

**REMITTANCE INFLOWS AND EDUCATIONAL OUTCOMES IN  
KENYA.**

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Nairobi.**

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**DECLARATION**

This research project is my original work and has not been submitted for any award in any other University.

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This research project has been submitted for examination with my approval as the university supervisor.

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## **DEDICATION**

To my dear parents Mr & Mrs. Nelson Affudo

Thank you very much for this far I have reached because of your prayers and encouragement.

To my lovely sons, Louis and Trevis,

Many at times you wished to have a chat with me but I was busy with school work. You understood and took it positively.

To my siblings Oscar, Anita, Ferdinand, Emmy, and Kelvin: Loving friends Sabina, Mercy, and Alenga.

Thanks for the support.

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May God bless you.

## **ABSTRACT**

The impact of remittance on educational outcomes is of interest since human capital development may break the generation to generation transmission of poverty through higher incomes in the future. Therefore, this paper analyzed the effect of remittances on educational outcomes in Kenya using data from the 2009 Kenya Migration Household survey. The study also analyzed if there are differences in educational outcomes amongst males and females due to remittances. The relationship was tested using an ordered probit and ordered IV probit approach with the number of individuals above 65 years of age in the households and owning a bank account as instruments. From the results, remittances have a significant and positive impact on the education of household members at primary, secondary, and tertiary levels of education with the probability being much higher at the primary level. The marginal impact of remittances on the level of education completed was positive and statistically significant for males while negative for the males hence contributing to higher gender inequalities in education. Therefore, policies towards increasing remittances via regulations in the financial sector that would help lower transaction costs associated with remittances should be enhanced.

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## **ACRONYMS/ABBREVIATIONS**

GDP	Gross Domestic Product
IMF	International Monetary Fund
IV	Instrumental Variable
KMHS	Kenya Migration Household Survey
MDG	Millennium Development Goal
OLS	Ordinary Least Squares
2SLS	Two-Stage Least Squares
SSA	Sub-Saharan Africa
SD	Standard Deviation
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific, and Cultural Organization.

## **OPERATIONAL DEFINITION OF TERMS**

Endogeneity – The existence of a correlation between an independent variable and an error term.

Household size – Number of individuals living in a family.

Remittances – The total amount of money sent by international migrants to household members.

Resource constrain – Lack of enough finances

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the study

In many developing countries, remittance inflows are gaining more and more attention amongst development experts due to their persistent rise in volume plus the notable effect on building and expansion of the local and regional economy. Global remittances have been on the rise totaling US\$3 billion in 1975 to approximately US\$689 billion in 2018 (World Bank, 2018). The rise in remittances has led to positive effects on poverty decrease (Kiiru, 2010), financial development (Misati et al, 2019) and, economic growth (Ahmed, 2010). Approximately, 800 million people worldwide were benefiting from remittances (IFAD, 2018). In 77 developing countries, there is a 3.1 percent decrease in poverty headcount ratio if remittances increase by 10 percent (UNCTAD, 2011). In some countries, remittances are a major source of foreign exchange. Since the year 2000, countries such as Lesotho, Uganda, and Comoros had remittances amounting to an average of more than 25% of export earnings (World Bank, 2006). In 2018, the total amount of remittances to developing countries was US\$528 (World Bank, 2018). Countries in East Africa received a total of \$17.38 billion as remittances between 2013 and 2018 (World Bank, 2018). During the period, Kenya topped the region as the biggest beneficiary by receiving 60 percent of all remittances to East Africa and 10 percent of those to Sub-Saharan Africa. As a percentage of GDP, Kenya was one of the top ten remittance-receiving countries with remittances amounting to 3.09% of its GDP (World Bank, 2019).

Given the large and increasing remittance flows across the world, their stability, and inability to erode a country's competitiveness, considerable interest among developmental researchers has sparked on the developmental impacts of remittances. In the short-run, remittances affect households' consumption levels, poverty reduction, and labor market participation of left behind household members (Adams, 2011). In the long-run, remittances bring about increased investments in the human capital of left behind household members particularly education.

The relationship between remittance and human capital development has been studied by giving attention to how remittance affects household member's education. The empirical findings on the effect are ambiguous. Remittances bring about increased investments in education which has high social returns in the long run. Children from remittance-receiving households have a low

rate of school dropout and more funds are spent on their tuition (Acosta 2011, McKenzie & Rapoport, 2011). Remittances also bring ease to the budget constraints of households' hence encouraging educational investment of household members in the home country. Remittances see to it that those enrolled in school stay longer and enable those not in schools to enroll because of the lowered credit constraint. For those educated and have skilled labor, returns are high especially to those who move abroad. Therefore, remittances affect child schooling positively (Chabaan & Mansour, 2012).

On the other hand, migration brings about absenteeism of a household member which creates limitations to children's education in one way or another: children's responsibilities may increase, children may spend a lot of time carrying out household chores to bridge the labor gap left by migrant members, and finally, an income gap is created that compels children to take on labor (Mansuri, 2006; Chaaban & Mansour, 2012). There is also inadequate supervision and lack of a role model due to parents' absenteeism. Migration causes a decrease in labor supply in-home countries; this pushes labor wages in those countries upwards making a child's work more economically rewarding hence lowering the value of education (Nasir et al, 2011). The probability of children whose parents are migrants' migrating is higher compared to those without a migrant member. This lowers the opportunity cost of staying in school, as children would rather abandon school in earlier stages to migrate and commence working (Chabaan & Mansour, 2012). Therefore, the aftermath of migration on household member's educational investment is an unclear apriori.

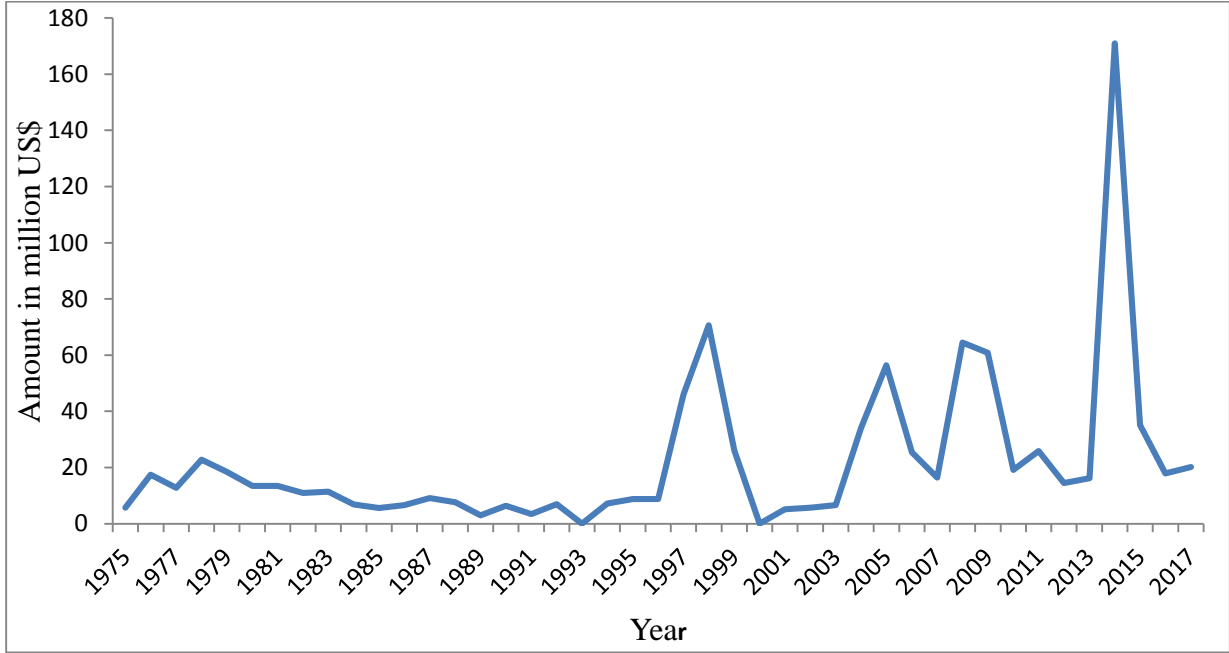
Despite the potential effects of remittances on education, only a few country-specific studies examine the remittance-education relationship in Africa. Additionally, there is no consensus in the studies available over the impact or direction of cause linking remittances and education (Cattaneo, 2012; Bouiyou & Miftah, 2015; Abdul-Mumuni & Koomson, 2019). This discussion on remittance-education linkage has not been evaded in policy circles in Kenya. Therefore, this study employed cross-section data from the 2009 Kenya Migration Household Survey (KMHS) plus an ordered probit and an IV probit estimation technique to investigate the remittance effect on education in Kenya. This study mainly focused on the completed level of education of household members and further investigated if there are differences in the remittance effects between males and females completed level of schooling as a result. If remittance income

increases educational investments, then remittances presumably decrease poverty and in the long run, they improve the growth of the economy. The study’s main concern was remittances. From the results, remittances lead to positive implications on the completed level of education by household members.

