar households without remittances. This finding is consistent with that of Demurger and Wang (2016) who found that in China, household expenditure on education is negatively affected by internal remittances. Similarly, Kollner (2013) and Zhu

(2016) report that remittances have a negative impact on expenditure on education. However, the finding is in conflict with that of Taylor and Mora (2006) and Bansak et al. (2015) who find that domestic remittances are positively and significantly associated with household spending on education. This result may suggest that recipients (lower income households) perceive internal remittances as a permanent source of income and, therefore, choose to spend less on human capital. Therefore, the results in this study support the pessimistic theory which postulates that remittances are not used productively.

Further, the fractional multinomial regression results show that the effect of domestic remittances on share of expenditure on wedding, engagement and funeral is negative. On average, households receiving internal remittances spend 36.7% less on engagement, wedding and funeral compared to households without remittances. The coefficient on the interaction between internal remittances and the logarithm of per-capita household expenditure is positive and significant on the average budget share on education and on wedding and engagement. This means that, on average, the impact of internal remittances on household spending on education and on wedding and engagement is larger for a household with higher levels of expenditure. The negative coefficient on interaction term for budget share on consumer durables suggests that the impact of internal remittances on the share of total household expenditure on consumer durables is smaller for a higher income household.

3.5.1 Summary and Conclusions

This study explores the relationship between remittances and household spending behaviour in Kenya using cross-sectional data from the 2009 World Bank Household Survey for African Migration Project. Given that each budget share is bounded between zero and one and that the shares for each observation must add up to one, fractional multinomial logit estimator is used. This study first assumes remittances as exogenous and later treats them as endogenous. In the endogenous model, remittances are instrumented using migration networks, which are proxied using the share of households in a district with migrants.

The results indicate that external remittances are inversely related to the household spending on food and physical investments and positively correlated to the expenditure assigned to education, consumer durables, and housing and land. Once endogeneity is controlled for, the results show

that external remittances are positively related to the expenditure share on investment (physical investment). Therefore, the results suggest that households with external remittances (higher-income households) perceive the receipts as a windfall /transitory income. Thus, they spend more on physical investment than non-recipients. The findings are in line with descriptive statistics. Specifically, descriptive statistics (Table 3.2) show that households with external remittances, on average, have a lower per-capita income (Ksh 14,695.29) and receive a higher level of remittances (Ksh 25,949.61). Thus, the results indicate that in Kenya, external remittances are likely to affect economic development positively in the long-run.

It was also found that households with internal remittances allocate a higher share of total household expenditure to food than households without remittances. Once endogeneity of remittances is controlled for, the coefficient on the share of total household expenditure on health and on wedding, engagement and funeral which was initially insignificant becomes significant while that on food becomes insignificant. These findings may suggest that households with internal remittances (lower-income households) treat the receipts as compensatory income or permanent income. Consequently, they spend them on immediate consumption. The results are consistent with the descriptive statistics (Table 3.2), which show that households with internal remittances on average have a lower per-capita income (Ksh 5,498.87) and receive lower amounts of remittances (Ksh 2,572.62). The results therefore suggest that internal remittances are unlikely to have a positive impact on economic development in the long-run.

3.5.2 Policy Implications

The results show that domestic remittances are positively and significantly related to the share of total household expenditure allocated to immediate consumption (food). Based on this finding, the government needs to devise policies to ensure that remittances are diverted to productive uses. The government ought to create a favourable investment climate. This is likely to increase the rate of return on investments and increase the opportunity cost of directing remittances to immediate consumption. Once internal remittances are treated as endogenous, the results indicate that receipt of internal remittances is negatively and significantly related to the share of total household expenditure allocated to education, so that they have adverse effects on human capital investment. Government efforts geared towards creating awareness of the importance of education may possibly enhance household spending on human capital investment. The

government should continue to support the free primary and secondary education programmes since they are likely to lessen the long-term negative effect of internal remittances on human capital investment.

The share of total expenditure allocated to food and investment is negatively and significantly affected by remittances' receipt. The receipt of external remittances has a positive and significant effect on the share of total expenditure allocated on education, and housing and land. The receipt of external remittances is positively and significantly associated with the share of expenditure allocated to consumer durables (immediate consumption). This would require policies to shift the use of remittances from consumer durables towards investment. For instance, the government should accord tax breaks to external migrants to encourage them import capital goods. Efforts to encourage productive use of remittances may also be achieved by conducting special training/programmes to assist external migrants and recipients make effective investment decisions. The government should also make effort to improve the overall investment climate.

After controlling for endogeneity bias in external remittances, the findings indicate that external remittances are positively related to the share of total household expenditure assigned to physical investments (productive assets, farming equipment and setting up of a small business). Therefore, increasing the flow of external remittances to Kenya can significantly increase household investment in physical capital. Based on this result, there is need to formulate policies to increase the flow of external remittances to the country. The government should reduce remittance transaction costs to enhance the disposable income of recipients and also induce migrants to remit more. There is also need for the Kenya Revenue Authority to extend the tax amnesty on taxable income sent by external migrants to Kenya beyond 30th June 2019.

3.5.3 Limitations of the Study

This study uses cross-sectional data to examine the effect of remittances on household spending behaviour due to scarcity of panel data. As a result, this study could not capture the dynamics of household expenditure allocation behaviour. Further, the expenditure items used in the analysis had different recall periods (weekly, monthly and semi-annually). This made comparison of expenditure shares quite difficult. To compute comparable expenditure categories, weekly and six month expenditures were converted into monthly expenditure. The household data had very

few observations on households receiving both domestic (international) remittances concurrently. Consequently, this study could not examine the relationship between domestic and international remittances simultaneously and household spending behaviour[3].

3.5.4 Areas for Further Research

Household expenditure allocation may vary according to gender of household head and remitter, and the location of a household. In this study, household head and location of a household are incorporated as explanatory variables in the budget share equation. Future studies could analyze the impact of remittances according to gender of household head, gender of remitter and location of the household. This study examined the link between remittances and household expenditure allocation behaviour in situations where remittances are certain. Future studies may assess the effect of uncertainty of remittances on household expenditure allocation. Further, it is possible that a household may receive internal and external remittances at the same time. Therefore, it would be vital to study the relationship between receiving domestic and external remittances concurrently and household expenditure allocation behaviour. Finally, to deal with selection bias and potential endogeneity, this study applied instrumental variable method. Future studies could use randomized control trial (RCT) technique that randomly separates the available sample into treatment and non-treatment groups.

[3] See Table A19 for the regression results of the effect of household receiving external and remittances simultaneously on household expenditure allocation while treating remittances as endogenous. Table A20 reports the average marginal effects from the fractional multinomial logit regression. Table A22 reports the results of the effect of household receiving both external and internal remittances simultaneously when remittances are treated as exogenous. Table A22 reports the average marginal effects of the fractional multinomial logit regression.

CHAPTER FOUR

EFFECT OF REMITTANCES ON LABOUR FORCE PARTICIPATION IN KENYA

4.1 Introduction

The growing levels and importance of internal and external remittances in Kenya has generated great interest from policy makers and researchers towards identification of drivers and effects of remittances. The Kenyan government has developed the Kenya Diaspora Policy to attract diaspora resources such as remittances with a view to spurring economic growth and development. Various studies have analyzed the motives for migrants sending remittances back to their place of origin and conclude that internal remittances are an important source of revenue to recipients (Knowles and Anker, 1981). Researchers have also attempted to understand how remittances impact on economic development by investigating their effect on household expenditure allocation (Simiyu, 2013), and investments in physical capital (Jena, 2017). Another important channel through which remittances impact on economic development is by influencing incentives of the recipients to participate in the labour market.

Remittances can affect labour market participation through a number of channels. Remittances as a non-labour income may generate income effect that can discourage individuals from participating in the job-search activity or working in their presently held employment in favour of leisure and home production (Hanson, 2007; Kalaj, 2009). Remittances can bolster household investment in human capital particularly for children and young adults and thus reduce their prospects of being in the labour force (Acosta, 2011). In addition, remittances may alleviate capital and risk constraints facing households and encourage creation of self-employment opportunities in such households (Acosta, 2007). This may in turn increase the possibility of being in the labour force. The link between remittances and labour force participation is therefore ambiguous theoretically and requires further empirical investigation. Given the huge and increasing levels of internal and external remittances in Kenya, it is worthwhile to explore how remittances affect labour market participation.

There exist empirical studies exploring the drivers of labour force participation in the context of Africa (Sackey, 2005 and Ntuli and Wittenberg, 2013). However, there is dearth of studies investigating the association between remittances and labour force participation (Binzel and

Assaad, 2011; Ndiaye et al., 2016). Similarly, despite the surge in remittances received by households in Kenya, their impact on labour market participation is not yet clear. Further, there exists a shortage of empirical works investigating the effect of remittances on labour market participation in Kenya. The few empirical studies on labour market in Kenya (Lokshin et al., 2000; Odhiambo and Manda, 2003; Kabubo-Mariara, 2002; 2003; Atieno, 2006; Wamuthenya, 2010; Wambugu, 2011; Asfaw et al., 2014) do not focus on labour market - remittances nexus. Therefore, a research gap exists in understanding how remittances affect the labour market in Kenya.

Therefore, this study sought to answer the following research questions: What is the effect of external remittances on labour force participation in Kenya? What is the effect of internal remittances on labour force participation in Kenya?

The main objective of this study is to investigate the effects of remittances on labour force participation in Kenya. Specifically, this study seeks to:

a) Examine the effect of external remittances on labour force participation in Kenya.
b) Investigate the effect of internal remittances on labour force participation in Kenya.

This study makes three contributions to the literature on the association between remittances and labour force participation. First, it provides empirical evidence from Kenya on remittances - labour force participation nexus. Second, the study explores the differential impact of internal and external remittances on labour market participation. This is essential because labour supply may vary with source of remittances. Finally, the study uses a two-step endogenous switching probit estimator to address for endogeneity of remittances and selection bias to provide more robust parameter estimates. Endogenous switching probit estimator also permits for exploration of the impact of remittances on labour supply for recipients and non-recipients simultaneously.

Understanding the association between remittances and labour market participation is important to policy makers striving to maximize on the developmental impact of remittances in Kenya. This is because remittances may negatively influence labour market participation, yet labour is a vital input in the production process. Based on the findings of this study, it will become clearer to policy makers if remittances are positively or negatively associated with labour marke

participation. For instance, if remittances reduce labour market participation, this would suggest lower levels of labour input available to the country and, therefore, lower potential output/economic growth. This in turn would call for policies to address the adverse impact of remittances on work effort. The findings of the study will also inform policy makers keen on alleviating poverty levels in the country. For example, if remittances reduce labour supply, then it would imply that remittances could increase levels of poverty. This is because most households in Kenya derive their income from labour. In turn, this would require policy makers to devise strategies to encourage work effort among recipients. This can be achieved by reducing levels of labour market discrimination, and strengthening industrial attachments and internship programmes. The findings of this study will inform policy makers who are concerned with increasing levels of income tax revenue. For example, if the study finds that remittances reduce labour market participation, this would imply that increased remittances are likely to reduce income tax revenue. Thus, the findings of this study will assist to come up with policies/interventions that should enhance positivity in remittances.

4.2 Literature Review

4.2.1 Theoretical Literature

There are several hypotheses seeking to clarify the link between remittances and labour supply of recipients. According to neoclassical theory of labour-leisure choice, individuals allocate time to market and non-market activities that maximize utility subject to budget constraint. The budget constraint is governed by prevailing market wage, individual's time constraint, and non-labour income. In deciding whether to work or not, an individual compares between reservation wage and market wage rate (prevailing wage rate in the labour market). The reservation wage refers to the lowest wage rate at which a prospective worker would be willing to accept a particular type of job (Azizi, 2018). If the reservation wage exceeds the market wage offer, then an individual decides not to work. Conversely, an individual enters the labour force when the wage rate surpasses the reservation wage. If leisure is a normal good, the non-labour income (such as remittances) lifts the reservation wage (depending on non-labour income which in turn varies with individual's assets and income of other household members) of a prospective worker. *Ceteris paribus*, an increase in the reservation wage reduces labour supply of an individual at the extensive (probability of participating in the labour market) and intensive margin (hours of work)

(Killingsworth, 1983). Thus, presuming similar preferences and wage offer to comparable individuals in households with and without remittances, the neo-classical theory predicts that the likelihood of participating in the labour market will diminish owing to remittances increasing reservation wage.

Another theory is advanced by Chami et al. (2005) and Naiditch and Vranceanu (2009) and concerns imperfect information between remitter and the recipient. This theory postulates that imperfect/asymmetric information between remitter and recipient leads to a moral hazard problem. Given that remitter cannot perfectly monitor recipient's effort, recipients may substitute remittances for work effort. This means recipients may enjoy leisure and choose not to work. Moreover, a recipient may reduce work effort to signal remitter the need for monetary assistance. This leads to reduction in labour supply (Naiditch and Vranceanu, 2009).

As stated by New Economics of Labour Migration (NELM) theory (Stark, 1991), remittances enable households to overcome capital/credit and risk constraints arising from incomplete/missing markets common in developing countries. Subsequently, recipient households use remittances to start new business ventures or to expand existing household enterprises. This enhances the prospect of participating in the labour market and hours of work of the recipients (Woodruff and Zenteno, 2007; Lokshin and Glinskaya, 2009) or in the change from wage to non-wage employment (Khan and Valatheeswaran, 2016).

Remittances also affect labour supply by increasing share of household dependency (Posso, 2012). Ordinarily, remittances stem from migration of household members who are likely to be of working-age. This induces labour force substitution effect in recipient households. Further, according to Amuedo-Dorantes and Pozo (2006a), recipients have higher chances of increasing hours of work and entering the labour force to compensate for the foregone labour or earnings. Recipients may also be compelled to raise labour supply to settle/defray costs associated with migration of household members (Amuedo-Dorantes and Pozo, 2006a). Posso (2012) argues that households without remittances and living in vicinity of recipient households may become conscious of the advantage of migration. This inspires non-migrants in the household to supply more hours of work and/or enter the labour market to assist household members to migrate.

Remittances may also affect recipient's labour supply by increasing household investments in education and training (Gorlich et al., 2007; Giuliano and Ruiz-Arranz, 2009; Chami et al., 2018). Remittances could relax credit constraints and allow recipients to send their children and young adults to school (Gorlich et al., 2007). Remittances may also increase the opportunity costs of schooling and reduce labour supply (Giuliano and Ruiz-Arranz, 2009). Further, remittances may reduce labour supply through "brain-gain" phenomenon (Gorlich et al., 2007). According to Beine et al. (2008) and Di Maria and Stryszowski (2009), migration of educated individuals may provide incentives for non-migrants to invest in human capital with the expectation that they will migrate and work successfully in a foreign country. This is due to the fact that labour markets in foreign countries offer higher returns to schooling than in the home country. Migration network is likely to be stronger for households with migrants. Therefore, the incentive for investment in education will be higher in migrant households than in non-migrant households. This theory predicts that migration and remittances will have a negative effect on labour supply (Gorlich et al., 2007).

In recent years, general equilibrium models have also been applied to explain the relationship between remittances and labour force participation (Bussolo and Medvedev, 2008). According to Bussolo and Medvedev (2008), remittances increase the non-labour income and reduce labour supply. Due to a rise in non-labour income, recipients consume more goods and leisure, and participate less in the labour market. Reduced labour market participation increases wages, thereby initiating the second-order effects. Higher wages increase the opportunity cost of leisure. Through the substitution effect, individuals participate more in the labour market to the point at which the income effect becomes dominant. Therefore, based on the foregoing theoretical literature, there are several channels through which remittances affect recipient's labour force participation.

4.2.2 Empirical Literature

The huge magnitudes of remittances received by households in developing countries have prompted authors to explore their impact on various economic outcomes. One such outcome is labour supply response for which there exists no broad consensus in the empirical works. Generally, studies analyzing the relationship between remittances and recipient's labour supply centre on two facets of labour supply: hours of work and labour market participation. Kozel and

Alderman (1990), Rodriguez and Tiongson (2001) and Konica and Filer (2009) apply probit estimator to explore the link between remittances and labour force participation. Kozel and Alderman (1990) find that in Pakistan, domestic and external remittances affect men's labour market participation negatively. The results from sample selection model and Tobit estimator show that hours of work supplied by men are adversely affected by external remittances. The negative impact of remittances on labour force participation is supported by Tiongson and Rodriguez (2001), who additionally find that labour supply response is stronger for men than for women. A similar study conducted in Albania by Konica and Filer (2009) finds that remittances reduce the probability of market participation for women. However, remittances are found to have insignificant effect on men's labour.

Earlier empirical studies scrutinizing the link between remittances and labour supply generally find that remittances have adverse effect on labour supply: hours worked and/or probability of participating in the labour force. Albeit informative, the findings from these studies are questionable and should be treated with caution because they treat remittances as exogenous rather than potentially endogenous to the labour market participation equation. Endogeneity and selection bias may occur since a household may self-select into having a migrant or receiving remittance due to unobserved characteristics which at the same time influence their labour market participation. Moreover, labour market status of a left behind household member may directly influence migration or remittance decision (Murakami et al., 2019). Due to the omitted variables and reverse causality, a simple estimation of labour force participation on remittances using a simple probit/logit estimator will deliver a biased parameter estimate of the impact of remittances on labour supply because the sample of population of migrant households and/or households receiving remittances is likely to be a non-random (Acosta, 2006; Jadotte and Ramos. 2016; Murakami et al., 2019).

Recent studies use different approaches to address for potential endogeneity of remittances receipts. Some studies apply instrumental variable (IV) approach (Amuedo-Dorantes and Pozo, 2006a; Dermendzhieva, 2010; Mendola and Carletto, 2012; Amuedo-Dorantes and Pozo, 2012; Mora, 2013; Jadotte and Ramos, 2016; and Lopez-Feldman and Escalona, 2017). Amuedo-Dorantes and Pozo (2006a) exploit per capita count of Western Union offices in a state as instrument for controlling endogeneity of remittances. The authors find that remittances induce

men to switch from formal and urban self-employment to the informal sector, while rural women work fewer hours in the informal sector and unpaid work. Mendola and Carletto (2012) use data gathered from Albania to examine the effect of men-dominated international migration on labour supply. The authors find similar results to those of Konica and Filer (2009) that external migration has insignificant effect on men's labour and diminishes the probability of women participating in paid work while increasing supply for non-market work.

Using the dataset used by Konica and Filer (2009), Dermendzhieva (2010) find that international remittances are significantly and negatively correlated to labour market participation for women and older men. The study also finds that OLS estimate of the impact of remittances on labour market participation is biased upwards. Amuedo-Dorantes and Pozo (2012) study the link between level and volatility of external remittances and hours of work in Mexico. The study corrects for endogeneity of remittances and the results suggest that recipient's labour supply react to remittances volatility only while women's labour supply is found to be more sensitive to remittances volatility than men's labour.

In Colombia, Mora (2013) finds that the chance of recipient participating in the labour force participation is negatively correlated to remittances. Women's labour supply is also found to be more reactive to remittances than that of men. Jadotte and Ramos (2016) build on the ideas of Amuedo-Dorantes and Pozo (2006a) to study how remittances affect household head's labour supply in Haiti. The results indicate that remittances are negatively associated with labour supply both at intensive and extensive margins. Further, the results indicate that compared to female household heads, recipient male household heads respond more to remittances. Using dataset from Mexico, Lopez-Feldman and Escalona (2017) find conflicting findings to those of Amuedo-Dorantes and Pozo (2006; 2012). Specifically, results show that the link between remittances and men's labour supply is negative and significant. The authors also find that remittances reduce the probability of participation and hours of work devoted to crop and animal husbandry, and natural resource extraction. Lokshin and Glinskaya (2009) apply endogenous switching probit estimator on data from Nepal to explore how men's migration affect non migrant women's labour supply decision. The parameter estimate shows that being a woman residing in households with migrants reduces the prospects of participating in the labour force

relative to a woman in a non-migrant household. The adverse effect of men migration is strongest on youthful women and those with 11 or more years of education.

Previous studies also address for endogeneity of remittances by utilizing propensity score matching (PSM) approach (Acosta, 2006; Cox-Edwards and Oreggia, 2009; Kalaj, 2009; Mughal and Makhlouf, 2013; Ndiaye et al., 2016). Acosta (2006) finds that in El Salvador, remittances reduce the probability of labour force participation for women but not for men and inspire younger men to engage in self-employment. Cox-Edwards and Rodriguez-Oreggia (2009) differentiate between persistent and irregular remittances and find no systematic differences in the likelihood of labour force participation for men and women in response to persistence remittances. This implies that remittances compensate the left-behind household members for the lost migrant income. In Albania, Kalaj (2009) finds that remittances negatively affect women hours of work and the chance of participating in the labour force but have insignificant impact on men's labour. Mughal and Makhlouf (2013) find that in Pakistan, internal and external remittances reduce labour supply at the extensive margin (participate in the labour market). The effect of remittances on labour supply is more pronounced for women, but hours of work (labour supply at the intensive margin) are found to be insensitive to remittance income. Remittances from foreign countries have a stronger effect on the probability of participating in the labour force than internal remittances. In Senegal, Ndiaye et al. (2016) find that the incidence of receiving remittances and the levels of remittances reduce the incentive of participating in the labour force. Although male and female's labour may respond to remittances differently, the authors include gender of recipient as an explanatory variable. The authors also fail to separate the effects of internal and external remittances.

Some authors use cross-sectional data to analyze the relationship between remittances and recipient's labour supply (Itzigsohn, 1995; Hanson, 2007; Melkonyan and Grigorian, 2012). Itzigsohn (1995) analyzes the impact of labour market outcomes emanating from receiving remittances by applying cross-sectional data gathered from Jamaica, Dominica Republic, Haiti and Guatemala. Without addressing the endogeneity of remittances, the author finds that in Jamaica, Dominican Republic and Haiti, remittances allow recipients to stay out of the labour market. Further, the author finds that remittances allow recipient households to send fewer members into the labour market in Dominican Republic and Guatemala. Hanson (2007) applies

historical migration rates as instrument for remittances on rural household survey data from Mexico to investigate the relationship between remittances and labour supply, both at the extensive and intensive margin. The study shows that labour supply is negatively affected by remittance income and the impact of remittance is conditioned on gender of the recipient. Women reduce labour supply at the extensive margin (participate in the labour force) and intensive margin (hours of work) on account of remittances, whereas men do not. Grigorian and Melkonyan (2012) instrument remittances using unemployment rate among men in a State in Armenia as well as the ratio of population facing risk to total regional population and finds that due to diaspora remittances, the labour supply by recipients at the intensive margin diminishes.

Few studies apply panel data to examine the association between remittances and labour supply (Kim, 2007; Binzel and Assaad, 2011; Posso, 2012; Chami et al., 2018). In Jamaica, Kim (2007) examines why soaring levels of unemployment coexist in the midst of rising real wages. The estimates suggest that chances of labour market participation but not hours of work reduce owing to household receiving remittance income. The author concludes that remittances increase recipients' reservation wage and induce the recipients to exit the labour market or become less passionate in the job search. Binzel and Assaad (2011) build on the ideas of Amuedo-Dorantes and Pozo (2006a) and Mendola and Carletto (2012) to investigate the effect of men-dominated migration on labour supply in Egypt and find that the impact of remittances on labour supply varies with gender. Specifically, women and wives switch from paid to unpaid work in response to remittances income while men's labour supply is less affected by remittances relative to female labour.

Other studies scrutinize the relationship between remittances and labour supply by exploiting cross-country aggregate data (Posso, 2012; Chami et al., 2018). Posso (2012) used 20-year aggregate panel data from 66 developing countries and finds that external remittances significantly increase men's labour market participation. The impact of remittances on labour supply is quadratic, suggesting that beyond a certain threshold, remittances induce recipients to substitute away from labour to leisure. Dissimilar result is found by Chami et al. (2018) who investigate the relationship between external remittances and labour market participation using 25-year panel data for 177 countries. The authors found that while remittances are negatively related to the probability of participating in the labour force, the effect is weaker among men

relative to women. One drawback of this assessment is that it lacks suitable control variables for labour force dynamics and includes only lagged labour force participation rate and size of the working-age population as the control variables. Using data from 122 developing countries spanning from 1990 to 2015 and weighted indicator of migrant host country as an instrument for remittance flows, Azizi (2018) finds that remittances reduce female labour market participation rate, yet they fail to impact on men's labour supply.

Previous works have also focused on the effect of remittances on occupational choice (Gorlich et al., 2007; Binzel and Assaad, 2011). Gorlich et al. (2007) disentangle the motives for labour market inactivity in Moldova and find no evidence for disincentive effect of remittances. The results also show that remittances induce women to reduce paid work in favour of home production. Remittances also increase labour market inactivity by encouraging enrolment in higher education. Though this study is quite revealing, it fails to provide separate analysis for men and women, yet the labour supply behaviour is likely to differ across genders. In Egypt, Binzel and Assaad (2011) show that remittances are negatively associated with the probability of women participating in paid work, while they increase the probability of participating in household business enterprises, household non-commercial agriculture, and unpaid household work. Karymshakov and Sulaimanova (2017) find that in Kyrgyzstan, migration increases the choice of women to be unpaid family worker and work more hours. The results also indicate that migration increases housework for women in wage employment. Vadean et al. (2019) investigate the effect of external remittances on men's occupational choice in Tajikistan. The results show that external remittances reduce the probability of working as a wage employee and increase the likelihood of small scale employment.

A number of studies explore the connection between remittances and the decision to become self-employed. For instance, Funkhouser (1992) finds that remittances are positively and significantly related to the probability of being in self-employment. Conflicting findings are found by Amuedo-Dorantes and Pozo (2006b) in the Dominican Republic. Specifically, receipt of external remittances is associated with lower likelihood of business ownership. These studies (Funkhouser, 1992; Amuedo-Dorantes and Pozo, 2006b) fail to account for potential endogeneity of remittances. This means that the estimated parameter of the impact of remittances on labour supply may be biased and inconsistent.

Few studies examine the association between remittances and labour market participation in a post-war scenario (Funkhouser, 1992; Justino and Shemyakina, 2012). Funkhouser (1992) find that in post-conflict Nicaragua, receiving remittances is negatively related to the probability of participating in the labour force. It is worth noting that this study treats remittances as exogenous to the labour supply equation and, therefore, the estimated impact of remittances on labour market participation is likely to be biased. In post-war Tajikistan, Justino and Shemyakina (2012) find that the possibility of participating in the labour market and hours of work are lower for individuals living in households receiving remittances. Moreover, the results also show that the inverse relationship of remittances on labour supply is stronger for men compared to women.

4.2.3 Overview of Literature

The review of theoretical literature in the preceding section reveals that there are several channels through which remittances affect recipient's labour supply. The neoclassical and asymmetric information theories predict that remittances are negatively correlated with labour supply while New Economics of Labour Migration (NELM) and the 'lost labour effects' theories predict that remittances are positively associated with labour supply. Empirically, previous studies find conflicting results on the relationship between remittances and labour supply. Some studies find that remittances are positively related to the probability of labour market participation while other studies show a negative or no relationship. The review of empirical studies indicates that results vary according to estimation method used and the context of analysis.

Previous studies are confronted with econometric problems of potential endogeneity of remittances variable and selection bias. The main approaches for addressing endogeneity and selection bias in the labour supply equation are to apply IV, PSM and panel data. The empirical literature review indicates that the effect of remittances on labour supply varies according to gender. Most studies find that women labour is more responsive to remittance income, but few analyses find that men labour responds more. This reveals the importance of taking into account heterogeneity of individuals by gender to get comprehensive parameter estimates.

Empirical review also shows that remittances-labour supply nexus is conditioned on the source of remittances. This in turn indicates the importance of taking into account the source of remittances (from internal migrants or from external migrants) when investigating the relationship between remittances and labour supply. Empirical works mainly explore the association between external remittances and labour supply. Only a few studies (Mughal and Makhlouf, 2013) focus on the impact of internal and external remittances. Studies exploring the relationship between internal (external) remittances and labour supply apply PSM approach. However, the PSM method controls only for observable bias and does not control for unobservables (Lokshin and Sajaia, 2011). This study investigates the effect of internal and external remittances on labour force participation for men and women separately because the empirical literature shows that labour market participation differs with the source of remittances and recipients' gender. To realize a consistent estimate of the relationship between remittances and labour market participation, this study uses endogenous switching probit estimator as it controls for both observable and unobservable bias.

4.3 Methodology

4.3.1 Theoretical Framework

Following Cahuc and Zylberberg (2004), assume a static labour supply model in which an individual's utility is defined over consumption of goods (C) and leisure (L). Formally this is expressed as:

$$U = U(C, L) \tag{4.1}$$

The utility function is well behaved, such that $U_C^{'} > 0, U_L^{'} > 0, U_C^{''}, < 0$ and $U_L^{''} < 0$. In this framework, an individual's total time endowment (T) is divided into hours of market work (H) and leisure (L). An individual's time constraint is given by: $T = H + L$, and therefore the hours allocated to market work are expressed as: $H = T - L$. An individual maximizes utility subject to the budget constraint, which is of the form $C \leq WH + Y$, where W denotes the wage rate, H is time devoted for market work and Y is the non-labour income. Substituting the hours allocated for work (H) in the budget constraint yields the following full-income constraint:

$$C = W(T - L) + Y \tag{4.2}$$

An individual selects $C > 0$ and $L > 0$ that maximizes utility (4.1) subject to the full-income constraint (4.2). Solving the utility maximization problem: $L = (C, L) + \lambda(Y + WT - WL - C)$ yields the following first order conditions:

$$U_{C^*}(C^*, L^*) = \lambda \text{ and } U_{L^*}(C^*, L^*) = \lambda W \tag{4.3}$$

The marginal rate of substitution between consumption and leisure (U_{C^*}/U_{L^*}) can be derived to yield solution for the labour supply expressed as:

$$U_{L^*}(C^*, L^*)/U_{C^*}(C^*, L^*) = W \tag{4.4}$$

The decision rule is that an individual participates in the labour market if and only if the market wage offer (W) is greater than the reservation wage (W_r). Thus:

$$W > W_r \Rightarrow \textit{participate in the labour force}$$

$$W \leq W_r \Rightarrow \textit{do not participate in the labour force} \tag{4.5}$$

Non-labour income influences the labour force participation, such that when an individual's non-labour income increases, the reservation wage also increases, making the individual not to participate in the labour market. Remittances as a form of non-labour income influences an individual's reservation wage, which in turn reduces this individual's probability of participating in the labour force (Kim, 2007; Bussolo and Medvedev, 2008).

4.3.2 Model Specification

Based on equation 4.5, the labour supply equation to be estimated can be written as in Khan and Valatheeswaran (2016):

$$L_{ih} = \phi_0 + \beta_{ih} X + \gamma_h R + \varepsilon_{ih} \tag{4.6}$$

where L_{ih} is a binary outcome variable representing participation in the labour force, X is a vector of household and individual characteristics, R is a binary variable indicating whether household receives remittances or not, ϕ_0, β_{ih} and γ_h are unknown parameters to be estimated and ε_{ih} is the error term.

Several econometric issues may arise if labour supply equation 4.6 is estimated using the standard logit or probit estimator. A migrant's decision to send remittances may be endogenous to the individual's labour supply. Remittances may be correlated with the error term due to omitted variable bias, reverse causality and measurement errors. Omitted variable bias exists if some unobserved attributes influencing propensity of migrants to remit may also affect decision by individuals of working-age to work or not. That is, households with remittances are not randomly selected but could systematically differ from those without remittances in characteristics such as ability and motivation. The unobserved characteristics may in turn influence the propensity of an individual belonging to remittances receiving household, and individual's decision to work (Gorlich et al., 2007; Mughal and Makhlouf, 2013). Remittances are also potentially endogenous because a migrant's decision to remit may be affected by recipients' labour supply. Though remittances may impact on labour supply of the non-migrants, a migrant may decide to remit if a household member is not working, giving rise to reverse causality (Murakami et al., 2019).

Econometric approaches to deal with endogeneity/selection bias in cross-sectional data include instrumental variable (IV) and propensity score matching (PSM) approaches. Though the traditional IV framework controls for both observed and unobserved heterogeneity, its treatment effect model with one selection and outcome equation assumes that the impact can be represented as a simple parallel shift with respect to the outcome variable (Mmbando et al., 2015). However, the impact of the treatment on labour market participation for treated and untreated can be different as the two groups of individuals may systematically have different characteristics (Mmbando et al., 2015). The PSM approach assumes that heterogeneity of the effect of remittances can be captured by controlling for observable characteristics. However, the decision to send remittances and to participate in the labour market may be conditional on unobservable attributes (Lokshin and Glinskaya, 2009).

The probit model with sample selection (heckprobit) and bivariate probit estimator can also be used to fit a model with binary endogenous variable (Lokshin and Sajaia, 2011). The heckprobit and bivariate probit estimators (both developed by Heckman) are inefficient and demand potentially more cumbersome adjustment to obtain consistent standard errors (Lokshin and

Sajaia, 2011). Furthermore, bivariate probit estimator relies on the assumption that the coefficients of the outcome equations for both treatment regimes are equal and thus is restrictive.

Recent works on binary endogenous regressors in the binary outcome framework highlight the advantages of applying switching probit model over alternative econometric techniques (Aakvik et al., 2005; Lokshin and Glinskaya, 2009; Lokshin and Sajaia, 2011). Endogenous switching probit model uses full information maximum likelihood method to estimate the binary selection and binary outcome equations of the model to obtain consistent standard errors of the parameter estimates (Lokshin and Sajaia, 2011). The switching probit framework relaxes the assumption of equality of coefficients of the outcome equations in the two regimes and, therefore, it is more efficient than IV and bivariate probit methods (Lokshin and Glinskaya, 2009). Endogenous switching probit model enables controlling for endogeneity of receiving remittance. Furthermore, it allows the definition of the effect of treatment on the outcome in relation to impact evaluation by estimating the treatment effect. The treatment effects that may be estimated include the average treatment effect on the treated (ATE), average treatment effect on the untreated (ATU), average treatment effect (ATE), and the marginal treatment effect (MTE) (Lokshin and Glinskaya, 2009; Lokshin and Sajaia, 2011).

Therefore, to estimate equation 4.6, this study adopts the switching probit framework for estimations of the system of equation. Following Lokshin and Sajaia (2011), the two-step switching probit model with two binary outcome equations (whether an individual participates in the labour market or not) and an indicator R_i that governs the regimes than an individual faces is specified by equation 4.7 to 4.9. The switching probit model set-up is written as follows:

$$R_i = 1 \quad if \quad \gamma Z_i + \mu_i > 0 \tag{4.7}$$

$$R_i = 0 \quad if \quad \gamma Z_i + \mu_i \leq 0$$

$$\text{Regime 1:} \quad y_{1i} = X_{1i}\beta_1 + \varepsilon_{1i} \quad \text{and} \quad y_{1i} = I(y_{1i}^* > 0) \tag{4.8}$$

$$\text{Regime 0:} \quad y_{0i} = X_{0i}\beta_0 + \varepsilon_{0i} \quad \text{and} \quad y_{0i} = I(y_{0i}^* > 0) \tag{4.9}$$

The observed labour force participation (y_i) is defined by:

$$y_i = y_{1i} \quad \text{if} \quad R_i = 1$$

$$y_i = y_{0i} \quad \text{if} \quad R_i = 0 \tag{4.10}$$

where R_i is a treatment variable, indicating whether an individual resides in a remittances receiving household or not. y_{1i}^* and y_{0i}^* are the two latent variables (unobserved probability of labour market participation) that realizes the observed labour market participation status y_{1i} and y_{0i} (whether an individual participates in the labour market or not); Z_i is a vector of covariates determining the decision to receive remittances (switch between regimes); X_i is a vector of observable covariates explaining an individual's propensity of labour market participation. I is an indicator function such that $\{0,1\}$ so that the outcome (y_{1i} and y_{0i}) is binary. y_{1i} and y_{0i} is observed and takes the value of one if the individual participates in the labour market and zero otherwise. Therefore, y_1 is the market participation (outcome) conditional on having remittances (treatment) and y_0 is the outcome conditional on no-treatment.

β_0, β_1 and γ are the vector of parameters to be estimated; μ_i is the error term corresponding to the selection equation, ε_{1i} and ε_{0i} are the disturbance terms for the first and the second regimes, respectively. Assuming that the residuals $(\mu_i, \varepsilon_{1i}, \varepsilon_{0i})$ are jointly normally distributed with a mean-zero vector and covariance matrix:

$$\Sigma = \begin{pmatrix} 1 & \rho_0 & \rho_1 \\ & 1 & \rho_{10} \\ & & 1 \end{pmatrix} \tag{4.11}$$

where ρ_1 and ρ_0 are the correlation between ε_i, μ and ε_0, μ, and ρ_{10} is the correlation between ε_1 and ε_0. If ρ_0 and/or ρ_1 are statistically significant, then controlling for selection bias arising from unobserved factors is warranted to obtain unbiased and efficient parameter estimates (Lokshin and Sajaia, 2011; Demurger and Li, 2012). However, y_{1i} and y_{0i} are never observed simultaneously and, therefore, the joint distribution of (ε_1 and ε_0) is not identified, and thus, ρ_{10} cannot be estimated (Lokshin and Sajaia, 2011). Thus, in most cases, it is normally assumed that the correlation between ε_0 and ε_1 is equal to unity ($\rho_{10} = 1$).

The system of simultaneous equations given by equations 4.7, 4.8 and 4.9 is estimated by full information maximum likelihood (FIML) method. The log-likelihood function of the simultaneous equations is specified as follows:

$$L = \sum_{R_i=0, y_i=0} \ln\{\Phi_2(X_{1i}\beta_1, Z_i\gamma, \rho_1)\} + \sum_{R=0, y_i=0} \ln\{\Phi_2(-X_{1i}\beta_1, Z_i\gamma - \rho_1)\} + \sum_{R_i=0, y_i\neq 0} \ln\{\Phi_2(X_{0i}\beta_0 - Z_i\gamma, \rho_0)\} + \sum_{R_i=0, y_i=0} \ln\{\Phi_2(-X_{0i}\beta_0, -Z_i\gamma, \rho_0)\} \quad (4.12)$$

where Φ_2 denotes the cumulative function of a bivariate normal distribution. To ensure that the estimated ρ_0 and ρ_1 are bounded between [0, 1], the switch probit model directly estimates $\text{atanh}(\rho)$: the inverse hyperbolic tangent of the correlation coefficients (Lokshin and Sajaia, 2011). The maximum log likelihood parameter estimates are computed over four possible outcomes which are: treatment/market participation, treatment/market non-participation, no treatment/ market participation and, finally, no treatment/market non-participation.

The endogenous switching probit model is identified by non-linearities of its functional form (Carrasco, 2001; Lockshin and Sajaia, 2011). However, it is advisable for the Z variables in the treatment model to contain at least one variable commonly known as selection instrument, not in X_i, in equations 4.8 and 4.9 to improve identification of the parameters of the model (Carrasco, 2001; Lokshin and Sajaia, 2011). In other words, to rule out the potential endogeneity of remittances, the two-step endogenous switching probit model requires the inclusion of at least one selection instrument in the first-stage estimation, thereby fulfilling exclusion restriction.

The selection of selection instrument was guided by previous empirical studies. A study by Lokshin and Glinskaya (2009) used migration network as the selection instrument. This assessment also uses migration network proxied by share of household in a district with a migrant as exclusion restriction based on two reasons. First, migration network facilitates migration and increases the probability of a household to receive remittances (Lokshin and Glinskaya, 2009). Migration networks promote migration by reducing migration costs and barriers related to migration by providing contacts and sharing of information on potential employment opportunities at the migration destination (Sherpa, 2011). Secondly, migration network is likely to significantly affect the probability of household receiving remittances but

may not directly affect the probability of household members participating in the labour market (Hanson and Woodruff, 2003; Woodruff and Zenteno, 2007).

To test the validity of migration network as an instrumental variable, this study uses a simple falsification test suggested by Lokshin and Glinskaya (2009) and implemented by Di Falco et al. (2011). In this study, remittances and labour market participation are measured as binary variables. Therefore, to test validity of migration network as an instrument, two simple binary probit models for a household receiving remittances and an individual participating in the labour force with inclusion of instrument as an additional explanatory variable are estimated.

The maximum-likelihood parameter estimates obtained from the log-likelihood of the switching probit model given in equation 4.12 are used to generate counterfactual probabilities of labour market participation for working-age individuals in the different regimes of remittances and labour force participation (Lokshin and Glinskaya, 2009; Lokshin and Sajaia, 2011). The expected effect of remittances on working individuals with observed characteristics x or the effect of treatment on the treated (TT) and is computed as in Aakvik et al. (2005) and Lokshin and Glinskaya (2009):

$$TT(x) = \Pr[y_1 = 1 \mid R = 1, X = x] - \Pr[y_0 = 1 \mid R = 1, X = x]$$

$$= \frac{\Phi_2(X_1\beta_1, Z\gamma, \rho_1) - \Phi_2(X_0\beta_0, Z\gamma, \rho_0)}{F(Z\gamma)} \tag{4.13}$$

where F is a cumulative function of the univariate normal distribution. The TT is the difference between the predicted probability of labour market participation for an individual living in a household receiving remittance, and the probability of market work participation for this individual had the household not received remittances (Lokshin and Glinskaya, 2009).

The effect of treatment on individuals with observable characteristics x who do not actually receive remittances is the effect of treatment on the untreated (TU). Therefore, TU is obtained by calculating the difference between the predicted probability of labour market participation for an individual without remittances, and the probability of market participation had the individual received remittances. TU is calculated as:

$$TU(x) = \Pr(y_1 = 1 \mid R = 0, X = x) - \Pr(y_0 = 1 \mid R = 0, X = x)$$

$$= \frac{\Phi_2(X_1\beta_1 - Z\gamma, -\rho_1) - \Phi_2(X_0\beta_0 - Z\gamma, -\rho_0)}{F(-Z\gamma)} \tag{4.14}$$

The treatment effect is the impact of remittances on labour market participation of the working-age individuals. Therefore, the effect of remittances on the probability of participating in the labour market for an individual of working-age randomly drawn from the population of individuals with characteristics x is the treatment effect (TE) and is calculated as:

$$TE(x) = \Pr(R = 1, X = x) - \Pr(R = 0, X = x) = F(X_1\beta_1) - F(X_0\beta_0) \tag{4.15}$$

The average treatment effect on the treated (ATT), average treatment effect on the untreated (ATU) and the average treatment effect (ATE) from the corresponding sub-groups of the population can be calculated by averaging equation 4.13 to 4.15 over the observations in the sub-groups. For instance, the average treatment effect on the treated (ATT) is derived by averaging $TT(x)$ over the sample of individuals who actually received remittances. ATT is computed as:

$$ATT(N_T) = \frac{1}{N_T}\sum_{i=1}^{N_T} TT(x_i) \tag{4.16}$$

where N_T represents the number of individuals with $T = 1$; that is, the number of individuals receiving remittances. In this study, N_T could be for example men, so that $ATT(N_T)$ is the average treatment effect on all men who actually receive remittances. Equation 4.16 could also be used to calculate the average treatment effect on the untreated and the average treatment effect. Therefore, TT is just swapped with TU or TE.