**1.1.1 Remittances in Kenya**

In approximation, three million Kenyans (7.2 percent of the total population) live in other countries (Ministry of Foreign Affairs, 2014). Remittances to Kenya have gone up from US\$934 million in 2011 to around US\$2.7 billion in 2018. This increase is caused by increased migration which saw a steady increase of remittances at a rate of 15.8 percent annually in the last decade (World Bank, 2019). In Africa, Kenya is ranked as the fifth-highest remittance-recipient country following Ghana, Morocco, Nigeria, and Egypt. However, there is a possibility that remittance inflows could be more if the remittance amount sent through informal channels or in-kind were inclusive (World Bank, 2010; IMF, 2009). In Africa, 75% of remittances are informal (Freund & Spatafora, 2005). Figure 1 illustrates the trends in remittance flows to Kenya.

**Figure 1: Personal remittances to Kenya (million US\$)**



*Source: World Development Indicators (2018)*

From figure 1, remittances picked up in 2003 and have been steadily on the rise over the last ten years. This is due to the rise in the number of Kenyans living in the diaspora. A larger amount of remittances comes from North America and Europe. As opposed to other volatile capital flows, remittances are stable although they also decrease even in times of natural disasters or economic decline (Yang, 2006). This explains the stability in remittances in 2008/2009 although there was a drop due to the global economic crisis. In such situations, most migrants hold onto most of their income as precautionary savings (Denzer & Ivaschenko, 2010).

Remittances are important to the Kenyan economy. External remittances follow tea, horticulture, and tourism in terms of earning foreign exchange (Bett, 2013). The last five years have seen remittance continuously rising while government revenue from major traditional exports such as tea and coffee declining (International Organization for Migration, 2012). Remittances have led to a 2% decline in the number of individuals living in absolute poverty in Kenya (Prospects, 2006). Regularly, 14% of Kenyan adults receive remittances and on estimation; each adult receives US\$735 from other countries yearly (World Bank-Central Bank of Kenya, 2010).

### **1.1.2 Education**

This period of globalization has seen education become an important aspect around the world. Those educated are a critical asset to an information economy. On the other hand, those that are highly talented and most informative can access more opportunities to preside over the entire economy (Becker, 2009). Concerning this, access to human capital, people's abilities, experiences, competencies, and skills can be a powerful driver towards building a more competitive economy. Education brings about large and consistent returns in income. To individuals specifically, it brings about employment, earnings, health, and poverty reduction. Globally, for any extra year of schooling, a 9% increase in hourly earnings is noted (George, Patrinos & Anthony, 2018). Therefore, facilitating adequate investments in education is essential for the accumulation of human capital that will cease extreme poverty.

Due to this, the Millennium Development Goal of achieving free primary education for all children by the year 2015 came up. Since 2000, the United Nations body has been at the forefront in advocating for the achievement of this goal (Lee, 2013). This goal has achieved some progress (Watkins, 2011). Since the year 1999, the non-enrolments of children in school dropped by 33 million worldwide, the gender gap in enrolments is on decreasing trend while the

adult literacy rate is on the rise (UNESCO, 2015). Nonetheless, an estimated 67 million primary school-age children were still unable or could not enroll in school (Watkins, 2010; Naidoo, Saihjee & Motivans, 2011).

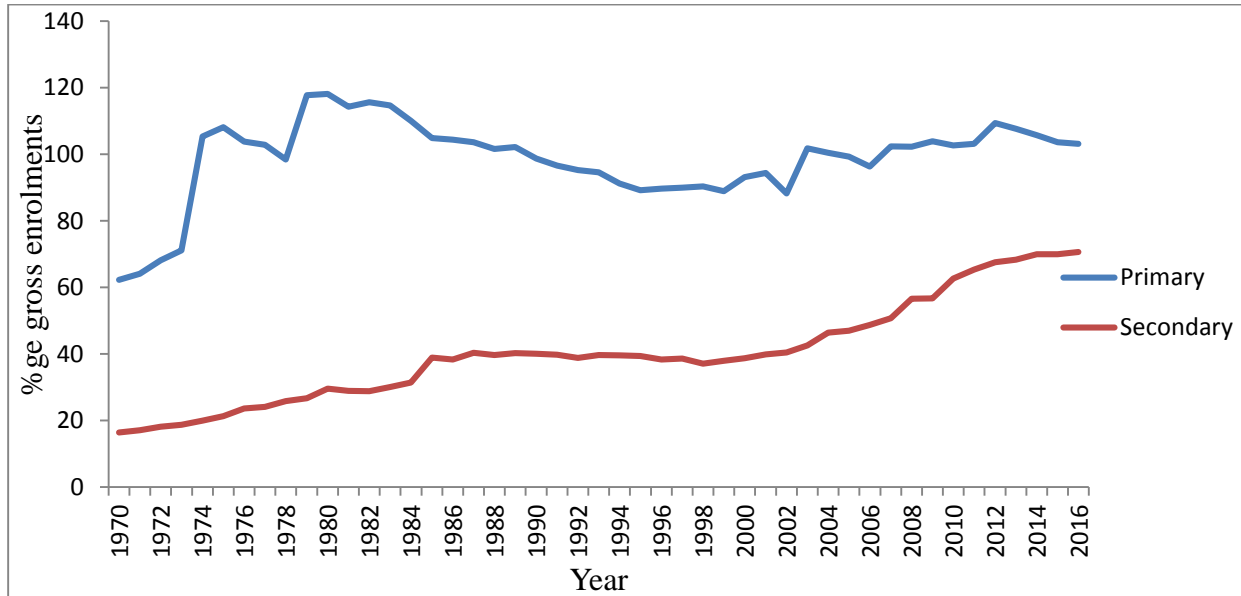
The Kenyan government's overall strategy for socio-economic development requires the provision of quality education and training. Education is a key factor for the country's realization of being an industrialized country that can provide a high quality of life for all citizens hence realizing sustainable development (Vision, 2030). Kenya's education system is an 8-4-4 model composed of eight years of learning in primary school, four years in secondary school, and four years in the university. In the year 2003, the government of Kenya declared free primary education while subsidizing secondary education in 2008. This measure led to the enrolment of more than 3 million children in primary schools in 2012 than in 2003. Between 2015 and 2016, primary school enrolment increased by 1.9%. For secondary schools, the gross enrolment ratio increased from 43 percent to 67 percent as those who completed free primary education found their way through to secondary school (Clark, 2015). 2016 saw secondary education enrolment rates rising by 6.4% from the previous year.

Figure 2 shows the trend in gross primary and secondary school enrolments. From figure 2 below, both primary and secondary school enrolments have been rising steadily especially from the year 2003 when free primary education was endorsed. A drop was recorded in 2007 attributed to the post-election violence that saw some students out of school. Despite all the progress, education access and quality are still low in Kenya since one million children were still unable to attend school in 2012 culminating to around half the number in the year 1999, illiteracy rates were also on the rise among children who had primary education for six years (Clark, 2015). Moreover, providing high-quality schooling still poses a challenge evidenced by the not-so-appealing learning levels amongst children in primary institutions (Uwezo, 2010). This may be because although free primary and subsidized secondary schooling was endorsed, there are other fees that in terms of uniform, books, building fees, school supplies, that households have to cater for (Salmi, 1998). Thus access to education remains problematic especially for vulnerable or poor groups and can be a heavy financial burden. This is also because poverty is a barrier to children's education in Sub Saharan Africa (Roby, Erickson & Nagaishi, 2016). However,



remittance inflows to these economies can help in this regard through increased investment in education (Yang, 2006).

**Figure 2: Gross school enrolments in Kenya**



*Source: World Development Indicators*

Whether remittances may help achieve long-term growth through education or disrupt growth due to substitution of labor and creating the ‘Dutch disease’ effects is still a debatable issue in the Kenyan economy. There is a need to come to a consensus about the flow of remittances and their effect on education as the volume of remittances to Kenya has increased massively during the last decade. Therefore, this study is concerned with finding out and exploring remittance effects on educational outcomes in the Kenyan economy.

**1.2 Problem statement**

International remittance to developing countries has been on the rise since the early 1970’s exceeding other capital flows. Kenya in particular has been receiving remittances from its migrants in other countries and this has been a significant source of capital. However, despite the available knowledge on remittances, there is little information about its effect on human capital development especially, on education.

The persistent challenges in financing education in Kenya have stimulated the demand for other alternatives to handle these challenges effectively. Although government spending on education has continuously affected education in terms of increased school enrolments to some extent, there is still the necessity to review other sources of capital that can help achieve total access and better quality of education. Such a source is remittance.

Besides, existing empirical studies have mainly concentrated on other effects of remittance inflows such as financial development, physical investments, poverty, and economic growth. There are only a few studies that have looked at how remittance impacts human capital development especially education. Regardless of the notable impact of remittances to Kenya as a whole, empirical studies on remittance and education in the Kenyan economy have been done using different micro data sets. Some studies employed the data from the 2009 KMHS while others employed the two wave (2007& 2009) data set of rural households in Kenya while employing different measures of educational outcomes such as educational expenditures and school enrolments. This study also used the 2009 KMHS with the level of education completed as a proxy for education. In this regard, this study fills this gap by clearly examining how remittance inflows into the Kenyan economy have affected educational outcomes.

### **1.3 Research questions**

- i. What is the impact of remittance inflows on the level of education completed in Kenya?
- ii. What is the gender difference in the impact of remittance inflows on the completed level of education in Kenya?

### **1.4 Research objectives**

The main objective of the study was to estimate the effect of remittance on educational outcomes in Kenya. The specific objectives guiding the study were:

- i. To analyze the effect of remittance inflows on the completed level of education in Kenya.
- ii. To examine gender differences in remittance impact on the completed level of schooling.
- iii. To draw policy implications from the findings.

### **1.5 Significance of the study**

This study contributes to the vast information on the relationship between remittance income and education in developing countries both general and specific terms. Generally, the study used

cross-section data with an ordered IV probit estimation technique that solves for endogeneity. It also explores the gender and locational dimensions of the remittance-education relationship. The study also adds to the literature on whether there are differences in the impact of remittances on males and females completed level of schooling. The study also exploited the size and coverage of the 2009 KMHS, which allowed a detailed analysis of specific groups, not well represented in smaller samples. Specifically, the study contributed to relatively scarce literature that focuses on how remittance income affects education. This will enable policymakers in the financial sector to develop strategic policies addressing challenges in receipt of remittances such as the high bank and transfer charges. Additionally, policymakers should develop incentives such as payment of reasonable interests and/or identify financial instruments that are much safer and more profitable. These findings also provided important insight into investments in private transfers. To academicians, this study will serve as an additional informant on topical matters in development economics. It will also be referred to by other researchers who might desire to carry out a similar study in the future.

## **1.6 Organization of the study**

This study was organized into five chapters. The preceding chapter presents an introduction to the study. The second chapter presents a literature review on the effects of remittance inflows on educational outcomes. Chapter three discusses the theoretical and analytical framework of the study where the specification of the model is done, variable definition, data sources, pre-estimation, and post-estimation tests are described. Chapter 4 presents the results and findings of the study and chapter five gives the summary, conclusion, and policy recommendations for the effects of remittances on educational outcomes.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter reviews the theoretical and empirical literature on remittance and education. The first section reviews theoretical literature that highlights ideas on remittance and education from various schools of thought. The second section reviews empirical literature showing research works by different authors concerning the remittance effect on educational outcomes. The last section provides an overview of the literature reviewed.

#### 2.2 Theoretical literature

The literature on human capital development of children highlights that remittance income has two effects on education. The first effect advocates for the standard economic theory which states that in case household budgets are constrained, then an increase in income resulting from remittances might stimulate investments in the education of household members remaining behind (Lu & Treman, 2007; Calero et al., 2009). However, not all households with migrants receive remittances. In most cases, household members receive remittance long after the migrant moves from home and secure employment that eventually brings income (Antman. 2013).

Standard economic theory is in agreement with the model of investment in education by Becker (1974). The model highlights that families take into account the cost of education and the educational rate of return when choosing the optimal level of education for their children. A variety of factors influences educational attainment. Financial constraints in a family would make schooling of children lower than optimal. Therefore, if liquidity constraints of the family are relaxed, international remittances may facilitate investments in education.

The second effect of remittance on education states that absenteeism brought by the migration of a household member forces migrants children to contribute to household income (McKenzie & Rapoport, 2011; Frisancho & Oropesa, 2011). According to McKenzie & Rapoport (2011), most household members who migrate are active economically. This means that their migration creates a workers' shortage in the family. To account for this shortage, left-behind children are forced to leave school and engage in working activities. Frisancho & Oropesa (2011) noted that the migration of parents reduces their availability in supervision and following up on school

performance. From the wage effect point of view, the migration of household members also affects child education. Large-scale migration leads to a shortage of labor supply in the home country forcing labor wages to rise. This makes child work more profitable hence lowering the usefulness of education (Elbadawy & Roushdy, 2009; Nasir, Tariq & Rehman, 2011).

### **2.3 Empirical literature**

Previous studies on remittance and child education have come up with contradicting results. Dharmadasa et al (2019) investigate the migration and remittance effect on school enrolment of migrants' children in Sri Lankan rural sector households. Data used in the study was obtained from the Department of Census and Statistics and was analyzed using probit models. Results indicated that, with the presence of either an internal or international migrant in the family, the school enrolment of left-behind children increases. Other factors that also show a significant impact are the number of young dependents, old dependents, agriculture land availability, and mother's education. This study analyses the migration effect and remittance effect on school enrolments separately. However, this study only focuses on the rural sector and does not cater for the endogeneity of remittances.

Khan & Khan (2016) examines the effect of remittances on child education in Pakistan. The study applied an IV probit model and an IV censored ordered probit model. The main findings for the study were that children from remittance-recipient households have a higher probability of enrolling in school than those from non-recipient households and that remittance income creates a larger marginal impact on girls' and rural households school enrolments. Remittances also have a negative and significant impact on a child's grade attainment apart from children from urban areas. This lowers the likelihood of a child moving to a higher grade. The study uses migrant network variables at the village level that interrelates with the number of adults in households as an instrument.

In Kyrgyzstan, Kroeger & Anderson (2014) analyze the effect of receiving remittances on both the children's health and education between the years 2005-2009 using five waves of the Kyrgyzstan Integrated Household Survey. This study used both fixed effects and instrumental variable estimation. Instrumentation in the study was the rate of regional migration from 2003 to

2005. From the results, remittances lead to improved school enrolments in younger children but impact negatively on enrolments of older boys and girls. There is a high probability of other children enrolling in school as compared to 14-18-year-old boys in remittance-recipient households. However, the data used does not allow identification of labor migrants, labor migration in a household, and remittances as a proxy for any additional income.

In Ecuador, Bucheli et al (2018) employed a bivariate probit model to examine the remittance impact on children's education using data from the Ecuadorian Population and Housing Census of 2010. The study found out that income from remittances eases the budget constraints of a household hence increasing the chances of investing in children's education, especially for poorer and urban males. In wealthier households, remittances have negatively affected children implying that the absenteeism effect from migrant relatives offsets the positive remittances income effect. On the positive side, this study did look at the magnitude of the impact depending on the group considered with large data sets. Therefore, the evaluation of different samples was made possible.

While employing a Cox proportional hazard model, Kalag (2010) examines how remittances affect educational attainment using household-level data from the Albanian Living Standard Measurement survey of 2005. The study indicated that with remittances, there is a high probability of leaving school especially after the completion of secondary education. This probability is high in males residing in rural areas. This is because remittances tend to propel further outmigration in preference to aiding education at home. On the contrary, parental absence affects children's school enrolment negatively. It leads to less parental control and child work as children are forced to tackle the work responsibilities in substitution of members who migrated. The study also found out that additional income from remittance increases the probability of females staying longer in school than their male counterparts while the hazard of leaving school is not affected by the education level of mothers in the households. However, this study fails to capture the effect of father's education to have a better understanding of the joint impact of parental schooling. The study further proposes the estimation of a logit model to gain a clear picture of the remittance effect on the education of left-behind children.

Kumar (2019) uses primary data from 396 households to examine if international remittances affect the education and health of household members in Bangladesh. OLS results indicate that

international remittances negatively affected children's education but positively affect the health of household individuals. This study provides insights on remittances and educational expenditure. However, the study was time and budget-constrained and did not control for the endogeneity nature of remittances.