4.3.3 Definition and Measurement of Variables

The definition and measurement of variables used in this study are reported in Table 4.1.

Table 4.1: Description of variables and their measurements

Variable	Definition	Measurement
	Dependent variable	
Labour force participation	Whether individual aged 15-64 years participate in the labour force	Binary, 1=yes; 0 otherwise
Remittance	Whether a household received remittance in the last one year	Binary, 1=yes; 0 otherwise
	Explanatory variables	
Age	Age of an individual	Years
Age squared	Age of an individual squared	Years squared
Primary education	Whether individual has primary education	Binary,1=yes; 0 otherwise
Secondary education	Whether individual has secondary education	Binary,1=yes; 0 otherwise
Tertiary	Whether individual has primary education	Binary, 1=yes; 0 otherwise
Marital status	Whether individual is married	Binary, 1=yes; 0 otherwise
Household head	Whether individual is a household head	Binary, 1=yes; 0 otherwise
Number of children (0-5) years	Number of children aged 5 years and below in a household	Continuous
Number of children (6-14) years	Number of children aged 6 to 14 years in a household	Continuous
Number of elderly (>65 years)	Number of elderly in the household	Continuous
Household size	Size of household at the origin	Total number of individuals living in a household
HH location	Whether or not household is located in a rural area	Bianry,1=rural; 0 otherwise
Household own agricultural land	Whether household owns agricultural land	Binary, 1 =yes; 0 otherwise
Migration network	Migration network	Ratio of household in a district having a migrant

Source: Author's compilation

4.3.4 Data Type and Sources

The data used in this essay is drawn from the 2009 Migration and Remittances Household Survey for Kenya. The survey is single round cross-sectional household survey gathering information about households with domestic, international and without migrants. The survey was administered as a component of the African Migration Project to enhance understanding of migration, remittances and their impacts in Sub-Saharan Africa. The African Migration Project

applied a similar methodology developed by World Bank for all the six countries studied (Kenya, Uganda, Nigeria, Senegal, Burkina Faso and South Africa).

The Kenyan Household Survey was conducted by the University of Nairobi. The household survey was based on two-stage sampling procedure drawn by the Kenya National Bureau of Statistics (KNBS). The household survey adopted the 1999 Kenya Housing and Population Census to map out survey areas. To address population growth, migration and variations in the boundaries of the administrative units (such as districts) after the 1999 population census, the 2005/06 Kenya Integrated Household Budget Survey (KIHBS), the 2006 Financial Services Deepening Survey, and the existence of M-Pesa, Western Union and Money Gram service providers were considered in blueprinting the sampling framework. Further, officials from KNBS, village elders and administrative officers also assisted in mapping out sampling clusters with higher numbers of international migrants.

A total of 17 districts (counties under the new Kenyan constitution) comprising 91 clusters were selected. The selection of households to be interviewed begun with re-registering households in all clusters to determine internal, international and households without migrants. All the three categories of households were considered as a separate sub-frame. Random sampling was consequently employed to choose households in each group. Eventually, 1,942 households in 17 districts spanning the eight regions of Kenya were surveyed. Of the surveyed households, 51% were drawn from rural areas while 49% were based in urban areas. Of the surveyed households, 37% had external migrants, 29% had internal migrants while 34% had non-migrants. Further, the data was gathered for 8,343 non-migrant and 2,245 migrant individuals.

The questionnaire collected information on all individuals living in the household: age, gender, association between individuals and the household head, ethnicity, marital status, schooling, labour market situation, and household head's religion. The household survey also collected data on movable and immovable assets owned by the household, internal and external migrants, frequency and amount of remittances sent by the migrant in the previous 1 year (in Kenya shillings).

4.4 Empirical Results and Discussion

4.4.1 Descriptive Statistics

In assessing the effect of remittances on labour market participation, this study uses individuals as the unit of analysis. Individuals who report as being in paid employment are classified to be in the labour force. This study also defines labour market participation as including self-employed individuals and unemployed individuals but looking for work.

Table 4.2: Descriptive statistics of the variables included in the labour force participation model

	Individuals participating in the labour force		Individuals not participating in the labour force		All individuals		Difference in means
	(N=3037)		(N=1936)		(N=4973)		
	Mean	s.d	Mean	s.d	Mean	s.d	
Individual age in years	35.5142	(12.6261)	29.8650	(15.4781)	33.2993	(14.0858)	-5.6492***
Level of schooling: Primary	0.4307	(0.4953)	0.5137	(0.4999)	0.4632	(0.4987)	0.083***
Secondary	0.2895	(0.4536)	0.3413	(0.4743)	0.3098	(0.4625)	0.0518***
Tertiary	0.2784	(0.4483)	0.1436	(0.3508)	0.2256	(0.4180)	-0.1348***
Gender	0.4732	(0.4994)	0.6378	(0.4807)	0.5374	(0.4986)	0.1646***
Marital status	0.6424	(0.4793)	0.4432	(0.4969)	0.5648	(0.4794)	-0.1992***
Household headship	0.4304	(0.4952)	0.1327	(0.3394)	0.3145	(0.4644)	-0.2976***
Number of children (0-5) years	0.5196	(0.7894)	0.5640	(0.7894)	0.5196	(0.7894)	0.0445*
Number of children (6-15) years	0.9388	(1.1987)	1.3156	(1.4036)	0.9388	(1.1987)	0.0373***
Number of elderly in the household (>65 years)	0.2502	(0.5126)	0.2965	(0.5595)	0.2502	(0.5126)	0.0462***
Number of household members	4.9543	(2.4881)	5.6235	(2.5798)	5.2148	(2.5450)	0.6691***
Location of household	0.4847	(0.4998)	0.4990	(0.5001)	0.4847	(0.4998)	0.0143
Households owns agricultural land	0.6292	(0.4830)	0.6668	(0.4715)	0.6292	(0.4831)	0.0376***
Received domestic remittance	0.1386	(0.3456)	0.1586	(0.3654)	0.1464	(0.3535)	0.0200*
Received international remittance	0.1946	(0.3960)	0.2252	(0.4178)	0.2065	(0.4048)	0.0306***

*Source: Author's computation Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively.*

Table 4.2 reports the summary statistics for the dependent and explanatory variables used in the analysis. The descriptive statistics for this analysis are restricted to the working-age individuals (15-64 years). Table 4.2 reveals that the average age of individuals in the sample is 33.3 years. Market participants are older (35.5) on average than non-participants (29.9). Older individuals are

likely to be more experienced in the labour market. Due to the higher labour market experience, they are likely to receive higher wages than younger (less experienced) individuals. This implies that older individuals might have a higher opportunity cost for not working relative to younger individuals.

More individuals of the working age (31%) have attained secondary education compared to tertiary education (22.7%). On average, 27.8% of the labour market participants have tertiary education compared to 14.4% for the market non-participants. Individuals with higher levels of schooling are likely to be more productive and, therefore, secure higher wages than less educated individuals. This means that they have a higher opportunity cost for not working. Around 54% of individuals in the working age are women, while 46% are men. This result may point to higher migration of men than for women. Fewer women (47%) participate in the labour force than men (53%). This finding reflects the idea that women ordinarily have lower education qualifications than men, which reduces the probability of participating in the labour market. Women are also likely to receive remittances from migrant husbands. Therefore, women are more likely to exit paid employment to specialize in home production.

On average, 56% of the individuals of the working age group are married. More (64%) market participants are married compared to non-participants (44%). A larger share (87%) of market non-participants are non-household heads. Married individuals and household heads may have more financial responsibilities and therefore participate more in the labour market to provide for their families. Non-participating individuals hail from households with slightly more (0.56) young children than market participants (0.52). A higher number of young children in a household may curtail participation in market work especially among women because young children require more parental attention and care than other members of the household.

Labour market non-participants hail from households with a higher share (30%) of elderly members than market participants (25%). Elderly household members demand more attention relative to younger household members. This may reduce the chance of labour force participation for some household members, especially women. A higher share of young children and elderly persons in the household imply higher dependency and therefore higher probability of household receiving remittances. In turn, this may increase dependency on remittances, thereby reducing labour market participation.

The average household size in the entire sample is 5.2 persons. Labour market non-participants originate from larger households (5.6 persons) than the participants (5.0). To gain insight on differences in labour market participation between individuals with and without remittances income, a disaggregation of data by remittance status is carried out (Table A23). The data indicates that, on average, 61% of individuals of the working age irrespective of remittance status participate in the labour market. Further analysis of data by disaggregating remittances by source indicates that individuals without remittances participate more in the labour force (63%) than individuals with internal remittances (58%). Similarly, individuals with external remittances participate less in the labour market (58%) than individuals without remittances (63%). Descriptive statistics, therefore, provide preliminary evidence that internal and external remittances have an adverse effect on the likelihood of labour force participation.

4.4.2 Estimation Results

The parameter estimates for the full information maximum likelihood endogenous switching probit estimator, which estimates the impact of remittances on labour force participation in Kenya are presented in Table 4.3 to 4.6. Empirical studies (Tiongson and Rodriguez, 2001; Konica and Filer, 2009) demonstrate that remittances may affect men and women labour supply differently. Consequently, in this study, the analyses of the impact of remittances on labour force participation are carried out depending on gender of an individual.

To assess if the instrument variable used to identify endogenous switching probit model is valid, a simple falsification method is used as in Lokshin and Glinskaya (2009), Di Falco et al. (2011). Two probit models, one for the selection model and another for the labour force participation outcome model are estimated (Tables A24 and A25). In both binary probit models, migration network (selection instrument) is used as explanatory variable among other variables. The results of validity test of instrument show that migration network variable is positively and significantly related to the probability of household receiving external/internal remittances. However, there is no statistically significant effect of migration network on the likelihood of individuals of the working age participating in the labour market. This result suggests that the selection instrument is significantly correlated with household receiving remittances, but not directly correlated with labour market participation decision. This result indicates that migration network is a valid selection instrument in the subsequent endogenous switching models.

Turning back to the regression results, the first column of Table 4.3 to Table 4.6 presents the estimates of the probit selection equation. The second and the third column present the estimated coefficients of the probability of labour market participation for individuals in household with remittances and their counterparts in household without remittances, respectively. The Wald Chi-square statistics (Table 4.3 to Table 4.6) are significant at 1% level. This indicates that the endogenous switching probit models have a strong explanatory power. The log likelihood-ratio test for joint independence of equations 4.8 and 4.9 returned a Chi-square that is significant at 5% level, indicating that the null hypothesis of $\rho_1 = \rho_0$ can be rejected in all the four labour force participation equations (Table 4.3 to Table 4.6). This result implies that unobservables in the equations estimating the probability of household receiving remittances commonly referred to as the selection equations are significantly associated with unobservables in the market participation equations in the four labour force participation models (Table 4.3 to Table 4.6).

A further scrutiny of the results in the regression of the effect of external (internal) remittances on labour participation shows that ρ_0 is negative and statistically significant at 1% level (Table 4.3 to Table 4.6). This indicates a negative correlation between unobservable characteristics that predict selection into receiving external (internal) remittances and labour force participation for individual in household without external (internal) remittances. Similarly, the correlation coefficient ρ_1 is negative and significant at 1% or 5% level (Table 4.3 to Table 4.6). This suggests a negative correlation between the error terms in equations determining the decision of household receiving external (internal) remittances and individual's labour market participation if the household receives external (internal) remittances. Since ρ_0 and ρ_1 are statistically significant (Table 4.3 to Table 4.6), this implies that external/internal remittances are endogenous. This justifies the use of endogenous switching probit estimator. That is, addressing for selection bias emanating from unobserved factors using endogenous switching probit estimator is required to achieve unbiased and efficient parameter estimate of the impact of remittance income on the probability of labour force participation.

Table 4.3: Endogenous switching probit regression results for effect of international remittances on female labour force participation

Variable	Selection equation	Outcome equation: Labour force participation	
	Receiving internal remittance	Individuals with internal remittance	Individuals without internal remittanc
Age of the individual in years	-0.0173*	0.1818***	0.2096***
	(0.0130)	(0.0248)	(0.0149)
Age squared	0.0027	-0.0023***	-0.0026***
	(0.0002)	(0.0003)	(0.0002)
Level of schooling: Primary	0.2869**	-0.0672	-0.1035
	(0.1197)	(0.2472)	(0.1297)
Secondary	0.2134*	0.0888	0.1971*
	(0.1345)	(0.2779)	(0.1481)
Tertiary	0.2031*	0.2543	0.2527**
	(01345)	(0.2737)	(0.1482)
Marital status	-0.1092***	-0.2641*	0.5815***
	(0.0769)	(0.4191)	(0.0874)
Household headship	0.1839**	0.2971**	0.5260***
	(0.0743)	(0.1487)	(0.1310)
Number of children (0-5) years	-0.1633***	-0.0911	-0.0013
	(0.0382)	(0.0830)	(0.0416)
Number of children (6-14) years	-0.1371***	-0.1399**	0.1022
	(0.0268)	(0.0669)	(0.0298)
Number of elderly in the household (>65 years)	0.0998***	-0.0340	-0.0007*
	(0.0475)	(0.0887)	(0.0691)
Number of household members	0.0792***	0.0339	0.0159
	(0.0137)	(0.0366)	(0.0177)
Location of household	-0.0017	0.1122	0.0234
	(0.0398)	(0.1082)	(0.0644)
Households owns agricultural land	0.1136*	0.0620	0.0148
	(0.0623)	(0.1237)	(0.1069)
Migration network	0.0170***	na	na
	(0.0023)		
Constant	-2.0175***	-2.7354***	-3.0644***
	(0.2864)	(0.8300)	(0.2879)
Number of observations	2700		
Wald $chi^2(14)$	141.88***		
Log pseudo likelihood	-3154.7911		
ρ_1	-0.2709***		
	(0.0437)		
ρ_0	-0.3937**		
	(0.2287)		
LR test of independent eqns. Chi2(2)	0.63**		

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

The second column of Table 4.3 and 4.4 present the probabilities of households obtaining external remittances. The second column of Table 4.5 and 4.6 present the probabilities that a household receives internal remittances. Table 4.3 to 4.6 shows that households with more young children (below the age of six years) and school going children have a lower probability of

receiving international remittances than households with few young children and school going children. Having children in the household can discourage individuals from migrating, and thus reduce the prospect of household obtaining external remittances. Having more elderly members in the household and a family being large in size increases the probability of receiving external remittances. Larger households and those with more elderly members are likely to have a greater need of financial support and, therefore, appeal for more remittances from migrants. Levels of household assets as proxied by land holdings are positively and significantly associated with the chance of household obtaining internal and international remittances. Households in rural areas are more likely to receive internal remittances than their urban counterparts (Table 4.6). Households with more elderly members have a higher likelihood of receiving internal remittances (Table 4.5) while the number of school going children in the household is negatively correlated with the probability of receiving internal remittances (Table 4.6).

The essay now turns to discuss the estimates from the outcome equations of the switch probit model. The study begins by discussing the results of the effect of external remittances on female labour force participation as reported on Table 4.3. The third column of the table presents the probability of labour force participation for women living in households receiving international remittances, while the fourth column reports the probability of wage work participation for women residing in households without external remittances. The coefficients of the endogenous switching probit model show the path or direction of the effect of independent variables. However, it is important to note that the coefficients do not show the magnitude of the effect of independent variables such as the ones observed under standard OLS. Consequently, this section does not discuss the magnitude of the parameter estimates but considers the sign and statistical significance of the coefficients.

Age is positively and significantly associated with the probability of women participating in the labour force, and the effect is stronger for women in households without external remittances than for women in households with external remittances. Theoretically, older individuals are more experienced in the labour market and, therefore, earn higher wages than younger individuals (Mincer, 1974). Therefore, older women may participate more in the labour market because they have higher opportunity cost for not working. The result may also reflect the effect of larger household size. Older women are likely to have larger families than younger women, leading to

dilution of household income so that women have to work more to support larger households. The result may also point to declined fertility and presence of older siblings assisting with household chores, thereby releasing women into the labour market.

Table 4.4: Endogenous switching probit regression results for effect of international remittances on male labour force participation

Variable	Selection equation	Outcome equation: Labour force participation	
	Receiving international remittance	Individuals with international remittance	Individuals without international remittance
Age of the individual in years	-0.0290**	0.2275***	0.3394***
	(0.0147)	(0.0396)	(0.0209)
Age squared	0.0005***	-0.0031***	-0.0044***
	(0.0002)	(0.0005)	(0.0003)
Level of schooling: Primary	0.1078	0.4630*	0.5601***
	(0.1185)	(0.2517)	(0.1566)
Secondary	0.2553*	0.6239*	0.5044***
	(0.1385)	(0.3187)	(0.1916)
Tertiary	0.0415	0.5247*	0.3444**
	(0.1322)	(0.2810)	(0.1740)
Marital status	0.2168**	0.2697	0.5474***
	(0.1050)	(0.2122)	(0.1698)
Household headship	-0.6135***	0.7862***	0.4528**
	(0.1086)	(0.2325)	(0.1796)
Number of children (0-5) years	-0.1354***	-0.1154	0.1058***
	(0.0461)	(0.1078)	(0.0672)
Number of children (6-14) years	-0.1581***	-0.0903	-0.1088**
	(0.0305)	(0.0882)	(0.0474)
Number of elderly in the household (>65 years)	0.1849***	-0.3068***	0.1616*
	(0.0578)	(0.0999)	(0.0941)
Number of household members	0.0603***	0.0213	-0.0248
	(0.0166)	(0.0378)	(0.0238)
Location of household	0.0252	0.1417	-0.0893***
	(0.0657)	(0.1301)	(0.0096)
Households owns agricultural land	0.0724	0.0223	0.0021
	(0.0701)	(0.1398)	(0.0969)
Migration network	0.0143***	na	na
	(0.0024)		
Constant	-1.5163***	-3.2042***	-5.6661***
	(0.3151)	(1.1675)	(0.3834)
Number of observations	2344		
Wald $chi^2(14)$	192.86***		
Log pseudo likelihood	-2128.5121		
ρ_1	-0.5577**		
	(0.2397)		
ρ_0	-0.9497***		
	(0.2938)		
LR test of independent eqns. $Chi^2(2)$	4.71***		

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

The coefficient on the quadratic term of age variable indicates that the link between the likelihood of labour force participation and age is non-linear; that is, the effect follows an inverted-U shape. This means that the propensity of market work participation for women with or without international remittances initially increases but eventually decreases with age. This result is not surprising given that much older women may have more household activities that may disrupt their participation in the labour market.

Education is an important driver of the decision to participate in the labour market for women without external remittances but not for women with external remittances. Having secondary education is positively and significantly related to the likelihood of participation in the labour market for women without external remittances. Women with tertiary education and without external remittances have a higher probability of labour market participation than their counterparts residing in households receiving external remittances. This suggests that human capital investment in women through education enhances the probability of participating in the labour market.

Marital status (marriage) is positively and significantly associated with labour supply among women without external remittances. Married women have more family responsibilities and financial requirements than unmarried women and therefore may be motivated to join the labour market to earn and provide for their families. Expectedly, being a married woman in a household with international remittances reduces the chances of participation in the labour force significantly. It is likely that married women receive remittances from migrant husbands and therefore allocate more time to home production, which negatively affects their labour supply at the extensive margin.

Female headship is positively and significantly associated with the prospects of participating in the labour market. This association is higher for women without remittances from abroad than for women with external remittances. This result aligns with the fact that female-headed households without international remittances have lower income. As a result, this may increase the likelihood of female heads participating in the labour market. The positive coefficient on headship suggests the possibility of women getting financial assistance from migrant husbands, to start and run familial enterprises. The presence of school going children in household with international remittances is negatively and significantly related to women's labour market participation. This finding indicates that there is a trade-off between participating in the labour market and care-giving (home-production) for women receiving external remittances.

Analysis of the results presented in Table 4.3 shows that being a woman living in households with more elderly members and without external remittances is inversely related to the probability of participating in the labour force. This finding may be suggestive of the attention and care that women have to provide in households with more elders, which in turn lowers their chances of joining the labour market. The estimates of the relationship between external remittances and men's labour force participation are presented in Table 4.4. The third column presents results for the effect on labour force participation for men with international remittances while the fourth column reports labour market participation for men without international remittances.