Nepal (2016) examines what international remittances do to child schooling, child labor, and household expenses in Nepal using 2010 household-level data. The study controls for various household observable characteristics while employing the IV technique. Findings show that remittance income neither affects child education nor child labor. However, international remittances lead to more spending on non-food items, inclusive of education. Despite the increase in child education expenditure due to remittances, educational outcomes do not improve. This paper focuses on household subsamples whereby at least one member of a household migrated to another country. Bilateral exchange rate shocks on currencies of destination countries and the Nepali currency was the instrument for the study. However, this study was constrained by the unavailability of data on the test results of school children.

Parinduri & Thangavelu (2011) employed an IV estimation technique to study the remittance effect on children's education in Indonesian households. Two instruments were employed in the study: the past percentage of households receiving remittances at the district and sub-district, and if a household is located in a traditionally migrant-sending district. Results were that remittances increase the probability of a child remaining in school by 23 percent although it does not increase the quality of schooling in children. This implies that the migration of parents to other countries impacts negatively on a child's human capital development. However, this study does not account for the families receiving remittances.

In Albania, Cattaneo (2012) analyzed how international remittances relate to educational expenditure using data from the Albanian measurement survey carried out between April and September 2002. The study employed an Engel curve framework and quantile regression analysis technique. Findings show that remittances do not affect education since remittance senders offer directives on the use of the money to other specific allocations instead of education. From the study, other factors affecting investments in education from remittances are the low perceived returns to education brought by the low quality of education in the region and underdeveloped educational infrastructure in most Albanian schools.

Zhunio et al. (2012) investigated how remittances affect the health and education of 69 low and middle-income countries from the year 1987 to 2006 using World Development Indicators. This study employs the 2SLS and Hausman-Taylor estimation techniques and finds that remittances affect primary and secondary school attainment positively although the effect is much higher in secondary schools than in primary schools. To solve for endogeneity, the study uses colonial histories as an instrument. However, the study was constrained due to the lack of some data and underreporting of the actual value of remittances.

In Columbia, Tsaurai (2015) investigated the long-run relationship between remittance inflows and children's gross enrolment ratio in primary and secondary schools. With an ARDL bounds co-integration technique and data ranging from 1978 to 2010, the study revealed that there is no relationship between remittances and enrolments in both schools. Amega (2018) uses system GMM to find out how remittance inflows impact the education and health of 46 sub-Saharan African countries ranging over the years from 1975 to 2014. Study findings indicate that remittances impact positively on education through increased school enrolments in both secondary and tertiary institutions although remittances do not affect primary school enrolments.

Acosta (2011) investigates the relationship between labor supply, school attendance, and international remittances in El Salvador. Robust estimates in the study solve for selection and endogeneity problems: a different approach from the OLS estimates in previous studies. Using propensity score matching as a selection correction technique and both village and household networks as instruments, the following results were obtained. First, girls and young boys in recipient households are more likely to enroll in school. Secondly, child labor and adult female labor supply were negatively related to remittances while adult male labor force participation was unaffected. These findings imply that with remittances, girls' school attendance increases, women's supply of labor reduces while remittances do not affect males above 14 years. Therefore, there exist gender differences in remittance use amongst households.

Nasir et al. (2011) study how international remittances affect children's educational performance in remittance-receiving households using primary data from four cities in Khyber Pakhtunkhwa Province, Pakistan. The OLS estimates illustrate that remittances negatively affect children's educational performance. However, including parental education as a control variable in the regression process leads to an insignificant effect. This result is only subject to parents'



education only. Other factors that influence education in the study are low level of parental education, type of family, size of family, assets, and current incomes. This study did not address the potential endogeneity of remittances.

Antman (2011) investigates how paternal US migration affects the educational attainment of migrants daughters using data from the Mexican Migration Project (MMP118). With the use of the family fixed-effects regression model, this study found that paternal US migration affects the migrants' daughters' educational attainment positively. Instrumentation for the study was based on varying the ages of siblings at a specific time when the parent migrated. This study looked at both parents who migrated and those that never migrated and considered permanence of family dissolution through father absence as a distinction from other studies. The fixed effects technique employed does not control time-varying sources of endogeneity.

Azizi (2018) employs data for 122 developing countries covering the years 1990-2015 to find out the effect of remittances on human capital. The study also employs an innovative instrumental variables estimation technique with remittance-sending countries' per capita Gross National Income, real interest, and unemployment rate. Findings indicate remittances result in increased school completion rate, private school enrolment, and school enrolment in general. When evaluated according to gender, remittances significantly improve girls' education more than boys'. This study used a new innovative approach in building instruments for endogeneity and creates bilateral remittances used as weighted indicators for countries that send remittances.

Bouoiyour & Miftah (2016) studied the remittance-education relationship in rural areas of Southern Morocco using household survey data from the Moroccan Migration Project. The study employed an IV probit estimator with the costs of remittances and historical migration networks as instruments. Findings show that remittances affect the school attendance of children positively, particularly for boys. Parent's education increases the likelihood of attending school for children although the impact is more pronounced in girls implying that with parent's education, females encounter a lesser risk of disruption from education. Male-headed households were also found to not only disfavor girls' school attendance but they also discourage girls' acquisition of education as compared to female-headed households. Despite the findings, the study did not address the relative importance of the head's preferences.

In Ghana, Gyimah & Asiedu (2015) investigated the remittance effect on education investment by employing data from the Ghana Living Standards Survey wave 5. Two techniques were used in the study: the bivariate probit and pseudo-panel technique. Results indicate that with international remittances, enrolments in primary and secondary schools increase although the impact is stronger than that from domestic remittances. Remittances also have a larger effect on educational investment in households headed by females than in their male-headed counterparts. This study contributed to the literature on the remittance-education nexus. First, it used cross-sectional data to find the static effects while pseudo panel data enabled the identification of dynamic effects of remittance on education. It also examined the effect of remittance recipient's gender on educational investment amongst households. It also solved for endogeneity problem by using a new identification strategy. However, the study did not address regional or locational differences.

Mumuni & Koomson (2019) also examines how remittance inflows affect education in Ghana using school hours as a proxy for education. The study employs an instrumental variable approach with the channel of receiving remittance as an instrument for endogeneity. Findings from the study were as follows: one, with the receipt of remittances, household liquidity constraints reduce leading to a rise in the number of hours that children spend in school. In urban areas, remittances increase the school hours for children but lowered school hours for those from rural areas. Lastly, remittance inflows lead to more gain in school hours for boys but have little or no impact on improving that for girls. While addressing the endogeneity problem, this study also includes children in nursery and kindergarten when considering child education. It also addressed the gender and locational heterogeneities which may exist in the remittance-education effect.

In Moldova, Matano & Ramos (2013) investigates the remittance impact on educational outcomes by use of data from the 2008 CBSAXA Moldovian Household Survey. With the probit and IV probit estimation techniques, results show that if one lives in a remittance-receiving family, then the likelihood of attending higher education is 33 percent. Additionally, the migrant's educational level influences the family member's education positively. With the historical migration rate as an instrument, the study solves for the endogeneity of remittances. However, the study only addresses household members aged 16 and 30.

Elbadawy & Roushdy (2010) studied how international migration and remittances impact on schooling and work of children in Egypt using the 2006 Egypt Labour Market Panel Survey. The study employs an IV approach with migration intensity at the village level as an instrument for migration. From the findings, remittances have minimally affected school attendance for university-aged boys but girls were ever enrolling, with a positive conditional attendance for girls aged 15-17 years. Remittances also had an insignificant impact on tutoring for boys while the effect was implausible for girls. A negative impact on the market and domestic work for boys was noted, especially those between 15-17 years of age as they substitute their father or the absent household member in domestic chores. This study extended literature by focusing on the remittance impact on educational investment represented by private tutoring variables.

Arif & Chaudhry (2012) studied the impact of external migration of some household individuals on children's educational outcomes in Punjab, Pakistan using household-level data. Employing the instrumental variable approach, several results came up. First, external migration impacts positively on younger children's school enrolments and older children's accumulated schooling levels. Secondly, no differences exist in dropout rates of children in migrant or non-migrant households. Migration also lacks a significant effect on how many days a child stays in school. As a contribution to existing literature, this study uses Punjab's historic rates of migration at the district level and accumulated level of schooling as a schooling outcome. However, data on attendance could not fully reflect child attendance since it was obtained a week before surveying the respondent. Insufficient data on dropout rates of children aged between 5 and 11 years restricted the estimation of the impact of migration in that age group.

In Tajikistan, Dietz, Gatskova & Ivlevs (2015) investigated the relationship between emigration and remittance on left-behind children. Findings from the fixed effects estimations state that both emigration and remittances do not improve school attendance of left-behind children. This finding supports the theory that migration brings about more work for children as a substitution for the absentee household member and decreased supervision but fails to support the standard economic theory. From the study, other factors that affect school attendance are; ethnicity, education of household head, migration of non-parent family members' gender, and age of the child. This study fails to address potential endogeneity arising from both reverse causality and

time-varying unobservable variables affecting remittances and education. Therefore, to establish precise causal effects, this study advocates for an IV technique.

Lu & Treman (2007) investigates how South African Black migrant remittances affect children's schooling using both household survey data and panel data. The fixed effects and random effect estimates examined the effect. The study revealed that Blacks have a high probability of migrating and remitting than any other racial group. The study also suggests that remittances through increased household spending on education increase the chances that children stay in school. They also decrease child labor and alleviate the disruptions caused by parental absence. The study contributed to a clear understanding of the social impact of migration. However, the data available was on households rather than individuals, therefore, many conclusions were made based on indirect inference. The study was also restricted to blacks even though other racial groups are present and do remit.

In Kenya, many studies done are on remittance inflows and their effect on other socio-economic indicators but those focusing on remittance and education are quite limited. Hines & Simpson (2018) studies the relationship between out-migration, remittances, and investment in human capital using the Kenyan Migration Household Survey of 2009. Results indicate that amount of remittances a household receives positively relates to how much is allocated to education at all levels when using the OLS technique. However, the results do not hold up to various specifications when using the IV specifications in isolating remittance effect levels. The study fails to differentiate between households that receive remittance and those that do not. The paper contributes to existing knowledge on the relationship between remittance and spending. Simiyu (2013) investigates how domestic and international remittances affect the education of children in rural areas of two Kenyan provinces. The study concluded that most households consume remittances instead of investing in education.

#### **2.4 Overview of literature review**

Economic theory presents two main effects of remittances on school education. Standard economic theory argues that increasing incomes through remittances eases household budget constraints (Lu & Treman, 2007; Calero et al., 2009). On the other hand, the migration of adult household members forces school children to handle tasks that those migrants were supposed to undertake. Furthermore, absentee adults not only fail to supervise their children but are also

unable to help them in undertaking their homework, and finally, the possibility of young adult migrating discourages them from staying in school (Frisancho & Oropesa, 2011; McKenzie & Rapoport, 2011; Elbadawy & Roushdy, 2009).

The existing empirical studies have shown contradicting results. Some have shown a positive effect of remittances on education (Dharmadasa et al (2019); Hines & Simpson (2018); Arif & Chaudhary (2012); Lu & Treiman (2007); Matano & Ramos (2013); Mumuni & Koomson (2019); Azizi (2018); while others document a negative effect (Matano & Ramos (2013); Dietz, Gatskova & Ivlevs (2015); while other studies show that remittances do not impact on education (Cattaneo, 2011). Therefore, no conventional generalizations can be made. Most of these studies are with specific reference to Asia, Latin America, Europe, and West Africa. This means that very little is known about how remittances affect education in East Africa, particularly Kenya. Differences in methodologies used, data sources, regions, or countries lead to varying findings in the study.

Given the above, this study employed an ordered probit and an ordered IV probit strategy to investigate how household remittance inflows affect educational outcomes by focusing on the levels of education completed by household members and further investigate if there are differences in the completed level of education between the males and females in households receiving remittances. The study contributes to the extant literature in general and specific terms. Generally, it employs an ordered IV probit strategy while incorporating an instrumental variable to resolve the endogeneity problem associated with remittance. Specifically, it employs the level of education completed as a measure of education.

## CHAPTER THREE

### METHODOLOGY

#### 3.1 Introduction

Chapter three dwells on the theoretical approach in examining remittance impact on educational outcomes in Kenya, empirical model, data sources, estimation procedures, and data sources.

#### 3.2 Theoretical Model

This study draws its theoretical from the standard economic theory as a description of the remittance effect on educational investment (Zhunio et al, 2012; Arif & Chaudhry, 2012; Matano & Ramos, 2013). The assumption is that Kenyan households would wish to finance their children's education up to a certain extent. This desire is not possible since households lack enough resources, and that credit markets are non-existent or those available are inefficient. These households eventually fail to provide finances to achieve the level of education desired for their children. With remittances on board, the households' resource credit constraint is relaxed allowing increased investments in children's education.

Suppose that a household decides to maximize utility,  $U$ , which depends on education investment and consumption of all other commodities.

$$\text{Maximize } U = U(E, C), u_1 > 0 \dots\dots\dots 1$$

Where  $U$  = household utility

$E$  = education investment

$C$  = consumption of all other commodities

The households receive an income  $Y$ , which is dedicated to the maximization of their utility by choosing an education investment level and consumption level for all other commodities. Therefore, the budget constraint is;

$$Y \geq P_e E + P_c C \dots\dots\dots 2$$

Where,  $Y$  = Total income received by households (inclusive of remittances)

$P_i$  = price of good  $i$

An optimization problem is set up to solve for E by maximizing equation 1 subject to equation 2 as follows:

$$L = U(E, C) + \lambda(Y - P_e E - P_c C) \dots\dots\dots 3$$

From the first-order condition of equation 3, we derive an optimal condition:

$$\frac{U_e}{P_e} = \frac{U_c}{P_c} = \lambda \dots\dots\dots 4$$

$\frac{U_e}{P_e}$  denoted as  $\theta$  describes how utility changes as a result of a change in education investments while  $\frac{U_c}{P_c}$  denoted as  $\phi$  shows the change in utility level resulting from a change in the consumption level of other commodities. Therefore, the Marshallian demand curve for education is stated as:

$$e = 1 - \frac{\phi}{\theta} (Y - P_e E - P_c C) \dots\dots\dots 5$$

Partially differentiating education with respect to income:

$$\frac{\partial e}{\partial Y} = -\frac{\phi}{\theta} \dots\dots\dots 6$$

From equation 6, the direction of a change in education resulting from a change in income (inclusive of remittances) is uncertain since it is dependent on a household's choice between the gains from education and their consumption of all other commodities. These choices may also vary depending on the location of household members due to imperfect labor markets that are much prevalent in rural areas. This may influence the need for child work distinctively. This interrelation may also vary according to the household heads age and gender, amount households' income, and the child's age and gender. This implies that we are not sure of what signs to expect in the study results since they may differ across the sub-groups in the population (Chudgar, 2011; Gyimah & Asiedu, 2015).

In this study, education is measured as the level of school completed by an individual. A continuous variable  $e^*$  describes the level of education desired and depends on several dependent variables denoted as  $X$  and an error term  $\epsilon$ . Therefore,

$$e^* = X\beta + \varepsilon \dots\dots\dots 7$$

Where  $\varepsilon/X \sim \text{normal}(0,)$

However, only a discrete education level  $e$  expressed in different levels of school attendance can be observed but not the desired level  $e^*$ . Therefore,

$$e = \begin{cases} 0 & \text{if } e^* \leq \alpha_1 \\ 1 & \text{if } \alpha_1 < e^* \leq \alpha_2 \\ 2 & \text{if } \alpha_2 < e^* \leq \alpha_3 \\ \vdots & \dots\dots\dots 8 \\ \vdots & \\ j & \text{if } \alpha_j < e^* \leq \alpha_{j+1} \end{cases}$$

The variables  $\alpha_1$  to  $\alpha_j$  are parameters symbolizing movement from one level of education to the next level. Education is classified in categories with a natural order: pre-primary (1), primary (2), post-primary (3), secondary (4), college/middle level (5), and university (6). Any observed level of school attendance  $e$  is a result of optimizing the utility function of a household. A household member moves from one education level  $e$  if the value of the unobserved variable  $e^*$  lies between  $\alpha_1$  and  $\alpha_{j+1}$ . Hence, education is handled as an ordered and discrete variable.