Age is positively and significantly related to the probability of men participating in the labour market, and the coefficient of this variable is statistically significant in the case of men living in households receiving (no receiving) external remittances. Further, the results show that the effect is larger for men without external remittances than men with external remittances. Theoretically, older individuals have more work experience. Therefore, they are likely to earn more in the labour market, implying that they may have higher chance of being in the labour force compared to younger persons. There is a non-linear relationship between age and men's labour supply at the intensive margin. This result highlights the existence of life-cycle effects in men's labour supply. A plausible exposition for this result is that there may be a declined productivity of much older men. This in turn reduces their wages, and thus the probability of labour market participation. This finding also reflects the fact that most individuals in Kenya are found in the informal wage employment. The informal paid jobs are physically demanding and therefore render men to exit the job market as they age.

Education is positively and significantly related to men's labour market participation. Having primary education is positively and significantly associated with labour supply at the extensive margin for men with and without external remittances. This means that low level of education is not a bottleneck in entering the labour force in Kenya. For instance, jobs in the informal sector may not require higher education qualification. Having secondary education is positively related to the odds of labour force participation. This effect applies in the case of men in households with (without) external remittances. The results also indicate that the effect is stronger for men in households with international remittances than for men in households without remittances.

Tertiary education is positively and significantly related to male labour supply, and the effect is larger for men with external remittances than those without external remittances. This finding aligns with the fact that higher educational levels enhance skills and productivity of individuals and therefore wage earnings. This, in turn, increases their chances of participating in the labour force.

Table 4.5: Endogenous switching probit regression results for effect of internal remittances on female labour force participation

	Selection equation	Outcome equation: Labour force participation	
Variable	**Receiving internal remittance**	**Individual with internal remittances**	**Individual without internal remittances**
Age of the individual in years	-0.0002	0.1169***	0.2096***
	(0.0132)	(0.0425)	(0.0149)
Age squared	0.0001	-0.0014***	-0.0026***
	(0.0002)	(0.0005)	(0.0002)
Level of schooling: Primary	-0.1281	0.0878	-0.1035
	(0.1167)	(0.2070)	(0.1297)
Secondary	-0.0984	0.2447	0.1971
	(0.1381)	(0.2408)	(0.1481)
Tertiary	-0.2305*	0.5985**	0.2527*
	(0.1356)	(0.2543)	(0.1482)
Marital status	-0.0980	-0.0583	-0.5815***
	(0.0827)	(0.1741)	(0.0874)
Household headship	0.4969***	0.0798	0.5260***
	(0.0759)	(0.3202)	(0.1310)
Number of children (0-5) years	0.0432	-0.0558	-0.0013
	(0.0401)	(0.0744)	(0.0416)
Number of children (6-14) years	0.0168	-0.0993*	-0.1022***
	(0.0285)	(0.0568)	(0.0298)
Number of elderly in the household (>65 years)	0.02261***	0.0004	-0.0007
	(0.0498)	(0.1606)	(0.0644)
Number of household members	0.0168	0.0090	0.0159
	(0.0176)	(0.0345)	(0.0177)
Location of household	0.0004	-0.0220	0.0234
	(0.0631)	(0.1166)	(0.0644)
Households owns agricultural land	0.5042***	-0.1613	-0.1069***
	(0.0696)	(0.2668)	(0.0148)
Migration network	0.0088***	na	na
	(0.0025)		
Constant	-1.7643***	-1.1210	-3.3033***
	(0.3063)	(1.5950)	(0.2860)
Number of observations	2700	2700	2700
Wald $chi^2(14)$	157.25***		
Log pseudo likelihood	-2951.8698		
ρ_1	-0.5646**		
	(0.2561)		
ρ_0	-0.4245***		
	(0.1270)		
LR test of independent eqns. $Chi^2(2)$	0.55**		

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

Marital status is an important predictor of the choice of participating in the labour force. This effect holds for men without external remittances but not for men with international remittances. Married men from households without external remittances have significantly higher probability of participating in the labour force than similar men who are single. The positive association between marital status and male labour supply at the extensive margin is consistent with theoretical predictions. Similarly, male headship is positively linked to men's labour supply at the extensive margin. The effect is more important in the sub-sample of men with external remittances than in the sub-sample of men without external remittances. The finding that household headship is positively related to prospects of labour force participation is anticipated, considering that family heads are expected to work to provide for their families.

The estimates in Table 4.4 show that the number of young children in the household is positively related to men's labour supply. This effect is significant for men in households without internal remittances. Men residing in households with more young children and without remittances may be pressurized to supply more labour to provide for their families. The number of school going children is also an important factor affecting the odds of participating in labour market for men. While school-going children negatively and significantly influence the possibility of men participating in the labour force, this variable has insignificant effect on labour supply for men with remittances from abroad.

The number of elderly people in the household is significantly related to men's labour supply. Men's labour supply at the extensive margin for those living in households receiving international remittances decreases with number of elderly individuals. This reflects lower financial constraints facing households receiving external remittances. This in turn eases the prospects of labour market participation. The number of elderly persons is directly correlated with men's labour supply, and this impact is significant for men in households without external remittances. More elderly individuals in the household may mean greater financial responsibility, which may induce men to join the labour market. Locality of household has a significant effect on male labour supply at the extensive margin. Being a man in a rural area and without external remittances lowers labour supply in comparison to being a man in urban area and without external remittances. This finding underscores the scarcity of paid jobs in rural areas relative to urban areas.

Table 4.5 shows the switch probit regression results for the link between internal remittances and women's labour supply at the extensive margin. The third column of Table 4.5 reports results for the effect on women's labour force participation in households obtaining internal remittances while the fourth column reports the estimates for labour market participation for women in households without internal remittances.

The results in Table 4.5 show that the coefficient on women's age is positive and significant. This indicates that older women supply more labour than their younger counterparts. Apparently, the effect of age on the likelihood of labour market participation is weaker for women in households having internal remittances than for women living in households without internal remittances. As women reach working age, their likelihood of securing a job are low but after getting employed and having work experience, their probability of working increases. The coefficient on age square is negative and statistically significant. This means that the relationship between age and women's probability of working is concave. This implies that the chance of a woman being active in the labour force increases with her age but eventually tapers off.

Education is a crucial driver of women's decision to participate in the labour market. Tertiary education is positively and significantly related to the odds of a woman participating in the labour force. This indicates that higher levels of schooling encourage women to join the labour force. This result is possible through higher productivity associated with highly educated individuals. Higher productivity leads to higher wages. This in turn raises women's labour supply. Being a married woman residing in a household without internal remittances is negatively and significantly related to the chance of participating in the labour force. This finding may reflect the influence of African culture which discourages women in marriage from participating in the labour market. Generally, married women are expected to stay at home and discharge household obligations.

Household headship is positively associated with the possibility of a woman being in the labour market. However, this effect is only relevant for women living in households without internal remittances. Generally, female headed households have lower incomes compared to male-headed households. As a result, female household heads have to work to provide for their families.

Table 4.6: Endogenous switching probit regression results for effect of internal remittances on male labour force participation

	Selection equation	Outcome model: Labour force participation	
Variable	**Receiving internal remittances**	**Individuals with internal remittances**	**Individuals without internal remittance**
Age of the individual in years	-0.0287*	0.2611***	0.2872***
	(0.0154)	(0.0396)	(0.0188)
Age squared	0.0006***	-0.0035***	-0.0037***
	(0.0002)	(0.0005)	(0.0002)
Level of schooling: Primary	0.0408	0.3158*	0.5637***
	(0.1210)	(0.1932)	(0.1468)
Secondary	-0.0083	0.3314*	0.6095***
	(0.1454)	(0.2373)	(0.1724)
Tertiary	-0.1251	0.1679	0.4950***
	(0.1390)	(0.2114)	(0.1605)
Marital status	-0.0656	0.3672*	0.4399***
	(0.1117)	(0.1994)	(0.1421)
Household headship	-0.7745***	0.7758***	0.6622***
	(0.1167)	(0.2311)	(0.1882)
Number of children (0-5) years	0.0459	-0.0191	0.0428
	(0.0485)	(0.0759)	(0.0635)
Number of children (6-14) years	-0.0644*	0.0593	0.1464***
	(0.0335)	(0.0565)	(0.0391)
Number of elderly in the household (>65 years)	0.0246	-0.0173	0.0082
	(0.0622)	(0.0922)	(0.0754)
Number of household members	-0.0179	-0.0116	0.0642**
	(0.0188)	(0.0317)	(0.0203)
Location of household	0.1272**	0.1334	0.0215
	(0.0689)	(0.1068)	(0.0868)
Households owns agricultural land	0.3360***	-0.2897**	0.0432
	(0.0772)	(0.1271)	(0.1043)
Migration network	0.0057***	na	na
	(0.0024)		
Constant	-.8948***	-2.9161***	-4.9331***
	(0.3266)	(0.7513)	(0.3520)
Number of observations	2344		
Wald $chi^2(14)$	161.11***		
Log pseudo likelihood	-1981.3665		
ρ_0	-0.9579***		
	(0.3397)		
ρ_1	-0.2990**		
	(0.1038)		
LR test of independent eqns. $Chi^2(2)$	5.22**		

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

The number of young children in the household is inversely associated with women's labour supply. However, this effect is statistically insignificant. The number of school going children is significantly related to women's labour supply. This effect is significant for women in

households receiving (not receiving) internal remittances. Specifically, having more school going children in the household is inversely related to women's labour supply at the extensive margin. This finding is contrary to theoretical predictions because more school going children implies greater financial obligation facing the household, and more time available for females to take part in the labour force. The findings in this study, however, indicate that bringing-up children conflicts with participating in the labour market for women, such that there is a trade-off between participating in market work and the number of school going children.

Ownership of land is negatively and significantly related to the likelihood of women in households without domestic remittances participating in the labour market. The effect on ownership of land on probability of labour force participation for women receiving internal remittances is also negative but not statistically relevant. The result is explained by the fact that household assets constitute non-wage income for the household. Households owning assets could be wealthier and therefore induce women to supply less labour due to steady income stream from household assets.

The regression results for the internal remittances-men labour force participation nexus are reported in Table 4.6. The third column reports the parameter estimates for the effect on men with internal remittances. The fourth column presents estimates of labour market participation for men without internal remittances. The estimates show that age is positively related to men's probability of participating in the labour market. This impact is statistically significant for men in households with and without internal remittances. Further, the estimates show that the impact of men's age on labour supply is weaker for men with internal remittances than for men without internal remittances. In their younger years, men are still schooling and therefore depend on parents. This diminishes men's labour supply. However, as men age and finish schooling, their labour supply at the extensive margin expands.

The coefficients on the age square have a negative sign as expected. This indicates that men's labour supply increases as they become older but at a decreasing rate. This suggests that the association between men's age and labour supply at the extensive margin follows an inverted-U curve. This result is consistent with the idea that much older men are less energetic and productive, which in turn lowers their wage rate. Thus, the labour supply of older men reduces due to lower opportunity cost of being inactive in the labour market.

Education level is a vital factor affecting men's labour supply at the extensive margin. Having primary education significantly increases the probability of participating in the labour force for men with (without) internal remittances. This result implies that lower education does not restrict men from participating in the labour market. Secondary education is positively and significantly associated with the likelihood of participating in the labour force for men with (without) internal remittances. In line with priori expectations, tertiary education is positively correlated with the probability of men being in the labour market. This effect is significant in the sub-sample of men without internal remittances.

Marital status is an essential factor influencing men's labour supply. The impact of marriage is stronger for men without internal remittances than for men with internal remittances. This result is expected, given that men in marriage are expected to be in employment and satisfy financial requirements of their households. Men household headship is positively and significantly related to the odds of participating in the labour men. Predictably, household headship is positively related with labour supply for men with (without) internal remittances. This result is unsurprising since household heads have the duty of providing for their families. Accordingly, they are expected to be employed to meet financial demands for their families. The number of school going children is positively and significantly related to men's labour supply. This impact is statistically relevant in case of men in household without domestic remittances. More school going children in the household indicates greater financial need facing the household, thus pressurizing men without internal remittances to join the labour market to provide for the household.

Household size significantly affects labour market participation for men without internal remittances. This result suggests that men in larger households have to be active in the labour market to cater for increased household requirements. Ownership of land is negatively and significantly associated with the probability of men participating in the labour market. It is worth noting that this effect is statistically significant for men in households with internal remittances and not for their counterparts without remittances.

4.4.3 Treatment Effects of Remittances on Individual Labour Force Participation

To gain insight into the effect of remittances on labour market participation, the estimated coefficients from the endogenous switching probit regression (Table 4.3 to 4.6) are used to compute the mean treatment parameter estimates. The computed mean treatment parameter estimates are reported in Table 4.7. The effect of the treatment (internal and international remittances) on market participation is calculated following Lokshin and Sajaia (2011) method of generating treatment effects. The parameter estimates from the FIML estimator are utilized to compute counterfactual probabilities of labour market participation for individuals in different regimes. The treatment effects are computed for the treated sample (TT), untreated sample (TU) and the whole sample (TE). The treatment effect on the treated (TT), treatment effect on the untreated (TU) and the treatment effect (TE) are subsequently computed based on equation 4.13, 4.14 and 4.15, respectively. The average treatment effect on the treated (ATT), the average treatment effect on the untreated (ATU) and the average treatment effect (ATE) for the various sub-groups of the population were then calculated by dividing ATT, ATU and ATE over the observations in the respective sub-groups.

Table 4.7: Mean treatment effects from internal and international remittances on male and female labour force participation

	Female		Male	
Treatment effects	**International remittances**	**Internal remittances**	**International remittances**	**Internal Remittances**
Average treatment effect on the treated (ATT)	-0.0287** (0.0140)	-0.0264*** (0.0096)	-0.0354*** (0.0140)	-0.0656*** (0.0214)
Average treatment effect on the untreated (ATU)	-0.1858 *** (0.0640)	-0.3217 *** (0.0208)	-0.1321** (0.0858)	-0.2760*** (0.0213)
Average treatment effect (ATE)	-0.1457 *** (0.0362)	-0.2604 ** (0.1165)	-0.1059*** (0.0841)	-0.2361*** (0.0480)

*Source: Author's computation Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

The results presented in Table 4.7 show that the ATT for women in a household receiving international remittances is -0.029 while the ATE is -0.146. Clearly, the computed ATT suggests that a woman living in a household receiving international remittance has approximately 3 percentage point lower probability of participating in the labour force compared to counterfactual scenario of woman without international remittances. This finding aligns with Kalaj (2009) and Mughal and Makhlouf (2013) and Binzel and Assaad (2009). The result is also consistent with

Lokshin and Glinskaya (2009) and Kim (2007) and Gorlich et al. (2007) finding that male migration reduces the chance of women participating in the labour force. The negative coefficient of ATE indicates that for the women population, receiving internal remittances reduces the prospect of participating in labour force by 26.0 percentage points. The study finds an ATU value of 0.322, indicating that women without internal remittances would have 33.2 percentage points lesser chance of being in the labour force had they received international remittances.

The results of the ATT given in Table 4.7 indicate that males with international remittances have 4.0 percentage point lesser prospect of participating in the labour force. This finding concurs with Dermendzhieva (2010) and Justino and Shemyakina (2012). Analysis of the results in Table 4.7 indicates that men's labour force participation is more sensitive to remittances compared to women's labour force participation. This finding aligns with Rodriquez and Tiongson (2001) and Jadotte (2009) and Justino and Shemyakina (2012). However, this observation is inconsistent with that of Amuedo-Dorantes and Pozo (2012) and Mora (2013). The computed ATE suggests that a randomly selected man would have had roughly 11 percentage point lower probability of participating in the labour market if he was to receive international remittances. Unsurprisingly, the calculated ATU in Table 4.7 indicates that if men without international remittances were to receive remittance, they would have 13.2 percentage points lower chance of participating in the labour market.

The ATT presented in Table 4.7 reveals that internal remittances are negatively related to women labour market participation. The results show that a woman living in a household receiving internal remittances has 3.0 percentage points lower chance of participating in the labour market compared to the counterfactual scenario of a woman not having external remittances (Table 4.7). The estimated ATE value of -0.260 indicates that a randomly selected woman would have 26 percentage points lesser prospect of being in the labour market if they received internal remittances. The computed ATU estimate of -0.322 suggests that if women living in households without internal remittances had lived in households having internal remittances, they would have had 32 percentage points lesser chance of participating in the labour market.

Regarding men having internal remittances, Table 4.7 shows that the ATT is 0.066. This means that internal remittances reduce the odds of men participating in the labour force by 7 percentage points relative to the counterfactual scenario (of man being in a household not receiving internal remittance). This finding is supported by Mughal and Makhlouf (2013). The foregoing result of the ATU suggests that if men without internal remittances had received the remittances, they would have had 28 percentage points lower chance of labour force participation. Finally, the computed ATE is negative at -0.236, suggesting that a randomly chosen man would have 24 percentage points lesser likelihood of participating in the labour market if he received internal remittances (Table 4.7).

4.5.1 Summary and Conclusions

This study investigates the effect of internal (external) remittances on labour market participation in Kenya using data drawn from the 2009 World Bank Household Survey for the African Migration Project. Two-step endogenous switching probit estimator is applied to address for potential endogeneity of remittances and selection bias. Different estimations are carried out for men (women) and for individuals with internal (external) remittances. Empirical findings indicate that internal and external remittances are negatively related to the chance of men and women participating in the labour market. The results also indicate that men's labour supply is more sensitive to remittances than that of women. The empirical results therefore show that internal (external) remittances may perhaps be creating moral hazard problem and therefore inducing recipients to reduce work effort. This suggests that in Kenya, remittances generate 'parasitism effect'.

4.5.2 Policy Implications

The results showed that being man (woman) residing in a household with external (internal) remittances has a negative impact on labour supply at the extensive margin than counterfactual scenario of a man (woman) being in a household without remittances. To be precise, external (internal) remittances are found to have a depressing impact on the probability of recipients (men and women) participating in the labour market. Thus, policies that encourage work effort are needed to avert the adverse effect of remittances on labour market participation. Given that recipients of remittances choose leisure over work, policies that increase the costs of leisure

choice are needed. To increase the cost of leisure and therefore induce higher labour market participation, the government should raise the minimum wage. Also, to increase the cost of leisure choice and thus increase labour market participation, the government ought to provide affordable credit to the smaller businesses and reduce the cost of doing business. Additionally, it is important to note that if labour market discrimination is binding, remittances may serve as an escape avenue. Thus, the government should strive to reduce levels of labour market discrimination to attract recipients to the labour market. Furthermore, the government ought to introduce/strengthen industrial attachment and internship programmes in the school curriculum. This is because industrial attachment/internship may inculcate a work ethic and induce graduates to choose work when faced with work-leisure choice.

4.5.3 Limitations of the Study

The study draws on cross-sectional data to investigate the relationship between remittances and labour market participation due to scarcity of panel data on migration and remittances. Therefore, the study could not capture dynamics of labour supply of individuals with remittance income. Information on hours of work was scarce. Consequently, this study does not investigate the relationship between remittances and labour supply at the intensive margin (hours worked). Further, the household survey data has very few observations regarding households with internal and external remittances simultaneously. Thus, the study could not investigate the effect of receiving internal and external remittances concurrently on labour market participation[4].

4.5.4 Areas for Further Research

Remittances may affect both labour supply and occupational outcomes. This study focuses on the labour supply at the extensive margin. Future studies should explore the impact of remittances on occupational choice of recipients both at extensive and intensive margin. This study investigates the relationship between remittances and labour market participation when remittances are received under condition of certainty. Research on the association between remittances and labour market participation when remittances are uncertain is required with a view to having a

[4] See Table A26 (A27) for the endogenous switching probit regression results for the effect of household receiving both external and internal remittances on female (male) labour force participation. Table A28 reports the mean treatment effects from household receiving external and internal remittances on male and female labour force participation.

complete picture of remittances-labour supply nexus. It is possible that the association between remittances and labour market participation may differ with regional labour markets. This study includes an indicator for regional labour market as an explanatory variable in the labour supply equation using a binary variable indicating whether a household is in urban or rural setting. Future studies should provide separate analyses of the impact of remittances on labour market participation according to region: rural or urban area. Remittances may affect labour market participation by influencing household decision to start or expand household business enterprises. Thus, research on the relationship between remittances receipt and household entrepreneurship is required.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Introduction

This chapter concludes the thesis by a way of summarizing the study, giving the main findings and policy implications. It also discusses the limitations of the study and contribution of the study to knowledge. Areas for further research are also indicated.

5.2 Summary and Conclusions

The study sought to understand the drivers and effects of remittances on household behaviour in Kenya. The main objective of this study was to analyze the drivers of remittances in Kenya; examine the effect of remittances on household expenditure allocation in Kenya; and investigate the effect of remittances on labour market participation in Kenya. The first chapter provided background information on migration and remittances in Kenya. The chapter laid an important basis for the three essays in the thesis. The study utilized single round household survey data from the 2009 African Migration Project for Kenya.

The first objective of the study sought to analyze the determinants of external and internal remittances in Kenya. Household income was treated as endogenous. Consequently, per-capita household expenditure, proxy for household income, was regressed on variables that measure household human and physical capital using OLS estimator. The OLS estimates were then used to compute predicted values of household income. Heckman two-step procedure was applied to test and address for sample selection bias. Heckman estimation method requires the use of exclusion restriction to identify model parameters. Migrant's marital status was used as the identifier. The estimated parameters showed the existence of sample selection bias. This implies that the use of Heckman's procedure was warranted to address sample selectivity bias.