If  $\varepsilon$  has a standard normal distribution, then the conditional distribution of  $e$  given  $X$  can be obtained. Therefore, each response probability adding to one is calculated as follows

$$\begin{cases} P(e = 0/X) = P(e^* \leq \alpha_1/X) = P(X\beta + \varepsilon \leq \alpha_1/X) = \Phi(\alpha_1 - X\beta) \\ P(e = 1/X) = P(\alpha_1 < e^* \leq \alpha_2/X) = \Phi(\alpha_2 - X\beta) - \Phi(\alpha_1 - X\beta) \\ P(e = j - 1/X) = P(\alpha_{j-1} < e^* \leq \alpha_j/X) = \Phi(\alpha_j - X\beta) - \Phi(\alpha_{j-1} - X\beta) \\ P(e = \alpha_j/X) = P(e^* - \alpha_j/X) = 1 - \Phi(\alpha_j - X\beta) \end{cases} \dots\dots\dots 9$$

The maximum likelihood estimation technique can be used to estimate  $\alpha$  and  $\beta$  (Wooldridge, 2010). Therefore, the log-likelihood function for each  $i$  is:

$$l_i(\alpha_1, \beta) = 1[e_1 = 0] \log[\Phi(\alpha_1 - X\beta)] + 1[e_1 = 1] \log[\Phi(\alpha_2 - X_1\beta) - \Phi(\alpha_1 - X_1\beta)] + \dots + 1[e_1 = j] \log[1 - \Phi(\alpha_j - X_1\beta)] \dots\dots\dots 10$$

Since the dependent variable, education is discrete with a natural order but partly sequential such that an individual cannot complete university (6) without going through the secondary level (4).



However, one can attend university without completing the middle/college level (5). This measure of education is not restricted to the level of schooling insinuating that the dependent variable does not have a conditional sequence. Therefore, an ordered probit model seems appropriate for our estimation.

### 3.3 Econometric Models

To analyze the remittance impact on education, this study follows the theoretical model from equation 15, and specifies the empirical model for the study as follows:

$$P(e = 1) = \Phi (\alpha_0 + \alpha_1 rem + X\beta + \varepsilon) \dots \dots \dots 11$$

Where  $\alpha$  and  $\beta$  are co-efficient to be estimated,  $\Phi$  is the cumulative normal distribution,  $e$  refers to the level of education completed,  $\varepsilon$  is the stochastic term which shows the impact of other unobserved factors,  $X$  refers to all other independent variables affecting education, while  $rem$  refers to the remittance income.

### 3.4 Model estimation

To estimate the effect of remittances on education, this study assumed no relationship between education decisions and migrants' decision to remit. This means that if there is a correlation between education and remittance decisions, then a reverse causality problem would arise. The study also assumes that characteristics in  $X$  explain all differences amongst households receiving remittances and those that do not. Migration brings about remittances, and in case migration affects education directly adding to its indirect impact via remittances, then the error term suffers from omitted variable bias (McKenzie & Rapoport, 2011). Therefore, this study employs an IV approach to solve for endogeneity associated with remittances (Roodman, 2011) as follows:

$$rem = \gamma_0 + \gamma_1 Z + X\beta + i \dots \dots \dots 12$$

Where  $i$  is an error term,  $Z$  contains variables affecting  $e$  via  $rem$  only while  $X$  and  $rem$  are as stated above.  $Z$  solves for endogeneity associated with remittances that bring about inconsistent estimates by employing two instruments.

- i. Channel of receiving remittances represented by a dummy variable for households with a bank account (Matano & Ramos, 2013; Mansour et al., 2011).

- ii. The number of aged members in the household (above 65 years old). Mansour et al., (2011) & Cox et al., (1997) advocate for altruism as the driving force behind remittances. This implies that a household with more old members (above 65 years of age) can influence remittance sending decisions due to the need for health care fees to cater for the deteriorating health of these members.

These instruments satisfy the two general restrictions proposed by Wooldridge (2009) i.e channel of remittance and aged members are directly related to remittance inflow (Sam et al, 2013), but uncorrelated with the education of household members. Therefore, the structural and the reduced form equations of the model are as follows:

Reduced form equation (1<sup>st</sup> stage):

$$rem = \gamma_0 + \gamma_1 channel + \gamma_2 age + \gamma_3 male + \gamma_4 urban + \gamma_5 hhsiz e + \gamma_6 agric + \gamma_7 single + \mu \dots \dots \dots 13$$

Structural equation (2<sup>nd</sup> stage):

$$e = \alpha_0 + \alpha_1 rem + \alpha_2 age + \alpha_3 male + \alpha_4 urban + \alpha_5 hhsiz e + \alpha_6 agric + \alpha_7 single + \varepsilon \dots \dots \dots 14$$

Therefore, this study employed an ordered IV probit technique to derive the estimates of variables by endogenizing remittances as a binary variable. In the first stage, run a regression on equation 13 and compute the fitted values. In the second stage, regress the dependent variable (e) on the predicted values of the endogenous regressor, all exogenous variables, and the intercept (equation 14).

### 3.4.1 Estimation tests

#### Test for normality

This test was carried out via the Shapiro-Wilk test for normal data. Null and alternative hypothesis are:

$$H_0 = distribution is not normal$$

$$H_A = distribution is normal$$

The p-value obtained for most variables obtained is less than 0.05 shown in table 5... we reject the null indicating that distribution is normal.

### **Endogeneity test**

This test established whether remittance is indeed endogenous through the Wu-Hausman test. The hypothesis was stated as:

$$H_0 = \text{remittance not endogenous}$$

$$H_A = \text{remittance endogenous}$$

The p-value = 0.00, therefore, we reject the null that remittance inflow is not endogenous.

### **Weak identification test**

This test determined the strength of the endogenous regressor or if there existed a weak correlation with the endogenous regressor using the Wald F-statistic. The null and alternative hypotheses were as follows:

$$H_0 = \gamma_1 \neq 0$$

$$H_A = \gamma_1 = 0$$

Since the Wald F statistic is 104.1 and is greater than the weak ID critical values, then we reject the null of weak instrument implying that the model has no weak identification problems.

### **3.5 Definition of variables**

Table one below shows the definition of both the dependent variable and independent variables, their measurements, and expected sign after analysis as they were applied in the study.

**Table 1: Variable definition**

<b>Variable</b>	<b>Measurement</b>	<b>Expected sign</b>
Education	Categorical variable showing the level of education completed measured as 1 if primary school, 2 if secondary school, 3 if tertiary and 0 if no formal education.	
Remittance	Dummy variable showing remittance inflows into a household measured as 1 if a household receives remittances and 0 otherwise	Positive (Bouoiyour & Miftah, 2016).
Household size	A Continuous variable which measures the number of individuals in a household	Negative (Chaaban & Mansour, 2012)
Age	Continuous variable showing the age of household members in years	<b>Positive</b> (Simiyu, 2013)
Male	Dummy variable which gives the gender of the household member measured by 1 if a member is male and 0 if otherwise.	Positive (Gyimah & Asiedu, 2016)
Urban	A binary variable for location, where 1 if urban and 0 if rural.	Negative (Dietz, Gatskova & Ivlevs, 2015).
Single	A binary variable for the marital status of an individual measured as 1 if single and 0 if otherwise.	Positive (Kroeger & Anderson, 2014).
Bank account	Variable showing the mode through which a household receives remittances measured as 1 if an individual owns a bank account and 0 otherwise.	
Old age	Variable showing the number of old members in a household measured as 1 if above 65 years of age	

### **3.6 Data Sources**

To determine the effect of remittance inflows on the education of household members in Kenya, this study used secondary cross-sectional data obtained from the 2009 Kenya Migration Household Survey. This survey generates information on individual and household characteristics, migration both local, international, and non-migrants, and on transfers. The survey involved 1,942 household heads providing information for 10,588 individuals. 36% of these households have an international migrant. However, this survey only captures 17 districts in Kenya out of 46. The sample is henceforth not nationally representative. This study mainly focused on international remittances. Out of 1942 households, 779 of them reported receiving remittances (40.1% of the total sample). 326 of the 779 households were urban, constituting 41.8% of the total recipients. These additional incomes from remittances enable the recipient to direct them to specific uses, which helps improve their investments. The study also focused on the completed level of schooling of household members.

**CHAPTER 4**  
**RESULTS AND DISCUSSION**

**4.0 Introduction**

This chapter presents the study findings, estimation results, and their interpretation

**4.1 Descriptive statistics**

The dependent variable (level of education completed) was classified into four categories (no formal education, primary, secondary and tertiary level of education). Table 2 shows the frequency distribution of the dependent variable. From Table 2, 29.17% of the total individuals in the survey have no formal education, 36.65% have completed primary education, 19.66% have completed secondary education while 14.52 % are through with their tertiary level of education.

**Table 2: Frequency distribution for the level of education completed.**

Level of education completed	Frequency	Percent	Cumulative frequency
No formal education	2,434	29.17	29.17
Primary	3,058	36.65	65.83
Secondary	1,640	19.66	85.48
Tertiary	1,211	14.52	100.0
Total	8,343	100	

According to the survey results summarized in table 3, 41.15% of the individuals received remittances while 58.85% did not receive remittances in the past 12 months. The highest amount of remittance received was kshs. 20,000 at 4.24%. Males constituted 47.2% of the total population while females constituted 52.8% of the population. 44.9% of the males were residing in remittance recipient households while 48.8% of them lived in non-remittance recipient households. 46.61% of the individuals were living in urban areas while 53.39% were living in rural areas. Of those in urban areas, 42.1% of them received remittances while 49.7% of them did not receive remittances.

The average household size was found to be 5.46 people which was higher than the average household size of 4.40 people in Kenya. The most frequent household size is 5 people with 18.61%. The average age of individuals was 26.73 years. In a recipient household, the average age of individuals was 28.23 years while 25.68 years for a non-recipient household. 8.33% of the population are aged above 65 years of age with 10.9% of them receiving remittances while 6.5% of them not receiving remittances. On marital status, most individuals in the households are single at 58.37%. 67.02% of the total population owns agricultural land while 32.98% do not have agricultural land. 73.7% of those receiving remittances own agricultural land while 62.3% in non-remittance receiving households own agricultural land. 61.11% own a bank account while 38.89% of the individuals do not have a bank account.

**Table 3: Descriptive statistics by household remittance recipient status**

Variable	Full sample		Recipients		Non-recipients	
	Mean	SD	Mean	SD	Mean	SD
Remittance	0.412	0.492	0	0	0	0
Age	26.73	20.53	28.23		25.687	18.662
Household size	5.46	2.53	5.461	2.436	5.46	2.601
Male	0.472	0.4992	0.449	0.497	0.488	0.499
Single	0.5837	0.4929	0.584	0.493	0.584	0.493
Urban	0.4661	0.4888	0.421	0.484	0.497	0.5
Agricultural land	0.6702	0.4701	0.737	0.44	0.623	0.485
Bank account	0.6111	0.4874	0.628	0.483	0.6	0.489
Old age	0.0833	0.276	0.109	0.312	0.065	0.246
Observations	8343		3433		4910	

## 4.2 Empirical results

The empirical analysis for this study focused on the probability of completing a certain level of education as a result of remittances. To achieve this objective, the study employed the ordered probit and ordered IV probit estimation techniques to estimate equation 12.

#### 4.2.1 Effect of remittance on level of education by ordered probit

The results in Table 4 reports the individual coefficient estimates linking the independent variables to the dependent variable and their corresponding statistical significance.

**Table 4: Estimation results for remittance on education by ordered probit regression (regression coefficients)**

Variable	Coefficient	Standard error	$p >  z $
Rem	0.0222	0.249	0.373
Age	0.016	0.001	0.000
Hhsize	-0.0574	0.005	0.000
Male	0.187	0.024	0.000
Urban	0.354	0.026	0.000
Single	-0.072	0.035	0.040
Agric	0.432	0.029	0.129
Cut 1	-0.3126	0.0568	
Cut 2	0.7632	0.0571	
Cut 3	1.501	0.0582	
Pseudo $R^2$	0.0596		
Log-likelihood	1282.75		
Significance level	0.0000		
Observations	8,094		

Results in table 4 above indicate that all the variables produce coefficients that are statistically significant different from zero. Therefore, we reject all the null hypotheses. According to the results in table 4, the probability of completing a certain level of education is significantly influenced by remittances, that is, being in a household that receives remittances increases the probability of completing a certain level of education by 0.022 points.

The variables being male, living in an urban area, and owning agricultural land also increases the probability of completing a certain level of education by 0.187, 0.354, and 0.432 points respectively. Household size variable is statistically important at significant level 5% but related



to the level of education negatively. As household size increases, the probability of completing education decreases by 0.57. With being single, the tendency of completing education also decreases by 0.07. The cut-off points below the regression coefficients are statistically significant from each other, hence the four categories cannot be combined into one. Additionally, interpretation of ordered probit results requires more than just looking at the direction and level of statistical significance for the coefficient estimates. Therefore, marginal effects were estimated as shown in table 5.

**Table 5: Estimation results for remittance on the level of education by ordered probit model (Marginal effects).**

Variable	No formal education	Primary	Secondary	Tertiary
Rem	-0.0068 (0.008)	-0.001 (0.001)	0.0029 (0.003)	0.0046 (0.005)
Age	-0.0047 (0.000)	-0.0005 (0.000)	0.002 (0.000)	0.0033 (0.0001)
Hhsize	0.1749 (0.002)	0.002 (0.000)	-0.0074 (0.003)	-0.012 (0.01)
Male	-0.057 (0.007)	-0.006 (0.001)	0.024 (0.003)	0.0391 (0.05)
Urban	-0.108 (0.008)	-0.12 (0.001)	0.045 (0.003)	-0.015 (0.007)
Single	0.222 (0.108)	0.002 (0.01)	-0.009 (0.005)	-0.015 (0.006)
Agric	-0.103 (0.001)	-0.001 (0.001)	0.006 (0.003)	0.009 (0.006)

From the marginal effects in Table 5, a one-unit change in the receipt of remittances leads to a 0.007 points decrease in the probability of having no formal education and 0.001 points in primary education. However, as one progresses to higher levels of education, the remittance

effect is positive and statistically significant in that a unit change in the receipt of remittances leads to an increase in the probability of completing secondary and tertiary levels of education at 0.0029 points and 0.0046 points respectively. The marginal effect of an additional year of age decreases the probability of no formal education by 0.0047 points but has but the impact is not statistically significant on primary education. At the secondary level, the impact of an additional year is positive and statistically significant at 0.002 and 0.003 points respectively.

On the household variable, for a household with a larger size, the probability of having no formal education and completing primary school is positive and statistically significant at 17.49% and 0.2% respectively. However, as one progresses to secondary and tertiary levels, a larger household size decreases the probability of completing education by 0.74% and 0.12% respectively. Being a male increases the probability of completing secondary and tertiary levels of education at 0.024 and 0.039 points respectively. On completing the primary and no formal education levels, the probability decreases by 0.108 and 0.12 respectively.

Residing in an urban area increases the probability of completing the secondary level of education only but decreases the probability of completing secondary and tertiary levels by 0.12 and 0.015 points respectively. As for ownership of agricultural land as a wealth variable, a unit increase in owning land leads to an increased school completion rate by 0.006 points at the primary level and 0.009points at secondary and tertiary levels.

Results in Table 5 above shows ordered probit marginal effects of how remittances affect the level of education completed, with the assumption that there is no endogeneity in the variables. Table 6 below shows the relationship between remittance and the dependent variable education. With reference to chapter 2, many studies identified remittance as an endogenous variable. However, the estimates in Table 5 fail to address the fact that remittances are endogenous leading to inconsistency in results. Therefore, to make the estimates of the relationship between education and remittance reliable and consistent, an IV estimation was performed. Two instruments were employed: the number of aged members (above 65years) in a household and a dummy variable representing members owning a bank account (Table 7).

Table 6 shows the probit estimation of how instruments affect remittances and the level of education completed by testing how significant the instruments were on remittances and further performing the estimation on education level to find out if the instruments do not directly affect the variable of interest. These two conditions must be satisfied for the reliability of instruments. Results in table 5 reveal that the instruments are valid and are therefore adopted for the IV analysis.

**Table 6: Analysis of instruments**

Instrumental variable	Education level	Remittance
Bank account	0.5051	0.08
Old age	-0.8149	0.334
Chi_sq		60.14
p-value		0.0003

Table 6 below shows ordered IV probit estimation results showing the impact of remittance on the completed levels of education. Results from Table 7 reveal that the remittance impact on education was overestimated in the ordered probit regression (just like in Matano & Ramos, 2013). This insinuates that there existed biases in estimates of the effect of remittances on the level of education caused by the endogeneity nature of remittances. Therefore an ordered IV probit estimation was performed as shown in table 7.

#### **4.2.2 Remittance and level of education: ordered IV probit estimation**

This section presents results on the effect of remittance on education when considering remittance as an endogenous variable. Results obtained are as shown in table 7 below. According to the results in table 7, the marginal effect of remittance on education is statistically significant at the secondary and tertiary level but not statistically significant at the primary level. Therefore, living in a remittance recipient household increases the likelihood of completing secondary and tertiary education by 0.001.

The marginal effect for age differs across the categories of education in sign and magnitude. A unit increase in age lowers the probability of no formal education and primary education by 0.007 and 0.001 points respectively. However, a unit increase in age increases the probability of completing secondary and tertiary education by 0.003 and 0.005 points respectively. On the household size marginal effect, a unit increase in the number of household members decreases the chances of completing primary, secondary and tertiary education by 0.018, 0.007 and 0.011 points respectively.