The results indicate that external migrants exercise a higher probability to remit and send higher amounts of remittances than domestic migrants. Having a higher level of education before migration is positively and significantly related to internal and external remittances. Specifically, having secondary or tertiary education has a positive effect on the possibility of remitting and

intensity of internal and external remittances. This result means that remittances are likely to be motivated by inter-temporal contractual agreement involving a migrant and his or her family. An employed migrant has significantly higher likelihood of remitting and send higher levels of internal (external) remittances. The positive correlation between migrant's employment and remittances suggest that domestic (external) remittances are motivated by altruism. Length of migration is positively related to the chance of remitting domestic remittances. There is a curvilinear relationship between length of migration and internal remittances. Length of migration is positively and significantly related to levels of external remittances, but this effect is non-linear. The results thus suggest that internal (external migrants) remit for altruistic reasons. The results may possibly suggest that external remittances flow to Kenya are to remain on an upward trajectory over the coming several years.

The effect of household characteristics at migrant's place of origin on migrant's remittance behaviour suggests that internal (external) remittances in Kenya are mainly motivated by altruism. The empirical estimates also provided some empirical evidence for self-interest and investment motives for remittances as among external migrants who remit, migrants from higher-income household remit more than their counterparts from lower-income households.

The second objective of the study was to examine the effect of internal and external remittances on household expenditure allocation. To achieve this purpose, fractional multinomial regression was applied to address the fact that budget shares are bounded between [0, 1] interval and that the shares must add up to 1 for each observation. To estimate the fractional multinomial logit model, expenditure on 'others' (wedding, engagement and funeral) was selected as the base or comparison group. The study treated remittances as both exogenous and endogenous. The probability of household receiving remittances was first estimated using a binary probit model. Then, the predicted probability of household receiving remittances was computed and included in the system of the budget share equations to address for endogeneity. Remittances were instrumented using migration networks which were proxied by the share of households in a district with migrants.

Empirical results show that households with external remittances tended to allocate a higher share of total household expenditure to education, consumer durables and housing and land

compared to households without remittances. Compared to households without remittances, households with external remittances devote a lower share of total household expenditure to food and physical investments. Once endogeneity of external remittances is controlled for, the findings indicate that remittances are positively associated with the share of household expenditure allocated to investment in physical capital (productive assets, farming equipment and setting up a business). This result implies that recipient households perceive external remittances as a windfall gain or transitory income that should be spent on investments. This means that external remittances are a valve for economic development. The findings also showed that domestic remittances are positively related to the share of total household expenditure allocated to food. This means that internal remittances are an important tool for consumption smoothing. When the study addresses for endogeneity, the findings show that internal remittances reduce the proportion of aggregate household expenditure dedicated to education, and wedding and engagement. This suggests that households treat internal remittances as a permanent income or compensatory income. Thus, internal remittances are not used productively. This suggests that they are unlikely to promote economic development in the long-run.

The third objective of this study sought to investigate the effect of internal (external) remittances on labour market participation. Two-step endogenous switching probit estimator is applied to address the likely endogeneity of remittances and selection bias. Endogenous switching estimation method requires the use of exclusion restriction to identify the model properly. The proportion of households in a district with migrants is used as the identifier. Separate analyses are conducted for men (women) and for households with internal (external) remittances because literature indicates that labour market participation varies according to gender of an individual and the source of remittances.

Empirical results indicate that internal and external remittances are negatively related to the probability of participating in the labour market. This effect is statistically significant both for men and women. It is also found that compared to women, men's labour is more sensitive to remittances. Therefore, remittances may be generating moral hazard problem and, therefore, inspire recipients to reduce work effort.

Overall, it is apparent that in Kenya, internal (external) remittances are largely driven by altruism. Contractual agreement and investment motive may also explain migrant's remittance behaviour. Internal (external) remittances promote present consumption (investments) and ease the possibility of recipients participating in the labour market. This result indicates that external (internal) remittances generate a moral hazard problem, induce recipients to exert minimal work effort, thereby generating a 'parasitism effect'.

5.3 Policy Implications

External migrants were found to remit more than internal migrants both at the intensive and extensive margins. This finding creates the need to devise migration policies to promote international migration. Given the high costs associated with international migration, the government ought to subsidize travelling related expenses. Level of schooling was found to be positively related to the chance of remitting, and levels of internal and external remittances. Policies that favour skilled migration are therefore required to increase the amounts of remittances to the households. Migrant being employed was found to be an essential driver of probability and intensity of internal and external remittances. There is therefore need to devise policies to increase the probability of migrants securing employment at the migration destination. This may be achieved through improving cooperation between migrant sending country and host country regarding dissemination of information on probable requirements in the host country labour market, and improving the recognition of foreign academic and professional qualifications. This is likely to improve migrants' economic situation at the migrants' destination and therefore increase amounts of remittances.

It was found that domestic and international remittances are driven by altruism and, therefore, they are important for household welfare. This calls for the government to craft remittance policy to encourage both internal and external remittances. Given that remittance transfer costs are highest in Sub-Sahara Africa (Kenya included) than in other parts of the world, this calls for drafting remittance policy to reduce remittance transaction fees. Strategies to increase competition in remittance market should be put in place. Such strategies include use of better technologies in remittance transfer markets, and increasing transparency in the remittance market. To attract higher levels of external remittances, the government should regulate and monitor recruitment agencies to reduce or eliminate illegal fees charged on migrants.

Additionally, the Kenya Revenue Authority should extend the recently introduced tax amnesty for migrants to repatriate resources held abroad beyond 30th June 2019. The results revealed that external remittances are also motivated by self-interest

The findings indicated that in Kenya, external remittances are inversely linked to household spending on food and investment in physical capital. Receipt of external remittances is positively and significantly associated with the share of total household expenditure allocated to education and, housing and land. In addition, the results indicated that external remittances increase the share of total household spending on immediate consumption as proxied by consumer durables. Policies that direct remittances to productive investments need to be put in place, for example policies such as preferential loans or grants for business ventures for the migrant households. The government should also offer tax breaks on imported capital goods by external migrants to encourage dedication of remittances to productive investments. There is also need to encourage and train external migrants and the recipients so that they are able to start small businesses. Furthermore, the government ought to improve the overall business environment.

Once endogeneity of external remittances is controlled for, the coefficient on physical capital investments (productive assets, farming equipment and setting up of a small business) becomes positive. Thus, external remittances are important for household investment in physical capital Consequently, policies to increase the flow of diaspora remittances to Kenya are required. The government and remittance service providers should strive to reduce remittance transaction costs The Kenya Revenue Authority should also prolong the tax amnesty on remittance income sent by international migrants back home beyond 30th June 2019.

It was found that in Kenya, internal remittances are positively related to the share of total household expenditure devoted to food (present consumption). Thus, policy makers trying to maximize the positive effects of remittances on economic development should devise policies to divert remittances to productive uses. The government should strive to create conducive business environment. After controlling for endogeneity, the estimates suggest that internal remittances are inversely related to the share of the total of household expenditure devoted to investment in human capital (education). This creates the need for the government to carry out awareness campaigns to sensitize people in migrant communities, particularly in rural areas, on the

importance of investment in education. The free primary and secondary education programmes need to be strengthened because they are likely to ameliorate the adverse effect of remittances on household investment in education.

Internal (external) remittances were found to have a negative impact on the likelihood of participating in the labour market. This relationship is significant for both men and women. Therefore, to mitigate the adverse impact of remittances on labour force participation, policies aimed at promoting work effort should be encouraged. It is worth noting that the government may pursue several strategies to induce work effort. The government can offer higher minimum wages, increase access to credit for smaller businesses, and reduce the cost of doing business. Further, government can also achieve higher rates of labour market participation by applying social policies that aim at reducing labour market discrimination. Additionally, the government may strive to instill work ethics among graduates by strengthening industrial attachment in the school curriculum and internship programmes.

5.4 Contribution of the Study to Knowledge

The study makes significant contribution to literature on remittances by empirically analyzing drivers of internal and external remittances in Kenya. While existing studies analyzed the drivers of either domestic or external remittances, this study investigates the drivers of both domestic and external remittances. The study uses Heckman sample selection model to address selection bias and thus achieve consistent parameter estimates. Nevertheless, this investigation calculates the marginal effects of Heckman sample selection model to illuminate the impact of the covariates on the probability to remit and amount of remittances sent, and therefore departs from previous studies which fail to compute the marginal effects. This is important because the conditional and unconditional marginal effects are more instructive in comparison to estimates of the parameters; the probability to remit and levels of remittances.

This study contributes to the existing debate on whether remittances promote economic development in the origin country or not. Specifically, the study examines how remittances affect allocation of household expenditure on immediate consumption and investment goods in Kenya. The study investigates the impact on three categories of households: households without remittances, households receiving internal remittances and households receiving external

remittances. Unlike previous studies, this analysis considered a broader array of household expenditures: food, education, health, consumption and durable goods, physical investments, housing and land, and discretionary goods. Furthermore, this study uses fractional multinomial logit estimator since each budget share is bounded between zero and one and the shares for each observation must add up to one. Also, the study controls for endogeneity by applying instrumental variable estimation method to avail unbiased parameter estimates of the impact of remittances.

This study deviates from existing studies on labour market studies in Kenya by incorporating remittances as non-labour income in the labour force participation equation. The study also applies endogenous switching probit estimator to test and address for potential endogeneity of remittances and selection bias, and simultaneously analyze the relationship between remittances and labour market participation in the case of individuals with and without remittances. Finally, the findings of this study provide relevant information necessary for policy formulation.

5.5 Limitations of the Study

In remittances literature, migrant's income level is regarded as one of the crucial determinants of migrant's remittance behaviour, yet the household survey data did not have information on migrant's income. To proxy migrant's unobserved income, the study controlled for factors that are likely to be positively correlated with a migrant's income. Specifically, a migrant's employment status and education attainment, which are predictably highly correlated with migrant's income, were included as control variables in the remittances equations. Considering the inclusion of migrant's education and employment status as explanatory variables in the remittances equation, income would have a negligible impact on migrant's remittance behaviour.

To analyze the drivers of remittances and the effect of remittances on household spending and labour force participation, this study was limited to cross-sectional data due to paucity of panel data. Consequently, this assessment could not capture the dynamics of migrant remittance behaviour and household decisions (household expenditure allocation and labour supply). Expenditure items had different recall periods (weekly, monthly and semi-annually), thereby making comparison of expenditures difficult. There was therefore need to generate comparable expenditure items by converting weekly and six months expenditure into monthly household

expenditure. Finally, data on hours of work was scarce and hence this study chose to assess the impact of remittances on labour supply at the extensive margin only.

5.6 Areas for Further Research

Although this study acknowledged that household expenditure allocation differs with gender of household head and therefore incorporated household gender as an explanatory variable, future studies should provide separate analysis according to gender of household head. Research on how gender of remitter impact on household expenditure allocation would also be indispensable. While it is true that remittance may impacts on labour supply and occupational outcome, this study concentrated on labour supply at the extensive margin. To produce a comprehensive impression of the relationship between remittances and labour supply choices, future studies could scrutinize the impact of remittances on recipient's occupational choice both at the extensive and intensive margin. This study analyzed the relationship between remittances and household spending in addition to labour market participation under condition of certainty. It would be paramount to also understand how uncertainty of remittances flows affects household spending and labour market participation to achieve a holistic picture of impact of remittance income on household decision making. Research on the effect of household receiving domestic as well as international remittances concurrently on household spending and labour market participation is also required to avail a complete picture of the impact of remittances on the economic outcomes.

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APPENDICES

Appendix 1: Determinants of remittances in Kenya

Table A1: OLS regression results for imputation of household income

Variable	Coefficient
Household head age in years	-0.0048
	(0.0048)
Household head age squared	0.00003
	(0.00004)
Household head gender	0.0767
	(0.0553)
Household head has primary education	0.1827*
	(0.1093)
Household head has secondary education	-(0.0471)
	(0.1299)
Household head has tertiary education	0.3032**
	(0.1139)
Household head is employed	-0.1996***
	(0.0674)
Proportion of household members >15 years having primary education	0.0106***
	(0.0012)
Proportion of household members > 15 years having secondary education	0.0060***
	(0.0011)
Proportion of household members > 15 years having tertiary education	0.0133***
	(0.0013)
Household owns land	-0.2928***
	(0.0570)
Constant	8.0019
	(0.2044)
R-squared	0.3077
Adjusted R-squared	0.3041
Number of observations	2101

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Standard errors are in parenthesis*

Table A2: Heckman regression results for identifying exclusion restriction variable

Explanatory variables	Probit estimate	Remittance Amounts (OLS)
Migrant age in years	0.0483***	0.1074***
	(0.0190)	(0.0347)
Age squared	-0.0005**	-0.0011**
	(0.0002)	(0.0004)
Migrant gender	0.0268*	0.1985*
	(0.0549)	(0.119)
Migrant marital status	0.2346***	0.0233
	(0.0697)	(0.1479)
Migrant has primary education	-0.0090	0.1138
	(0.1338)	(0.2018)
Migrant has secondary education	0.2732**	0.4049*
	(0.1355)	(0.2093)
Migrant has tertiary education	0.1595	0.5980**
	(0.1289)	(0.1938)
Duration of migration in years	0.0117***	0.0542**
	(0.0148)	(0.0226)
Duration of migration squared	-0.0007**	-0.0014*
	(0.0005)	(0.0008)
Employment status of migrant	1.1653***	1.3205*
	(0.1023)	(0.6339)
Household head age in years	-0.0019	-0.0088**
	(0.0019)	(0.0032)
Household head gender	0.2405***	0.2340
	(0.0664)	(0.1498)
Employment status of household head	-0.2441**	-0.2719*
	(0.0934)	(0.1570)
Number of household members	0.0072	0.0147
	(0.0168)	(0.0265)
Household income	-0.2410***	0.2174
	(0.0696)	(0.1612)
Proportion of children <15 years living in household	0.0010	0.0021**
	(0.0015)	(0.0027)
Location of the household	-0.1681***	-0.2356**
	(0.0571)	(0.1353)
International migrant	0.3748***	1.7320***
	(0.0555)	(0.1947)
Household has multiple migrants	-0.3826***	-0.6515***
	(0.0706)	(0.1864)
Constant	-1.5604**	-0.0547
	(0.7269)	(2.0622)
Mills lambda	1.5838*	
	(0.7743)	
Rho (ρ)	0.8613	
Sigma (σ)	1.8389	
Number of observations	2108	
Censored observations	1074	
Uncensored observations	1034	
Wald chi^2 (20)	347.49	
	(0.0000)	

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Standard errors are in parenthesis*

Table A3: Heckman regression results for the determinants of remittances

Explanatory variables	Probit estimate	Remittance Amounts (OLS)
Migrant age in years	0.0483**	0.1056**
	(0.0220)	(0.0425)
Age squared	-0.0005 *	-0.0011**
	(0.0003)	(0.0005)
Migrant gender	0.0268	0.1999*
	(0.0734)	(0.1193)
Migrant marital status	0.2346***	
	(0.0787)	
Migrant has primary education	-0.0090	0.1159
	(0.1112)	(0.1735)
Migrant has secondary education	0.2732**	0.3941*
	(0.1236)	(0.2012)
Migrant has tertiary education	0.1595	0.5906***
	(0.1117)	(0.1794)
Duration of migration in years	0.0117	0.0536***
	(0.0119)	(0.0201)
Duration of migration squared	-0.0007*	-0.0014**
	(0.0004)	(0.0007)
Employment status of migrant	1.1653***	1.2394**
	(0.1068)	(0.4824)
Household head age in years	-0.0019	-0.0088***
	(0.0019)	(0.0030)
Household head gender	0.2444***	0.2214
	(0.0773)	(0.1483)
Employment status of household head	-0.2441***	-0.2596
	(0.0915)	(0.1687
Number of household members	0.0072	0.0143
	(0.0156)	(0.0224)
Household income	-0.2410***	0.2310*
	(0.0550)	(0.1408)
Proportion of children <15 years living in household	0.0010	0.0020
	(0.0016)	(0.0028)
Location of the household	0.1681**	-0.2451**
	(0.0663)	(0.1102)
International migrant	0.3748***	1.7113***
	(0.0665)	(0.1772)
Household has multiple migrants	-0.3826***	-0.6316***
	(0.0659)	(0.1852)
Constant	-1.5604**	0.2519
	0.6822	1.8113
Mills lambda	1.4825	
	(0.6244)	
Rho (ρ)	0.8264	
Sigma (σ)	1.7940	
Number of observations	2.108	
Censored observations	1,074	
Uncensored observations	1.034	
Wald chi^2 (20)	547.80	
	(0.0000)	

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Standard errors are in parenthesis*

Table A4: Heckman regression results for identifying exclusion restriction in model for th determinants of international remittances

Explanatory variables	Probit estimate	Remittance Amounts (OLS)
Migrant age in years	0.0432*	0.0960**
	(0.0229)	(0.0461)
Age squared	-0.0005*	-0.0011*
	(0.0003)	(0.0005)
Migrant gender	-0.0137	0.2147
	(0.1061)	(0.1960)
Migrant marital status	0.2882***	0.2846
	(0.1046)	(0.2547)
Migrant has primary education	0.1622	0.0017
	(0.2036)	(0.3443)
Migrant has secondary education	0.6716***	0.5721
	(0.1907)	(0.5175)
Migrant has tertiary education	0.3972**	0.4709
	(0.1825)	(0.4209)
Duration of migration in years	0.3972	0.0637*
	(0.1825)	(0.0380)
Duration of migration squared	-0.0001	-0.0014
	(0.0006)	(0.0013)
Employment status of migrant	1.1965***	2.1586**
	(0.1373)	(0.8682)
Household head age in years	-0.0038	-0.0029
	(0.0027)	(0.0046)
Household head gender	0.1531*	0.3266
	(0.0943)	(0.2116)
Employment status of household head	-0.1169	-0.0836
	(0.1494)	(0.2708)
Number of household members	0.0368	0.0454
	(0.0271)	(0.0520)
Household income	-0.2983***	0.2515
	(0.0883)	(0.2579)
Proportion of children <15 years living in household	0.0002	0.0068
	(0.0028)	(0.0052)
Location of the household	0.0578	-0.3478*
	(0.1029)	(0.1931)
Household has multiple migrants	-0.4071***	-0.9481***
	(0.1060)	(0.2949)
Constant	-0.5475	0.3604
	1.1110	2.7657
Mills lambda	2.7489**	
	1.1143	
Rho (ρ)	1.0000	
Sigma (σ)	2.7489	
Number of observations	1,001	
Censored observations	445	
Uncensored observations	556	
Wald chi^2 (20)	58.59	
	(0.0000)	

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Standard errors are in parenthesis*

Table A5: Heckman regression results for the determinants of international remittances

Explanatory variables	Probit estimate	Remittance Amounts (OLS)
Migrant age in years	0.0432*	0.0844*
	(0.0267)	(0.0512)
Age squared	-0.0005	-0.0009
	(0.0003)	(0.0007)
Migrant gender	-0.0137	0.2533*
	(0.0943)	(0.1500)
Migrant marital status	0.2882**	
	(0.1142)	
Migrant has primary education	0.1622	-0.0844
	(0.2296)	(0.3514)
Migrant has secondary education	0.6716***	0.2172
	(0.2105)	(0.4301)
Migrant has tertiary education	0.3972**	0.2598
	(0.2163)	(0.3692)
Duration of migration in years	0.0053	0.0633*
	(0.0203)	(0.0346)
Duration of migration squared	-0.0001	-0.0014
	(0.0007)	(0.0014)
Employment status of migrant	1.1965***	1.3021*
	(0.1094)	(0.6813)
Household head age in years	-0.0038	-0.0014
	(0.0028)	(0.0045)
Household head gender	0.1531	0.2542
	(0.1000)	(0.1842)
Employment status of household head	-0.1169	-0.0291
	(0 .1229)	(0.22214)
Number of household members	0.0368	0.0268
	(0.0258)	(0.0429)
Household income	-0.2983***	0.4241*
	(0.0819)	(0.2277)
Proportion of children <15 years living in household	0.0002	0.0070*
	(0.0030)	(0.0040)
Location of the household	0.0578	-0.3959**
	(0.1081)	(0.1858)
Household has multiple migrants	-0.4071***	-0.7350***
	(0.0987)	(0.2360)
Constant	-0.5475	1.7840
	(0.9613)	2.2050
Mills lambda	1.6541**	
	(0 .8340)	
Rho (ρ)	0.8941	
Sigma (σ)	1.8500	
Number of observations	1,001	
Censored observations	445	
Uncensored observations	556	
Wald chi^2 (20)	78.09	
	(0.0000)	

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Standard errors are in parenthesis*

Table A6: Heckman regression results for identifying exclusion restriction in model for the determinants of internal remittances

Explanatory variables	Probit estimate	Remittance Amounts (OLS)
Migrant age in years	0.0487	0.1435*
	(0.0333)	(0.0799)
Age squared	-0.0004	-0.0013
	(0.0005)	(0.0009)
Migrant gender	0.1000	0.1449
	(0.1080)	(0.2044)
Migrant marital status	0.1766*	-0.1374
	(0.0980)	(0.2657)
Migrant has primary education	-0.1287	0.4017
	(0.1489)	(0.3581)
Migrant has secondary education	-0.0488	0.6170*
	(0.1465)	(0.3375)
Migrant has tertiary education	-0.0013	1.1276***
	(0.1478)	(0.3191)
Duration of migration in years	0.0389*	0.0349
	(0.0214)	(0.0568)
Duration of migration squared	-0.0019***	-0.0010
	(0.0007)	(0.0027)
Employment status of migrant	1.2048***	1.1915
	(0.1410)	1.6915
Household head age in years	-0.0003	-0.0211*
	(0.0031)	(0.006)
Household head gender	0.3706***	0.1231
	(0.1067)	(0.4110)
Employment status of household head	-0.3901**	-0.5944
	(0.1663)	(0.4656)
Number of household members	-0.0180	0.0028
	(0.0234)	(0.0493)
Household income	-0.1840*	-0.2789
	(0.1003)	(0.3170)
Proportion of children <15 years living in household	-0.3855	-0.0068
	(0.1214)	(0.0046)
Location of the household	0.2796***	-0.1414
	(0.0912)	(0.3340)
Household has multiple migrants	-0.3855***	-0.4080
	(0.1214)	(0.4069)
Constant	-1.5668	6.8779
	1.0933	4.5419
Mills lambda	1.1986	
	1.9145	
Rho (ρ)	0.7366	
Sigma (σ)	1.6272	
Number of observations	1,107	
Censored observations	629	
Uncensored observations	478	
Wald chi^2 (20)	109.45	
	(0.0000)	

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Standard errors are in parenthesis*

Table A7: Heckman regression results for determinants of internal remittances

Explanatory variables	Probit estimate	Remittance Amounts (OLS)
Migrant age in years	0.0487	0.1613**
	(0.0337)	(0.0686)
Age squared	-0.0004	-0.0015*
	(0.0004)	(0.0008)
Migrant gender	0.1000	0.1727
	(0.0944)	(0.1852)
Migrant marital status	0.1766*	
	(0.0932)	
Migrant has primary education	-0.1287	0.3465
	(0.1587)	(0.2863)
Migrant has secondary education	-0.0488	0.6003**
	(0.1675)	(0.3301)
Migrant has tertiary education	-0.0013	1.1323***
	(0.1687)	(0.3082)
Duration of migration in years	0.0389**	0.0520
	(0.0178)	(0.0416)
Duration of migration squared	-0.0019***	-0.0018
	(0.0006)	(0.0018)
Employment status of migrant	1.2048***	1.8286*
	(0.1535)	(1.0473)
Household head age in years	-0.0003	-0.0210***
	(0.0033)	(0.0055)
Household head gender	0.3706***	0.2820
	(0.1061)	(0.3140)
Employment status of household head	-0.3901***	-0.7551**
	(0.1254)	(0.3499)
Number of household members	-0.0180	-0.0036
	(0.0224)	(0.0427)
Household income	-0.1840*	-0.3627
	(0.0976)	(0.2355)
Proportion of children <15 years living in household	0.0005	-0.0069
	(0.0027)	(0.0049)
Location of the household	0.2796***	-0.0249
	(0.0997)	(0.2101)
Household has multiple migrants	-0.3855***	-0.5554**
	(0.0945)	(0.2730)
Constant	-1.5668	5.3539*
	(1.0326)	(3.2354)
Mills lambda	1.9428*	
	(1.1782)	
Rho (ρ)	0.9782	
Sigma (σ)	1.9862	
Number of observations	1,107	
Censored observations	629	
Uncensored observations	478	
Wald chi^2 (20)	125.68	
	(0.0000)	

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Standard errors are in parenthesis*

Appendix 2: Effect of Remittances on Household Expenditure Allocation

Table A8: Description of the expenditure categories

Expenditure category	Description
Food	Grains, tubers, legumes, vegetables, meat, fruits
Consumed and durables (CD)	Entertainment, clothing, footwear, mobile phones, computer, utilities (e.g. gas, water, electricity kerosene, mobile phones), luxuries, appliances, vehicles, electronic goods.
Education	School fee, books, uniforms and supplies
Health	Hospital fee, doctor fee, drugs and medicine
Investment	productive assets, farming equipment, setting up a business
Housing and land	House and land purchase, home improvement, rent, mortgage and loan repayment
Other goods	For example, expenditure on wedding, engagement and funeral.

Source: Author's computations based on 2009 World Bank Household Survey for the African Migration Project for Kenya

Table A9: Descriptive statistics for variables used in household expenditure mod according to the source of remittances

Variable	HHs without remittances	HHs with internal remittances	HHs with external remittances	All HHs Mean	Differenc in means
	N=1156 Mean	N=305 Mean	N=385 Mean	N=1929 Mean	
Food	0.477 (0.259)	0.494 (0.255)	0.388 (0.249)	0.459 (0.259)	0.046***
Education	0.076 (0.134)	0.066 (0.148)	0.072 (0.162)	0.080 (0.137)	-0.011
Health	0.031 (0.071)	0.051 (0.064)	0.059 (0.119)	0.036 (0.081)	-0.013***
Investments	0.013 (0.059)	0.012 (0.131)	0.023 (0.177)	0.015 (0.065)	-0.004
Consumer durables	0.268 (0.212)	0.244 (0.211)	0.271 (0.223)	0.267 (0.216)	0.002
Housing	0.118 (0.165)	0.114 (0.159)	0.166 (0.202)	0.122 (0.169)	-0.010
Others	0.017 (0.054)	0.019 (0.100)	0.021 (0.135)	0.021 (0.069)	-0.010***
Proportion of children (0-5) years	10.410 (15.324)	10.581 15.553)	8.034 (14.251)	9.782 (15.045)	1.570**
Proportion of children (6-15) years	16.867 (20.150)	22.425 (22.377)	16.533 (20.572)	17.603 (20.681)	-1.841*
Proportion of male >15 years	36.564 (28.570)	26.430 (26.566)	30.769 (25.891)	33.933 (27.893)	6.554***
Proportion of female >15 years	34.240 (24.437)	37.010 (23.242)	41.570 (23.971)	36.240 (24.091)	-5.115***
Proportion of household members >15 years having primary education	61.321 (30.446)	52.690 (30.850)	59.538 (32.340)	59.803 (31.027)	3.795**
Proportion of household members >15 years having secondary education	40.725 (37.048)	28.476 (32.980)	39.780 (34.999)	38.706 (36.063)	5.050***
Proportion of household members >15 years having university education	9.298 (24.586)	1.896 (10.820)	8.755 (21.991)	7.761 (22.066)	3.843***
Proportion of elderly in the household (>65 years)	6.135 (15.629)	9.332 (18.187)	12.450 (23.281)	8.238 (18.132)	-5.260***
Age of the household head in years	44.936 (14.512)	50.009 (16.372)	51.909 (17.231)	47.732 (15.806)	-6.993***
Gender of the household head	0.766 (0.424)	0.472 (0.500)	0.582 (0.494)	0.678 (0.467)	0.220***
Household head working status	0.777 (0.417)	0.754 (0.431)	0.758 (0.429)	0.699 (0.459)	0.195***
Location of household	0.465 (0.499)	0.610 (0.489)	0.535 (0.499)	0.511 (0.500)	-0.114***
Households owns agricultural land	0.571 (0.495)	0.748 (0.435)	0.642 (0.480)	0.627 (0.484)	-0.141***
Household size	4.202 (2.381)	4.361 (2.114)	4.231 (2.321)	4.294 (2.339)	-0.230***
Total per-capita expenditure (Ksh '000)	16.922 (56.746)	5.499 (8.044)	14.695 (30.024)	14.691 (4.751)	5.581***
Migration rate	63.412 (0.388)	67.121 (10.754)	68.688 (11.426)	65.351 (12.605)	-4.835***

*Source: Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10% respectively. Robust standard errors are in parenthesis*

Table A10: FMNL results for the effect of international remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.
Proportion of children (0-5) years	0.0163	-0.0094	0.0397**	0.0140	0.0544**	0.0253
	(0.0154)	(0.0171)	(0.0181)	(0.0157)	(0.0257)	(0.0165)
Proportion of children (6-15) years	0.0171	0.0067	0.0357**	0.0115	0.0541**	0.0278*
	(0.0147)	(0.0161)	(0.0172)	(0.0151)	(0.0261)	(0.0160)
Proportion of male >15 years	0.0155	-0.0163	0.0177	0.0084	0.0235	0.0202
	(0.0147)	(0.0164)	(0.0173)	(0.0151)	(0.0269)	(0.0160)
Proportion of female >15 years	0.0150	-0.0117	0.0246	0.0105	0.0308	0.0228
	(0.0147)	(0.0167)	(0.0171)	(0.0153)	(0.0271)	(0.0163)
Proportion of HH >15 years with primary education	0.0009	0.0042	0.0078	0.0019	0.0085	0.0036
	(0.0060)	(0.0073)	(0.0065)	(0.0061)	(0.0104)	(0.0063)
Proportion of HH >15 years with secondary education	0.0051	0.0158***	-0.0004	0.0086*	0.0105	0.0043
	(0.0034)	(0.0040)	(0.0041)	(0.0035)	(0.0067)	(0.0036)
Proportion of HH>15 years with tertiary education	-0.0026	0.0000	-0.0022	-0.0050	-0.0173*	-0.0041
	(0.0047)	(0.0051)	(0.0052)	(0.0047)	(0.0089)	(0.0048)
Proportion of HH >65 years	0.0060	-0.0090	0.0133**	0.0070	0.0043	0.0017
	(0.0061)	(0.0069)	(0.0065)	(0.0061)	(0.0111)	(0.0063)
Age of the household head in years	-0.0151**	-0.0056	0.0033	-0.0241***	-0.0282**	-0.0166**
	(0.0073)	(0.0082)	(0.0084)	(0.0072)	(0.0128)	(0.0078)
Gender of the household head	0.0611	-0.0726	0.1186	0.0701	0.1004	0.0014
	(0.2389)	(0.2698)	(0.2840)	(0.2426)	(0.4051)	(0.2549)
Household head working status	-0.0028	-0.0031	-0.0087	-0.0049	0.0067	-0.0030
	(0.0056)	(0.0064)	(0.0057)	(0.0056)	(0.0085)	(0.0060)
Location of household	-0.4845**	-0.2437	-0.1337	-0.5013**	0.2384	-0.5972***
	(0.2129)	(0.2376)	(0.2458)	(0.2155)	(0.3808)	(0.2307)
Households owns agricultural land	-1.5041***	-1.2056***	-0.9395***	-1.3567***	-0.4406	0.9401***
	(0.2149)	(0,2337)	(0.2585)	(0.2150)	(0.4199)	(0.2277)
Household size	-0.0775*	0.0918*	-0.0257	0.0047	0.0446	-0.0143
	(0.0436)	(0.0481)	(0.0517)	(0.0441)	(0.0793)	(0.0467)
Log of total per-capita expenditure	-0.6831***	-0.0828	0.0297	-0.0338	0.3019**	0.0698
	(0.0894)	(0.1048)	(0.1078)	(0.0893)	(0.1385)	(0.0923)
Receive external remittance	-0.2639	2.1104	1.5487	1.4483	-2.8501	1.4432
	(1.1904)	(1.3292)	(1.4693)	(1.1945)	(0.2451)	(1.2803)
Log of total per-capita expenditure*external remittance	0.0231	-0.2478*	-0.1761	-0.1737	0.2646	-0.1808
	(0.1383)	(0.1531)	(0.1703)	(0.1375)	(0.2451)	(0.1476)
Constant	9.9945***	3.4374**	-1.8648	4.3759***	-6.1532**	1.1989
	(1.5596)	(1.7341)	(1.8359)	(1.5897)	(2.4690)	(1.6996)
Wald $chi^2(102)$	1441.76***					
	(0.0000)					
Log pseudolikelihood	-1844.31					
Number of observations	1371					

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively*
Robust standard errors are in parenthesis

Table A11: FMNL results for the effect of internal remittance on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.
Proportion of children (0-5) years	-0.0126	-0.0444***	0.0063	-0.0184	-0.0008	0.0002
	(0.0147)	(0.0159)	(0.0159)	(0.0150)	(0.0270)	(0.0163)
Proportion of children (6-15) years	0.0050	-0.0086	0.0178	-0.0001	0.0072	0.0171
	(0.0129)	(0.0141)	(0.0146)	(0.0131)	(0.0263)	(0.0147)
Proportion of male >15 years	0.0150	-0.0143	0.0216	0.0088	0.0016	0.0185
	(0.0155)	(0.0171)	(0.0170)	(0.0159)	(0.0276)	(0.0170)
Proportion of female >15 years	0.0081	-0.0219	0.0148	0.0030	-0.0034	0.0101
	(0.0147)	(0.0162)	(0.0161)	(0.0150)	(0.0259)	(0.0163)
Proportion of HH >15 years with primary education	-0.0005	-0.0007	0.0003	-0.0009	0.0007	0.0016
	(0.0058)	(0.0069)	(0.0064)	(0.0061)	(0.0094)	(0.0062)
Proportion of HH >15 years with secondary education	-0.0030	0.0101**	-0.0068	-0.0003	-0.0012	-0.0002
	(0.0046)	(0.0050)	(0.0046)	(0.0047)	(0.0069)	(0.0047)
Proportion of HH >15 years with tertiary education	-0.0066	-0.0078	-0.0031	-0.0104	-0.0258**	-0.0066
	(0.0069)	(0.0078)	(0.0072)	(0.0069)	0.0127)	(0.0071)
Proportion of HH >65 years	0.0069	-0.0091	0.0112*	0.0062	-0.0072	0.0106
	(0.0064)	(0.0076)	(0.0065)	(0.0065)	(0.0135)	(0.0069)
Age of the household head in years	-0.0200	-0.0051	-0.0022	-0.0349***	-0.0262*	-0.0205**
	(0.0076)	(0.0091)	(0.0091)	(0.0078)	(0.0143)	(0.0082)
Gender of the household head	0.1574	-0.0407	0.1400	-0.0040	0.9467**	0.0175
	(0.2637)	(0.2929)	(0.3121)	(0.2699)	(0.4289)	(0.2786)
Household head working status	0.0038	0.0122*	0.0036	0.0022	0.0119	0.0116**
	(0.0056)	(0.0069)	(0.0044)	(0.0058)	0.0087)	(0.0056)
Location of household	-0.5998	-0.3638	-0.0663	-0.5507**	-0.4117	-0.591**
	(0.2387)	(0.2626)	(0.2556)	(0.2440)	(0.3961)	(0.2535)
Households owns agricultural land	-1.2307	-0.9660***	-0.8309***	-1.0371***	0.2576	-1.030***
	(0.2154)	(0.2367)	(0.2502)	(0.2183)	(0.4060)	(0.2262)
Household size	*-0.0510*	*0.1232***	*-0.0271*	*0.0318*	*0.0948*	*-0.0067*
	(0.0493)	(0.0555)	(0.0572)	(0.0511)	(0.0868)	(0.0522)
Log of total per-capita expenditure	-0.5795	-0.1336	-0.1000	0.1171	-6.0595***	0.0894
	(0.1029)	(0.1203)	(0.1108)	(0.1048)	(3.0860)	(0.1091)
Receive internal remittance	2.7298	1.2350	2.0722	1.8329	2.8233	1.5577
	(1.5653)	(1.6988)	(1.6990)	(1.6341)	(2.8522)	(1.7332)
Log of total per-capita expenditure*internal remittance	-0.3488	-0.1336	-0.2974	-0.2367	-0.2994	-0.1969
	(0.1980)	(0.1203)	(0.2150)	(0.2054)	(0.3491)	(0.2168)
Constant	10.4215	5.1867***	0.7959	4.7942***	-6.0595**	2.4526
	(1.4338)	(1.6522)	(1.7085)	(1.4652)	(3.0860)	(1.6008)
Wald chi^2(102)	1369.60***					
	(0.0000)					
Log pseudolikelihood	-1554.66					
Number of observations	1221					

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively*
Robust standard errors are in parenthesis

Table A12: Probit regression results for the determinants of international remittances

Variable	Probit estimate
Proportion of children (0-5) years	-0.0087
	(0.0058)
Proportion of children (6-15) years	-0.0084
	(0.0056)
Proportion of male >15 years	-0.0066
	(0.0057)
Proportion of female >15 years	-0.0060
	(0.0055)
Proportion of HH>15 years with primary education	-0.0022
	(0.0023)
Proportion of HH >15 years with secondary education	-0.0015
	(0.0017)
Proportion of HH>15 years with tertiary education	-0.0040**
	(0.0020)
Proportion of HH >65 years	0.0023
	(0.0025)
Age of the household head in years	0.0879***
	(0.0313)
Gender of the household head	-0.4450***
	(0.1013)
Household head working status	0.0072***
	(0.0027)
Location of household	0.0976
	(0.0907)
Households owns agricultural land	0.0328
	(0.0911)
Household size	0.1506*
	(0.0871)
Log of total per-capita expenditure	0.2212***
	(0.0372)
Migration networks	0.0181***
	(0.0032)
Constant	-3.3173***
	(0.6567)
LR $chi^2(16)$	179.93***
	(0.0000)
Pseudo R^2	0.1112
Log likelihood	-719.28
Number of observations	1371

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively*
Standard errors are in parenthesis

Table A13: Probit regression results for the determinants of internal remittances

Variable	Probit estimate
Proportion of children (0-5) years	-0.0095
	(0 .0062)
Proportion of children (6-15) years	-0.0102*
	(0.0061)
Proportion of male >15 years	-0.0121*
	(0.0065)
Proportion of female >15 years	-0.0158**
	(0.0062
Proportion of HH >15 years with primary education	0.0038
	(0.0025)
Proportion of HH >15 years with secondary education	-0.0020
	(0.0018)
Proportion of HH>15 years with tertiary education	-0.0080**
	(0.0035)
Proportion of HH >65 years	0.0001
	(0.0030)
Age of the household head in years	0.1800***
	(0.0371)
Gender of the household head	-0.9415***
	(0.1107)
Household head working status	0.0055*
	(0.0030)
Location of household	0.1151
	(0.0971)
Households owns agricultural land	0.2931***
	(0.1029)
Household size	0.0111
	(0.1027)
Log of total per-capita expenditure	0.0846 *
	(0.0495)
Migration networks	0.0161***
	(0.0038)
Constant	-1.9277**
	(0.7963)
LR $chi^2(16)$	218.77***
	(0.0000)
Pseudo R^2	0.1596
Log likelihood	-575.85
Number of observations	1221

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Standard errors are in parenthesis*

Table A14: FMNL results for the effect of international remittance on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.
Proportion of children (0-5) years	0.0160 (0.0192)	-0.0101 (0.0182)	0.0408** (0.0206)	0.0132 (0.0188)	0.0573** (0.0287)	0.0226 (0.0205)
Proportion of children (6-15) years	0.0168 (0.0183)	0.0063 (0.0168)	0.0373* (0.0194)	0.0102 (0.0173)	0.0600** (0.0271)	0.0241 (0.0203)
Proportion of male >15 years	0.0158 (0.0169)	-0.0157 (0.0166)	0.0193 (0.0192)	0.0080 (0.0163)	0.0257 (0.0289)	0.0181 (0.0190)
Proportion of female >15 years	0.0146 (0.0162)	-0.0126 (0.0166)	0.0248 (0.0197)	0.0098 (0.0160)	0.0325 (0.0291)	0.0209 (0.0188)
Proportion of HH>15 years with primary education	0.0007 (0.0057)	0.0040 (0.0081)	0.0083 (0.0060)	0.0015 (0.0056)	0.0115 (0.0109)	0.0024 (0.0057)
Proportion of HH>15 years with secondary education	0.0057* (0.0033)	0.0167*** (0.0040)	0.0002 (0.0037)	0.0092*** (0.0034)	0.0099 (0.0076)	0.0050 (0.0039)
Proportion of HH>15 years with tertiary education	-0.0021 (0.0058)	0.0009 (0.0063)	-0.0009 (0.0064)	-0.0048 (0.0059)	-0.0152 (0.0111)	-0.0045 (0.0059)
Proportion of HH >65 years	0.0062 (0.0061)	-0.0094 (0.0072)	0.0120* (0.0063)	0.0076 (0.0055)	0.0002 (0.0134)	0.0040 (0.0060)
Age of the Household head in years	-0.0149** (0.0070)	-0.0057 (0.0081)	0.0021 (0.0084)	-0.0227*** (0.0070)	-0.0374*** (0.0135)	-0.0127 (0.0080)
Gender of the Household head	0.0317 (0.2741)	-0.1120 (0.3064)	0.1448 (0.3412)	0.0075 (0.2745)	0.5249 (0.5010)	-0.1536 (0.2810)
Household head working status	-0.0028 (0.0073)	-0.0028 (0.0087)	-0.0097 (0.0071)	-0.0035 (0.0068)	-0.0028 (0.0651)	0.0006 (0.0082)
Location of household	-0.4853** (0.2364)	-0.2582 (0.2693)	-0.1720 (0.3153)	-0.4804** (0.2331)	0.0711 (0.3911)	-0.5227* (0.2685)
Households owns agricultural land	-1.5008*** (0.2175)	-1.2055*** (0.2365)	-0.9445*** (0.2774)	-1.3577*** (0.2224)	-0.5242 (0.3617)	-0.9347*** (0.2318)
Household size	-0.0776 (0.0569)	0.0889* (0.0547)	-0.0397 (0.0677)	0.0115 (0.0561)	-0.0025 (0.0939)	0.0094 (0.0470)
Log of total per-capita expenditure	-0.8367*** (0.1740)	-0.3406 (0.2035)	-0.1920 (0.1902)	-0.1448 (0.1798)	0.3133 (0.2927)	-0.0062 (0.1784)
Receive external remittance	-5.1938 (0.3651)	-5.0382* (5.1483)	-1.8965 (5.9037)	-3.5681 (4.4725)	11.3653 (8.1700)	-6.7955 (4.8894)
Log of total per-capita expenditure*external remittance	0.5824 (0.3651)	0.5817 (0.4998)	0.3159 (0.5583)	0.3304 (0.3978)	-0.8429 (0.7949)	0.5361 (0.4386)
Constant	11.2910*** (2.2448)	5.6528** (2.4529)	-0.1513 (2.4839)	5.4066** (2.3540)	-6.9040* (4.0825)	2.1611 (2.5772)
Wald chi²(102)	1407.33*** (0.0000)					
Log pseudolikelihood	-1844.92					
Number of observations	1371					

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively Bootstrapped standard errors are in parenthesis.*

Table A15: FMNL results for the effect of international remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.
Proportion of children (0-5) years	0.0160	-0.0101	0.0408**	0.0132	0.0573**	0.0226
	(0.0162)	(0.0177)	(0.0187)	(0.0165)	(0.0260)	(0.0173)
Proportion of children (6-15) years	0.0168	0.0063	0.0373*	0.0102	0.0600**	0.0241
	(0.0157)	(0.0170)	(0.0179)	(0.0160)	(0.0268)	(0.0169)
Proportion of male >15 years	0.0158	-0.0157	0.0193	0.0080	0.0257	0.0181
	(0.0156)	(0.0171)	(0.0180)	(0.0160)	(0.0275)	(0.0168)
Proportion of female >15 years	0.0146	-0.0126	0.0248	0.0098	0.0325	0.0209
	(0.0155)	(0.0171)	(0.0176)	(0.0159)	(0.0274)	(0.0169)
Proportion of HH >15 years with primary education	0.0007	0.0040	0.0083	0.0015	0.0115	0.0024
	(0.0065)	(0.0078)	(0.0069)	(0.0066)	(0.0109)	(0.0067)
Proportion of HH>15 years with secondary education	0.0057*	0.0167***	0.0002	0.0092***	0.0099	0.0050
	(0.0034)	(0.0039)	(0.0040)	(0.0035)	(0.0069)	(0.0037)
Proportion of HH >15 years with tertiary education	-0.0021	0.0009	-0.0009	-0.0048	-0.0152	-0.0045
	(0.0047)	(0.0052)	(0.0053)	(0.0047)	(0.0089)	(0.0048)
Proportion of HH >65 years	0.0062	-0.0094	0.0120*	0.0076	0.0002	0.0040
	(0.0066)	(0.0073)	(0.0069)	(0.0066)	(0.0115)	(0.0060)
Age of the household head in years	-0.0149**	-0.0057	0.0021	-0.0227***	-0.0374***	-0.0127
	(0.0077)	(0.0092)	(0.0086)	(0.0070)	(0.0144)	(0.0084)
Gender of the household head	0.0317	-0.1120	0.1448	0.0075	0.5249	-0.1536
	(0.2809)	(0.3183)	(0.3412)	(0.2857)	(0.5010)	(0.2957)
Household head working status	-0.0028	-0.0028	-0.0097	-0.0035	-0.0028	0.0006
	(0.0064)	(0.0074)	(0.0065)	(0.0064)	(0.0103)	(0.0068)
Location of household	-0.4853**	-0.2582	-0.1720	-0.4804**	0.0711	-0.5227*
	(0.2374)	(0.2608)	(0.2630)	(0.2401)	(0.3944)	(0.2539)
Households owns agricultural land	-1.5008***	-1.2055***	-0.9445***	-1.3577***	-0.5242	-0.9347***
	(0.2162)	(0.2351)	(0.2774)	(0.2166)	(0.4098)	(0.2293)
Household size	-0.0776	0.0889*	-0.0397	0.0115	-0.0025	0.0094
	(0.0505)	(0.0554)	(0.0584)	(0.0512)	(0.0857)	(0.0526)
Log of total per-capita expenditure	-0.8367***	-0.3406	-0.1920	-0.1448	0.3133	-0.0062
	(0.1668)	(0.1846)	(0.1841)	(0.1671)	(0.2468)	(0.1712)
Receive external remittance	-5.1938	-5.0382	-1.8965	-3.5681	11.3653	-6.7955
	(0.3556)	(4.9982)	(5.2933)	(4.4042)	(7.0966)	(4.5809)
Log of total per-capita expenditure*external remittance	0.5824	0.5817	0.3159	0.3304	-0.8429	0.5361
	(0.3938)	(0.4349)	(0.4840)	(0.3939)	(0.6214)	(0.4069)
Constant	11.2910***	5.6528**	-0.1513	5.4066**	-6.9040**	2.1611
	(2.0036)	(2.7123)	(2.2939)	(2.0277)	(3.0197)	(2.1427)
Wald $chi^2(102)$	1407.33***					
	(0.0000)					
Log pseudolikelihood	-1844.93					
Number of observations	1371					

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Robust standard errors are in parenthesis.*

Table A16: FMNL results for the effect of internal remittance on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.
Proportion of children (0-5) years	0.0248*	-0.0552***	0.0010	-0.0351**	-0.0141	-0.0160
	(0.0150)	(0.0144)	(0.0165)	(0.0158)	(0.0333)	(0.0176)
Proportion of children (6-15) years	-0.0068	-0.0193	0.0131	-0.0163	-0.0066	0.0014
	(0.0136)	(0.0132)	(0.0155)	(0.0145)	(0.0304)	(0.0164)
Proportion of male >15 years	-0.0017	-0.0296*	0.0150	-0.0142	-0.0155	-0.0039
	(0.0176)	(0.0179)	(0.0199)	(0.0187)	(0.0343)	(0.0194)
Proportion of female >15 years	-0.0121	-0.0419**	0.0074	-0.0253	-0.0240	-0.0176
	(0.0192)	(0.0200)	(0.0225)	(0.0201)	(0.0343)	(0.0209)
Proportion of HH >15 years with primary education	0.0050	0.0044	0.0025	0.0066	0.0052	0.0089
	(0.0056)	(0.0073)	(0.0071)	(0.0059)	(0.0114)	(0.0059)
Proportion of HH >15 years with secondary education	-0.0063	0.00700	-0.0082*	-0.0048	-0.0046	-0.0046
	(0.0048)	(0.0053)	(0.0047)	(0.0050)	(0.0078)	(0.0050)
Proportion of HH >15 years with tertiary education	-0.0189***	-0.0163**	-0.0125	-0.0258***	-0.0411*	-0.0212***
	(0.0072)	(0.0073)	(0.0085)	(0.0071)	(0.0202)	(0.0078)
Proportion of HH >65 years	0.0031	-0.0128*	0.0091	0.0010	-0.0097	0.0058
	(0.0067)	(0.0079)	(0.0063)	(0.0063)	(0.0179)	(0.0077)
Age of the Household head in years	-0.0093	0.0066	0.0091	-0.0195	-0.0137	-0.0052
	(0.0125)	(0.0128)	(0.0135)	(0.0125)	(0.0212)	(0.0118)
Gender of the Household head	-0.8464	-1.0906*	-0.2597	-1.4004**	-0.1209	-1.3553**
	(0.5683)	(0.6775)	(0.6852)	(0.5868)	(1.4153)	(0.5906)
Household head working status	0.0049	0.0142**	0.0024	0.0040	0.0120	0.0134**
	(0.0067)	(0.0070)	(0.0055)	(0.0070)	(0.0412)	(0.0064)
Location of household	-0.5950**	-0.3588	-0.0776	-0.5425**	-0.3813	-0.5810**
	(0.2524)	(0.2584)	(0.2887)	(0.2645)	(0.3307)	(0.2398)
Households owns agricultural land	-0.9487***	-0.6762**	-0.7175***	-0.6434***	0.5920	-0.6447**
	(0.2644)	(0.3068)	(0.2631)	(0.2833)	(0.5128)	(0.2777)
Household size	-0.0867*	0.0860	-0.0428	-0.0189	0.0519	-0.0562
	(0.0537)	(0.0604)	(0.0696)	(0.0601	(0.0943)	(0.0507)
Log of total per-capita expenditure	-0.2872*	-0.0298	0.02136	0.4433***	1.1595***	0.3937**
	(0.1704)	(0.1841)	(0.1922)	(0.1696)	(0.3654)	(0.1840)
Receive internal remittance	22.3669**	9.5385	22.6973**	24.0500***	29.4098*	21.6789*
	(8.9805)	(10.1152)	(9.9940)	(9.2274)	(16.3041)	(10.1104)
Log of total per-capita expenditure*internal remittance	-3.5178***	-1.9385	-3.1597**	-4.00270***	-4.2573*	-3.7011***
	(1.1800)	(1.3860)	(1.3899)	(1.2167)	(2.2533)	(1.3091)
Constant	10.5691***	6.8133**	-0.6845	5.6461**	-6.8723	3.3992
	(2.5516)	(2.6692)	(2.8410)	(2.6006)	(5.3204)	(2.7095)
Wald chi^2 (102)	1403.18***					
	(0.0000)					
Log pseudolikelihood	-1553.37					
Number of observations	1221					

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively*
Bootstrapped standard errors are in parenthesis

Table A17: FMNL results for the effect of internal remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inv.	Hous.
Proportion of children (0-5) years	0.0248*	-0.0552***	0.0010	-0.0351**	-0.0141	-0.0160
	(0.0150)	(0.0162)	(0.0172)	(0.0153)	(0.0287)	(0.0164)
Proportion of children (6-15) years	-0.0068	-0.0193	0.0131	-0.0163	-0.0066	0.0014
	(0.0131)	(0.0145)	(0.0156)	(0.0133)	(0.0287)	(0.0148)
Proportion of male >15 years	-0.0017	-0.0296*	0.0150	-0.0142	-0.0155	-0.0039
	(0.0165)	(0.0183)	(0.0200)	(0.0168)	(0.0310)	(0.0177)
Proportion of female >15 years	-0.0121	-0.0419**	0.0074	-0.0253	-0.0240	-0.0176
	(0.0173)	(0.0076)	(0.0210)	(0.0201)	(0.0319)	(0.0187)
Proportion of HH >15 years with primary education	0.0050	0.0044	0.0025	0.0066	0.0052	0.0089
	(0.0062)	(0.0076)	(0.0070)	(0.0065)	(0.0102)	(0.0065)
Proportion of HH >15 years with secondary education	-0.0063	0.0070	-0.0082*	-0.0048	-0.0046	-0.0046
	(0.0048)	(0.0055)	(0.0047)	(0.0049)	(0.0074)	(0.0050)
Proportion of HH >15 years with tertiary education	-0.0189***	-0.0163**	-0.0125	-0.0258***	-0.0411*	-0.0212***
	(0.0069)	(0.0081)	(0.0076)	(0.0069)	(0.0143)	(0.0071)
Proportion of HH >65 years	0.0031	-0.0128*	0.0091	0.0010	-0.0097	0.0058
	(0.0066)	(0.0078)	(0.0068)	(0.0068)	(0.0136)	(0.0070)
Age of the Household head in years	-0.0093	0.0066	0.0091	-0.0195	-0.0137	-0.0052
	(0.0099)	(0.0119)	(0.0122)	(0.0102)	(0.0184)	(0.0107)
Gender of the Household head	-0.8464	-1.0906*	-0.2597	-1.4004**	-0.1209	-1.3553**
	(0.5348)	(0.6623)	(0.7152)	(0.5591)	(1.2190)	(0.5678)
Household head working status	0.0049	0.0142**	0.0024	0.0040	0.0120	0.0134**
	(0.0060)	(0.0072)	(0.0049)	(0.0070)	(0.0094)	(0.0060)
Location of household	-0.5950**	-0.3588	-0.0776	-0.5425**	-0.3813	-0.5810**
	(0.2365)	(0.2603)	(0.2558)	(0.2645)	(0.3869)	(0.2507)
Households owns agricultural land	-0.9487***	-0.6762**	-0.7175***	-0.6434***	0.5920	-0.6447**
	(0.2269)	(0.3068)	(0.2613)	(0.2333)	(0.4844)	(0.2409)
Household size	-0.0867*	0.0860	-0.0428	-0.0189	0.0519	-0.0584
	(0.0544)	(0.0592)	(0.0637)	(0.0563)	(0.0884)	(0.0507)
Log of total per-capita expenditure	-0.2872*	-0.0298	0.02136	0.4433***	1.1595***	0.3937**
	(0.1679)	(0.1968)	(0.1802)	(0.1708)	(0.2955)	(0.1734)
Receive internal remittance	22.3669**	9.5385	22.6973**	24.0500***	29.4098*	21.6789**
	(9.0912)	(10.2470)	(9.5131)	(9.3453)	(16.6308)	(9.3769)
Log of total per-capita expenditure*internal remittance	-3.5178***	-1.9385	-3.1597**	-4.00270***	-4.2573**	-3.7011***
	(1.2049)	(1.3735)	(1.2892)	(1.2437)	(1.8886)	(1.2373)
Constant	10.5691***	6.8133**	-0.6845	5.6461**	-6.8723	3.3992
	(2.1808)	(2.5139)	(2.6911)	(2.2531)	(4.3757)	(2.3888)
Wald chi^2(102)	1403.18***					
	(0.0000)					
Log pseudolikelihood	-1553.37					
Number of observations	1221					

*Source: Author's computation. Note: ***, ** and * show significance at 1%, 5% and 10%, respectively. Robust standard errors are in parenthesis*

Table A18: Probit regression results for the determinants of both external and internal remittances

Variable	Probit estimate
Proportion of children (0-5) years	-0.0067
	(0.0111)
Proportion of children (6-15) years	-0.0040
	(0.0104)
Proportion of male >15 years	-0.0016
	(0.0107)
Proportion of female >15 years	-0.0077
	(0.0107)
Proportion of HH >15 years with primary education	0.0058
	(0.0043)
Proportion of HH >15 years with secondary education	0.0019
	(0.0028)
Proportion of HH >15 years with tertiary education	-0.0110**
	(0.0044)
Proportion of HH >65 years	0.0026
	(0.0044)
Age of the Household head in years	0.2424***
	(0.0586)
Gender of the Household head	-0.5362***
	(0.1558)
Household head working status	0.0008
	(0.0055)
Location of household	0.1180
	(0.1460)
Households owns agricultural land	0.5268***
	(0.1720)
Household size	0.4725***
	(0.1498)
Log of total per-capita expenditure	0.2160***
	(0.0623)
Migration networks	0.0193***
	(0.0061)
Constant	-6.6202
	(1.2349)
LR $chi^2(16)$	146.21***
	(0.0000)
Pseudo R^2	0.2300
Log likelihood	-244.7941
Number of observations	1,244

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively.*

Table A19: FMNL results for the effect of external and internal remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inve.	Hous.
Proportion of children (0-5) years	0.0130	-0.0170	0.0377*	0.0103	0.0472*	0.0263
	(0.0187)	(0.0209)	(0.0219)	(0.0193)	(0.0294)	(0.0200)
Proportion of children (6-15) years	0.0178	0.0077	0.0364*	0.0132	0.0482*	0.0326
	(0.0189)	(0.0214)	(0.0213)	(0.0193)	(0.0289)	(0.0206)
Proportion of male >15 years	0.0220	-0.0057	0.0234	0.0159	0.0335	0.0292
	(0.0196)	(0.0217)	(0.0235)	(0.0205)	(0.0325)	(0.0209)
Proportion of female >15 years	0.0150	-0.0109	0.0240	0.0120	0.0357	0.0237
	(0.0189)	(0.0207)	(0.0222)	(0.0201)	(0.0295)	(0.0200)
Proportion of HH >15 years with primary education	-0.0023	-0.0007	0.0109	-0.0032	-0.0017	0.0011
	(0.0073)	(0.0078)	(0.0083)	(0.0072)	(0.0124)	(0.0074)
Proportion of HH >15 years with secondary education	0.0035	0.0146***	-0.0060	0.0063*	0.0043	0.0052
	(0.0041)	(0.0048)	(0.0043)	(0.0039)	(0.0082)	(0.0040)
Proportion of HH >15 years with tertiary education	-0.0105*	-0.0115*	-0.0046	-0.0124*	-0.0297***	-0.0132**
	(0.0057)	(0.0064)	(0.0062)	(0.0057)	(0.0082)	(0.0058)
Proportion of HH >65 years	0.0065	-0.0075	0.0143*	0.0070	-0.0037	0.0031
	(0.0068)	(0.0075)	(0.0072)	(0.0071)	(0.0151)	(0.0075)
Age of the household head in years	-0.0045	0.0074	0.0130	-0.0212**	-0.0214	-0.0078
	(0.0103)	(0.0115)	(0.0119)	(0.0105)	(0.0164)	(0.0115)
Gender of the household head	-0.2585	-0.5205	-0.1724	-0.2308	0.1736	-0.3163
	(0.3185)	(0.3344)	(0.3742)	(0.3226)	(0.5369)	(0.3191)
Household head working status	0.0159***	0.0211***	0.0144***	0.0135***	0.0298	0.0161***
	(0.0059)	(0.0079)	(0.0056)	(0.0051)	(0.0545)	(0.0055)
Location of household	-0.5114*	-0.2375	-0.1988	-0.4956*	-0.0429	-0.5408*
	(0.3019)	(0.3156)	(0.3291)	(0.3050)	(0.3868)	(0.3277)
Households owns agricultural land	-1.2393***	-1.0445***	-0.8555***	-1.1849***	-0.1345	-0.9305***
	(0.2211)	(0.2386)	(0.2488)	(0.2259)	(0.4246)	(0.2307)
Household size	-0.0855*	(0.0753)	-0.0402	-0.0051	-0.0099	-0.0307
	(0.0447)	0530479	(0.0541)	(0.0487)	(0.0880)	(0.0538)
Log of total per-capita expenditure	-0.5619***	0.0304	0.0036	0.0909	0.5869***	0.1170
	(0.1100)	(0.1372)	(0.1186)	(0.1053)	(0.1586)	(0.1083)
Receive internal and external remittance	-5.9288	-4.2838	-4.9985	-2.9213	0.1690	-6.1918
	(4.6347)	(5.3956)	(5.0790)	(5.1296)	(7.8696)	(4.9846)
Log of total per-capita expenditure*internal and external remittance	0.3322	0.1766	0.3940	0.1842	-0.2354	0.4456
	(0.4342)	(0.5131)	(0.4673)	(0.4762)	(0.7255)	(0.4641)
Constant	8.9348***	2.4221	-1.8622	3.5366*	-7.7326***	0.4819
	(1.9105)	(2.3807)	(2.2644)	(2.0201)	(2.9702)	(2.2026)
Wald chi^2 (102)	-					
Log pseudolikelihood	-1628.4891					
Number of observations	1.244					

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

Table A20: Average marginal effects of FMNL: Effect of external and internal remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inve.	Hous.	Others
Proportion of children (0-5) years	0.0002	-0.0022***	0.0008**	-0.0006	0.0005	0.0016**	-0.0002
	(0.0009)	(0.0005)	(0.0003)	(0.0011)	(0.0003)	(0.0007)	(0.0003)
Proportion of children (6-15) years	-0.0002	-0.0008	0.0006*	-0.0014	0.0004	0.0017**	-0.0003
	(0.0009)	(0.0006)	(0.0003)	(0.0011)	(0.0003)	(0.0007)	(0.0003)
Proportion of male >15 years	0.0013	-0.0018***	0.0002	-0.0007	0.0002	0.0013*	-0.0003
	(0.0010)	(0.0006)	(0.0003)	(0.0011)	(0.0004)	(0.0008)	(0.0004)
Proportion of female >15 years	0.0006	-0.0018***	0.0003	-0.0004	0.0003	0.0012*	-0.0002
	(0.0009)	(0.0006)	(0.0003)	(0.0011)	(0.0003)	(0.0008)	(0.0003)
Proportion of HH >15 years with primary education	-0.0003*	0.0001	0.0004***	-0.0005	0.0000	0.0003	0.0000
	(0.0003)	(0.0003)	(0.0001)	(0.0003)	(0.0001)	(0.0003)	(0.0001)
Proportion of HH >15 years with secondary education	-0.0006	0.0007***	-0.0004***	0.0003	-0.0000	0.0000	-0.0001
	(0.0002)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with tertiary education	0.0003	-0.0000	0.0002	-0.0002	-0.0002**	-0.0002	0.0002*
	(0.0004)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >65 years	0.0005	-0.0009***	0.0003*	0.0005	-0.0001	-0.0002	-0.0001
	(0.0005)	(0.0003)	(0.0002)	(0.0005)	(0.0002)	(0.0005)	(0.0001)
Age of the household head in years	0.0014**	0.0012**	0.0007**	-0.0033***	-0.0002	0.0001	0.0001
	(0.0006)	(0.0005)	(0.0003)	(0.0006)	(0.0002)	(0.0005)	(0.0002)
Gender of the Household head	0.0026	-0.0194*	0.0030	0.0092	0.0060	-0.0061	0.0048
	(0.0181)	(0.0114)	(0.0086)	(0.0191)	(0.0048)	(0.0138)	(0.0054)
Household head working status	0.0002	0.0004	-0.0000	-0.0005	0.0002	0.0001	-0.0003***
	(0.0008)	(0.0004)	(0.0001)	(0.0007)	(0.0007)	(0.0005)	(0.0001)
Location of household	-0.0201	0.0167**	0.0085	-0.0091	0.0056	-0.0098	0.0082
	(0.0131)	(0.0084)	(0.0056)	(0.0120)	(0.0041)	(0.0113)	(0.0056)
Households owns agricultural land	-0.0483***	0.0048	0.0083	-0.0192*	0.0131**	0.0214**	0.0199***
	(0.0128)	(0.0078)	(0.0063)	(0.0107)	(0.0060)	(0.0109)	(0.0049)
Household size	-0.0183***	0.0085***	-0.0000	0.0083**	0.0003	0.0006	0.0007
	(0.0028)	(0.0020)	(0.0011)	(0.0035)	(0.0011)	(0.0029)	(0.0008)
Log of total per-capita expenditure	-0.1423***	0.0161***	0.0068***	0.0712***	0.0101***	0.0345***	0.0035*
	(0.0072)	(0.0055)	(0.0022)	(0.0055)	(0.0026)	(0.0049)	(0.0019)
Receive internal and external remittance	-0.4620	0.0314	-0.0078	0.4705	0.0652	-0.1828	0.0855
	(0.4656)	(0.2634)	(0.1271)	(0.4745)	(0.1027)	(0.3106)	(0.0774)
Log of total per-capita expenditure*internal and external remittance	0.0203	-0.0076	0.0037	-0.0248	-0.0069	0.0203	-0.0050
	(0.0505)	(0.0276)	(0.0115)	(0.0481)	(0.0095)	(0.0290)	(0.0071)

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

Table A21: FMNL results for the effect of external and internal remittances on household expenditure

Variable	Food	Educ.	Health	CD	Inve.	Hous.
Proportion of children (0-5) years	0.0141	-0.0160	0.0392*	0.0111	0.0480*	0.0276
	(0.0191)	(0.0207)	(0.0209)	(0.0196)	(0.0296)	(0.0204)
Proportion of children (6-15) years	0.0202	0.0098	0.0387*	0.0147	0.0504*	0.0349*
	(0.0180)	(0.0195)	(0.0202)	(0.0185)	(0.0288)	(0.0193)
Proportion of male >15 years	0.0228	-0.0052	0.0244	0.0165	0.0337	0.0296
	(0.0182)	(0.0198)	(0.0204)	(0.0187)	(0.0298)	(0.0196)
Proportion of female >15 years	0.0184	-0.0078	0.0266	0.0141	0.0388	0.0267
	(0.0182)	(0.0200)	(0.0202)	(0.0188)	(0.0298)	(0.0197)
Proportion of HH >15 years with primary education	-0.0043	-0.0026	0.0096	-0.0041	-0.0036	-0.0004
	(0.0060)	(0.0073)	(0.0070)	(0.0062)	(0.0100)	(0.0067)
Proportion of HH >15 years with secondary education	0.0017	0.0129***	-0.0074*	0.0049	0.0025	0.0033
	(0.0040)	(0.0045)	(0.0044)	(0.0041)	(0.0070)	(0.0042)
Proportion of HH >65 years	0.0039	-0.0102	0.0131*	0.0055	-0.0088	0.0008
	(0.0060)	(0.0074)	(0.0072)	(0.0063)	(0.0126)	(0.0067)
Age of the household head in years	-0.0155**	-0.0029	0.0045	-0.0271***	-0.0329)**	-0.0175**
	(0.0072)	(0.0086)	(0.0093)	(0.0073)	(0.0137)	(0.0079)
Gender of the household head	0.0133	-0.2689	0.0190	-0.0700	0.4534	-0.0609
	(0.3111)	(0.3390)	(0.3566)	(0.3155)	(0.4601)	(0.3243)
Household head working status	0.0174	0.0226***	0.0152***	0.0146***	0.0319***	0.0175***
	(0.0050)	(0.0074)	(0.0055)	(0.0046)	(0.0088)	(0.0050)
Location of household	-0.5812**	-0.3081	-0.2459	-0.5276**	-0.1259	-0.6012**
	(0.2289)	(0.2527)	(0.2476)	(0.231)	(0.3971)	(0.2446)
Households owns agricultural land	-1.3354***	-1.1372***	-0.9069***	-1.2063***	-0.2421	-1.0035***
	(0.2210)	(0.2377)	(0.2725)	(0.2197)	(0.4257)	(0.2357)
Household size	-0.1204***	0.0412	-0.0639	-0.0226	-0.0482	-0.0621
	(0.0434)	(0.0482)	(0.0515)	(0.0428)	(0.0852)	(0.0462)
Log of total per-capita expenditure	-0.5280***	0.0484	0.0537	0.1447	0.6001***	0.1875
	(0.0772)	(0.0942)	(0.1056)	(0.0766)	(0.1709)	(0.0855)
Receive internal and external remittance	2.0819	2.3356	2.2206	2.4432	7.2683***	3.8406**
	(2.1200)	(2.0801)	(1.7864)	(2.1756)	(2.5269)	(1.8816)
Log of total per-capita expenditure* internal and external remittance	-0.2834	-0.3069	-0.2375	-0.3098	-0.7810***	-0.4476**
	(0.2457)	(0.2460)	(0.2137)	(0.2539)	(0.2948)	(0.2136)
Constant	9.0684***	2.7026	-2.0153	3.2863*	-7.3257**	0.2434
	(1.8538)	(2.0712)	(2.0979)	(1.8970)	(3.4371)	(1.9967)
Wald chi^2 (102)	1473.62***					
	(0.0000)					
Log pseudolikelihood	-1627.9201					
Number of observations	1.244					

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

Table A22: Average marginal effects of FMNL: Effect of external and internal Remittanc on household expenditure

Variable	Food	Educ.	Health	CD	Inve.	Hous.	Others
Proportion of children (0-5) years	0.0002	-0.0022***	0.0008**	-0.0007	0.0005	0.0017**	-0.0002
	(0.0008)	(0.0006)	(0.0003)	(0.0009)	(0.0003)	(0.0008)	(0.0003)
Proportion of children (6-15) years	0.0000	-0.0008	0.0006*	-0.0015*	0.0004	0.0017**	-0.0004
	(0.0008)	(0.0006)	(0.0003)	(0.0009)	(0.0003)	(0.0008)	(0.0003)
Proportion of male >15 years	0.0014	-0.0019***	0.0002	-0.0008	0.0002	0.0012	-0.0003
	(0.0008)	(0.0006)	(0.0003)	(0.0009)	(0.0003)	(0.0008)	(0.0003)
Proportion of female >15 years	0.0008	-0.0018***	0.0003	-0.0006	0.0003	0.0012	-0.0003
	(0.0008)	(0.0006)	(0.0003)	(0.0009)	(0.0003)	(0.0008)	(0.0003)
Proportion of HH >15 years with primary education	-0.0005	0.0000	0.0004***	-0.0003	0.0000	0.0003	0.0001
	(0.0004)	(0.0003)	(0.0002)	(0.0004)	(0.0001)	(0.0004)	(0.0001)
Proportion of HH >15 years with secondary education	-0.0006***	0.0007***	-0.0004***	0.0004	-0.0000	-0.0000	-0.0001
	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with tertiary education	0.0005	0.0000	0.0002**	-0.0004*	-0.0002**	-0.0002	0.0002**
	(0.0003)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >65 years	0.0004	-0.0010***	0.0003*	0.0007	-0.0002	-0.0002	-0.0001
	(0.0005)	(0.0003)	(0.0002)	(0.0005)	(0.0002)	(0.0004)	(0.0001)
Age of the household head in years	0.0006	0.0011***	0.0007***	-	-0.0002	0.0000	0.0003**
	(0.0005)	(0.0004)	(0.0002)	0.0025***	(0.0002)	(0.0004)	(0.0001)
				(0.0005)			
Gender of the household head	0.0195	-0.0175*	0.0017	-0.0084	0.0067	-0.0027	0.0007
	(0.0157)	(0.0099)	(0.0067)	(0.0156)	(0.0045)	(0.0134)	(0.0054)
Household head working status	0.0002	0.0004	-0.0001	-0.0006	0.0002**	0.0001	-0.0003**
	(0.0009)	(0.0004)	(0.0001)	(0.0006)	(0.0001)	(0.0003)	(0.0001)
Location of household	-0.0256**	0.0156*	0.0088*	-0.0028	0.0052	-0.0104	0.0092**
	(0.0118)	(0.0080)	(0.0050)	(0.0118)	(0.0044)	(0.0101)	(0.0041)
Households owns agricultural land	-0.0591***	0.0030	0.0089	-0.0070	0.0125**	0.0206*	0.0212**
	(0.0126)	(0.0079)	(0.0060)	(0.0117)	(0.0050)	(0.0106)	(0.0046)
Household size	-0.0209***	0.0081***	0.0001	0.0112***	0.0002	0.0002	0.0012*
	(0.0033)	(0.0018)	(0.0012)	(0.0029)	(0.0010)	(0.0025)	(0.0007)
Log of total per-capita expenditure	-0.1456***	0.0143***	0.0071***	0.0741***	0.0097***	0.0377***	0.0028**
	(0.0059)	(0.0040)	(0.0027)	(0.0058)	(0.0025)	(0.0051)	(0.0013)
Receive internal and external remittance	-0.1452	-0.0112	-0.0077	-0.0154	0.0643**	0.1596	-0.0445
	(0.2129)	(0.0906)	(0.0439)	(0.2338)	(0.0282)	(0.1055)	(0.0344)
Log of total per-capita expenditure*internal and external remittance	0.0112	0.0006	0.0025	0.0019	-0.0063**	-0.0156	0.0056
	(0.0247)	(0.0105)	(0.0053)	(0.0269)	(0.0033)	(0.0116)	(0.0041)

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10% respectively*

Appendix 3: Effect of remittances on labour force participation

Table A23: Descriptive statistics of variables used in the LFP model according to sources remittances

Variable	Individual in HH without remittances	Individual in HH with internal remittances	Individual in HH with external remittances	All individuals	Differen in means
	N=2986 Mean	N=746 Mean	N=1046 Mean	N=4973 Mean	
Individual age in years	33.2993 (14.0858)	33.8893 (15.1745)	33.9154 (15.0969)	33.2993 (14.0858)	-5.6492**
Level of schooling: Primary	0.6258 (0.4840)	0.6719 (0.4697)	0.6372 (0.4810)	0.4632 (0.4987)	0.083**
Secondary	0.1278 (0.3340)	0.1186 (0.3235)	0.1288 (0.3351)	0.3098 (0.4625)	0.0518**
Tertiary	0.1824 (0.3862)	0.1383 (0.3454)	0.1791 (0.3836)	0.2256 (0.4180)	-0.1348**
Gender	0.5369 (0.4987)	0.5718 (0.4951)	0.5695 (0.4954)	0.5374 (0.4986)	0.1646**
Marital status	0.5709 (0.4950)	0.5308 (0.4994)	0.5335 (0.4991)	0.5648 (0.4794)	-0.1992**
Household headship	0.3203 (0.4666)	0.3164 (0.4654)	0.2772 (0.4479)	0.3145 (0.4644)	-0.2976**
Number of children (0-5) years	0.5364 (0.8116)	0.5241 (0.7909)	0.4216 (0.7034)	0.5196 (0.7894)	0.0445*
Number of children (6-15) years	1.0793 (1.2936	1.1971 (1.2294)	0.9818 (1.3054)	0.9388 (1.1987)	0.0373**
Number of elderly in the household (>65 years)	0.2714 (0.5394)	0.3043 (0.5482)	0.3279 (0.5938)	0.2502 (0.5126)	0.0462**
Number of household members	5.2058 (02.5459)	5.1689 (2.2456)	5.3652 (2.5868)	5.2148 (2.5450)	0.6691**
Location of household	0.4924 (0.5000)	0.5697 (0.4954)	0.4828 (0.4994)	0.4847 (0.4998)	0.0143
Households owns agricultural land	0.6458 (0.4783)	0.7627 (0.4257)	0.6434 (0.4792)	0.6292 (0.4831)	0.0376**
Migration networks	63.8455 (0.2478)	67.7152 (10.2255)	68.8786 (11.1952)	65.6343 (0.1793)	-4.3828**
Individual participate in the labour force	0.6279 (0.4834)	0.5830 (0.4933)	0.5800 (0.4937)	0.6079 (0.4883)	0.0490**

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10% respectively. Standard deviations are in parenthesis*

Table A24: Results of probit regression for international remittance instrument

Variable	Selection model: Determinants of receiving international remittances	Outcome model: Labour force participation (N=)
Individual age15-25 years	-0.0216**	0.2304***
	(0.0096)	(0.0099)
26-35 years	0.0003***	-0.0029***
	(0.0001)	(0.0001)
Primary	0.2046**	0.1500*
	(0.0837)	(0.0816)
Secondary	0.2173**	0.3579***
	(0.0973)	(0.0960)
University	0.1169	0.3785***
	(0.0937)	(0.0928)
Marital status of the individual	-0.0514	-0.3341***
	(0.0601)	(0.0609)
Relationship to household head	-0.1102	0.8724***
	(0.0525)	(0.0541)
Number of children (0-5) years	-0.1599***	-0.0294
	(0.0290)	(0.0284)
Number of children (6-15) years	-0.1488***	-0.1548***
	(0.0198)	(0.0199)
Number of elderly in the household (>65 years)	0.1387***	0.0208
	(0.0363)	(0.0374)
Household size	0.0739***	0.0355***
	(0.0111)	0.0115
Location of household	0.0054	0.0630
	(0.0438)	(0.0439)
Households owns agricultural land	0.0998**	0.0568
	(0.0461)	(0.0462)
Migration network	0.0162***	0.0013
	(0.0016)	(0.0016)
Constant	-1.8382***	-4.0183***
	(0.2102)	(0.2117)
Number of observations	5044	5044
LR $chi^2(18)$	309.43	1302.17
Prob > chi^2	0.0000	0.0000
Pseudo R^2	0.0535	0.1927
Log likelihood	-2736.3709	-2726.8817

*Source: Author's computation Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

Table A25: Results of probit regression for internal remittance instrument

Variable	Selection model: Determinants of receiving internal remittances	Outcome model: Labour force participation (N=)
Individual age15-25 years	-0.0120	0.2304***
	(0.0100)	(0.0099)
26-35 years	0.0002**	-0.0029***
	(0.0001)	(0.0001)
Primary	-0.0215	0.1500*
	(0.0829)	(0.0816)
Secondary	-0.0588	0.3579 ***
	(0.0989)	(0.0960)
University	-0.1984**	0.3785***
	(0.0957)	(0.0928)
Marital status of the individual	-0.1943***	-0.3341***
	(0.0639)	(0.0609)
Relationship to household head	-0.0350	0.8724***
	(0.0553)	(0.0541)
Number of children (0-5) years	0.0184	-0.0294
	(0.0300)	(0.0284)
Number of children (6-15) years	-0.0124	-0.1548***
	(0.0210)	(0.0199)
Number of elderly in the household (>65 years)	0.1489***	0.0208
	(0.0385)	(0.0374)
Household size	-0.0165	0.0355***
	(0.0124)	(0.0115)
Location of household	0.0589	0.0630
	(0.0457)	(0.0439)
Households owns agricultural land	0.4224***	0.0568
	(0.0506)	(0.0462)
Migration network	0.0090***	0.0013
	(0.0017)	(0.0016)
Constant	-1.4630***	-4.0183***
	(0.2208)	(0.2117)
Number of observations	5044	5044
LR $chi^2(18)$	215.54	1302.17
Prob > chi^2	0.0000	0.0000
Pseudo R^2	0.0426	0.1927
Log likelihood	-2420.6883	-2726.8817

*Source: Author's computation Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

Table A26: Endogenous switching probit regression results for the effect of external ar internal remittances on female labour force participation

Variable	Selection eqn.	Outcome equation: Labour force participation	
	Receiving both external and internal remittances	Individuals with both external and internal remittances	Individuals without both external and internal remittances
Age of the individual in years	0.0152	0.0764**	0.18872***
	(0.0214)	(0.0318)	(0.0134)
Age squared	-0.0000	-0.0011***	-0.0023***
	(0.0003)	(0.0004)	(0.0002)
Level of schooling: Primary	0.0634	0.0074	-0.0383
	(0.1922)	(0.2191)	(0.1121)
Secondary	0.3205	-0.0812	0.2391*
	(0 .2179)	(0.2827)	(0.1330)
Tertiary	-0.0113	0.3827	0.3239**
	(0.2192)	(0.3057)	(0.1286)
Marital status	-0.1489	-0.0807	-0.5044***
	(0.1289)	(0.1695)	(0.0788)
Household headship	0.0369	0.2500	0.4721***
	(0.1266)	(0.1769)	(0.0754)
Number of children (0-5) years	0.0385***	-0.0844	-0.0014
	(0.0583)	(0.0744)	(0.0375)
Number of children (6-14) years	-0.1890***	0.0145	-0.0946***
	(0.0460)	(0.0607)	(0.0294)
Number of elderly in the household (>65 years)	0.2386	-0.0329	-0.0002
	(0.0675)	(0.1005)	(0.0529)
Number of household members	0.0623**	-0.0515	0.0127
	(0.0246)	(0.0391)	(0.0168)
Location of household	-0.0638	-0.0185	0.0185
	(0.0975)	(0.1240)	(0.0587)
Households owns agricultural land	0.6151***	-0.5461***	0.0154
	(0.1225)	(0.1509)	(0.0682)
Migration network	0.0164***	n.a	n.a
	(0.0034)		
Constant	-3.9372***	1.6803***	-3.0625***
	(0.4849)	(0.5989)	(0.2473)
Number of observations	2.700		
Wald $chi^2(14)$	105.69***		
	(0.0000)		
Log pseudo likelihood	-2131.4482		
ρ_1	-1		
	(1.20e-10)		
ρ_0	-0.0868		
	(0.3774)		
LR test of independent eqns. $Chi^2(2)$	5.74 *		

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10% respectively.*

Table A27: Endogenous switching probit regression results for the effect of external and internal remittances on male labour force participation

Variable	Selection eqn.	Outcome equation: Labour force participation	
	Receiving both external and internal remittances	Individuals with both external and internal remittances	Individuals without both external and internal remittances
Age of the individual in years	-0.0226	0.2336***	0.3048***
	(.0225)	(0.0654)	(0.0175)
Age squared	0.0005	-0.0031***	-0.0039***
	(0.0003)	(0.0009)	(0.0002)
Level of schooling: Primary	-0.0754	0.6943**	0.5359***
	(0.1759)	(0.3378)	(0.1345)
Secondary	0.0556	0.7302**	0.5909***
	(0.2085)	(0.3331)	(0.1610)
Tertiary	-0.0960	0.7026**	0.4071***
	(0.2004)	(0.3096)	(0.1493)
Marital status	0.2595*	0.9533*	0.3535***
	(0.1499)	(0.5422)	(0.1345)
Household headship	-0.8340 ***	-0.5355**	0.6300
	(0.1691)	(0.2389)	(0.1432)
Number of children (0-5) years	-0.0100	-0.4557**	0.0854
	(0 .0698)	(0.1825)	(0.0568)
Number of children (6-14) years	-0.2552***	-0.2879***	-0.1421***
	(0.0548)	(0.0703)	(0.0380)
Number of elderly in the household (>65 years)	0.1440	-0.0846	0.0194
	(0.0828)	(0.1633)	(0.0711)
Number of household members	0.0314	0.1027**	0.0001
	(0.0257)	(0.0506)	(0.0190)
Location of household	0.1611	0.3428**	0.0784
	(0.1030)	(0.1655)	(0.0780)
Households owns agricultural land	0.5577***	0.52502*	0.0488
	(0.1334)	(0.3081)	(0.0863)
Migration network	0.0059		
	(0.0038)		
Constant	-2.1083***	-6.9110***	-5.2011***
	(0.49882)	(1.1666)	(0.3171)
Number of observations	2,330		
Wald $chi^2(14)$	98.63***		
	(0.0000)		
Log pseudo likelihood	-1342.6261		
ρ_1	1		
	(1.93e-09)		
ρ_0	-0.1499		
	(0.3207)		
LR test of independent eqns. $Chi^2(2)$	2.26		
	(0.3224)		

*Source: Author's computation. Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*

Table A28: Mean treatment effects from internal and international remittances on male and female labour force participation

	Female	Male
Treatment effect	Receiving both external and internal remittances	
Average treatment effect on the treated (ATT)	0.0833*** (0.0215)	0.0237** (0.0103)
Average treatment effect on the untreated (UTT)	0.43459*** (0.1320)	-0.6256*** (0.2456)
Average treatment effect (ATE)	0.4171*** (0.1835)	-0.5783*** (0.1411)

*Source: Author's computation Note: ***, ** and * show significance difference at 1%, 5% and 10%, respectively*