**Table 7: Estimation results for remittance on level of education by ordered IV probit model (Marginal effects).**

Variable	No formal education	Primary level	Secondary	Tertiary
Rem	-0.012 (0.131)	-0.0001 (0.145)	0.001 (0.056)	0.001 (0.081)
Age	-0.007 (0.000)	-0.001 (0.000)	0.003 (0.000)	0.005 (0.000)
Hhsize	0.016 (0.01)	-0.018 (0.001)	-0.007 (0.000)	-0.011 (0.00)
Male	-0.031 (0.007)	-0.03 (0.001)	0.017 (0.004)	0.023 (0.004)
Urban	-0.07 (0.006)	-0.07 (0.001)	0.0258 (0.004)	0.041 (0.006)
Single	-0.019 (0.17)	-0.002 (0.02)	0.0082 (0.07)	0.013 (0.011)
Agric	-0.026 (0.16)	-0.028 (0.002)	0.011 (0.007)	0.018 (0.11)

The gender variable represented by males in Table 7 significantly affects the probability of members completing the different levels of education. On the primary level, being male lowers the probability of completing that level by 0.03 points. However, being male increases the chances of completing secondary and tertiary education. The result for single status is positive

and significant on completing the secondary and tertiary levels at 0.0082 and 0.01. This means that with a single individual, the probability of completing primary and secondary education increases by approximately 0.008 and 0.01 points.

With the wealth variable measured by a dummy variable if one owns agricultural land, the marginal effect shown in Table 7 is statistically significant and positive at the secondary and tertiary level but negative at the primary level. Therefore, a unit increase in owning agricultural land increases the probability of completing secondary and tertiary education by 0.011 and 0.018 respectively while at the primary level, it decreases the probability by 0.028.

The marginal effect of urban, a dummy representing the location of a household is positive and significant showing that living in an urban area increases the probability of completing secondary and tertiary education by 0.026 and 0.041 respectively.

#### **4.2.3: Gender perspective of remittances and educational outcomes of household members**

Many governments in developing economies form policies that are generally geared towards reducing gender gaps in education. However, gender disparities in education still pose a challenge to many developing countries like Kenya. This section presents results on the gender effect of remittance income on educational outcomes of household members in Kenya.

Results for the gender category in table 8 show the marginal effect for the remittance variable is positive and statistically significant for females at all educational levels. This means that a unit increase in remittances would increase the probability that a female individual completes primary, secondary and tertiary education by 0.114, 0.112, and 0.116 points respectively. On the other hand, being a male in a remittance-receiving household lowers the probability of completing education at all levels by 0.009, 0.009, and 0.012 at primary, secondary, and tertiary levels. These results suggest that females gain from remittances while males are affected negatively. These findings fail to support the works of Mumuni & Koomsoon (2009) and Elbadawy & Roushdy (2009) who concluded that remittances to households had a positive effect on boys' education but the effect was less for girls.

**Table 8: Estimation results on gender perspectives of remittance on education by ordered IV probit (marginal effects).**

Variable	No formal education		Primary		Secondary			Tertiary
	Male	Female	Male	female	Male	female	male	Female
Rem	0.029 (0.678)	-0.034 (0.134)	-0.009 (0.023)	0.114 (0.44)	-0.009 (0.023)	0.112 (0.44)	-0.012 (0.002)	0.116 (0.46)
Age	-0.006 (0.002)	0.001 (0.00)	0.002 (0.002)	0.001 (0.00)	0.002 (0.001)	0.001 (0.001)	0.002 (0.001)	0.001 (0.001)
Hhsize	0.11 (0.004)	0.008 (0.001)	-0.003 (0.003)	-0.003 (0.001)	-0.003 (0.002)	-0.027 (0.007)	-0.004 (0.002)	-0.028 (0.001)
Urban	-0.018 (0.02)	-0.051 (0.011)	0.0053 (0.005)	0.017 (0.05)	0.0058 (0.005)	0.017 (0.04)	0.0073 (0.005)	0.08 (0.02)
Single	-0.798 (0.329)	0.06 (0.19)	0.0231 (0.0234)	-0.02 (0.07)	0.025 (0.017)	-0.021 (0.07)	0.031 (0.012)	-0.02 (0.007)
Agric	-0.018 (0.157)	-0.236 (0.18)	0.005 (0.007)	0.008 (0.006)	0.006 (0.006)	0.008 (0.006)	0.006 (0.005)	0.008 (0.006)

In general, individuals from households in urban areas complete more levels of education than their rural mates as depicted in table 4. These results contradict when we narrow down to remittance impact on gender and location dimensions. For the females in urban areas, there is a statistically significant and positive impact on the level of schooling although the probability is higher than that of the females. With being a female in an urban area, the probability of completing primary, secondary and tertiary education is 0.005, 0.006, and 0.007 respectively while for the females, the probability lies at 0.02, 0.01, and 0.08 respectively. While for the females in urban areas, the impact is significant but positive.

Table 8 also reveals that the marginal effect for household size is statistically significant and negative for both males and females. Therefore a unit increase in the number of household members decreases the probability of completing primary, secondary and tertiary education for males by 0.003, 0.003, and 0.004 and for females by 0.003 points at each level. For the wealth variable represented by owning agricultural land, the impact is positive and statistically significant for both males and females. The marginal effect for the variable age is statistically

significant and positive for both males and females at all education levels. With a unit increase in age, the probability of completing all levels of education for females is 0.001 while that for males was 0.002 as shown in table 8 above.

### **4.3 Discussion of the findings**

The main result of the study was that remittances impact positively on education by increasing the probability that household members complete different levels of education. These findings corroborate those of Mumuni & Koomson (2019) who concluded that with a 40% increase in household remittance, a 22 minutes per day increase in time spent by children in school is noted. In Haiti, Amuedo-Dorantes et al., (2010) also found that remittances increase the school attendance of children irrespective of whether they belong to households with migrants or not. Bucheli et al., (2018) also found that with remittances, a probability of 2.6% was found in school enrolments of children in remittance-receiving households as opposed to the non-remittance recipient ones. Gyimah & Asiedu (2015) also concluded that remittances impact positively on both primary and secondary school enrolments though the impact is high on secondary school enrolments. All these findings concur with the standard economic theory which states that in case households are resource-constrained, an increase in income from remittances relaxes the budget constraints enhancing increased educational investments.

However, the results are not surprising in that the marginal effect of remittances is higher for secondary and tertiary levels of education than the primary level. Considering the higher cost of secondary and tertiary education, remittances relax a much more binding constraint for higher education than it does for primary completion (Bucheli et al., 2018; Zhunio et al., 2012; Tsauroi 2015). Therefore, this study supports the findings that remittances have a higher positive effect on secondary and tertiary levels than the primary level. This can majorly be attributed to the free primary education that was endorsed in Kenya in 2003.

Results are also contrary to those of Cattaneo (2012) who found that remittances do not have an impact on education since remittance senders offer directives on the use of the money to other specific allocations instead of investments in education. Nepal (2015) also finds that remittances do not improve the educational outcomes of recipient households. The positive effect of

remittances results in this study do not also concur with findings from Matano & Ramos (2013); Dietz, Gatskova & Ivlevs (2015) who find remittances to impact negatively on the education of household members with the argument that migration brings about more work for children as a substitution for the absentee household member and decreased supervision.

The marginal effect of the age variable was positive and statistically significant. At the primary level, age reduced the probability of completing primary education while it encouraged completion of secondary and tertiary education. These findings are contrary to Acosta's (2011) findings that young individuals are more likely to enroll in school than their older counterparts.

In conjunction with the results, a household with more members has a lower probability of completing any level of education in Kenya. More individuals in a household increase the consumption level hence the allocation of more income for the purchase of food items. In most cases, remittances sent are spent on the daily requirements of household members. This situation is more pronounced in households without any other income source. If there is no other source of income, the share of remittances towards education decreases leading to a low completion rate of education at all levels. Jayawardena (2012) supports this by stating that even though remittances have been on the rise, its portion allocated to education is very low while the highest proportion is directed towards food items. Darmadasa et al., (2019) highlighted that an additional member in the family increases the number of people in the household leading to competition on the scarce financial resources available; eventually, children's school hours are decreased. Additionally, Shen (2017) found out that there are beneficial consequences on education if the household size is limited.

From the results, with increased ownership of agricultural land, the probability of education completion level increases at the secondary and tertiary levels. This finding is in line with Bouoiyour & Miftah (2015) who describe land as a form of wealth, and in most cases, wealth leads to an increase in school completion as households can meet fee requirements. Ray (2000) claims that wealth reduces the probability of children working. It loosens the household's budget constraints hence increasing enrolments in school. This result contradicts the expected sign of this impact. Dharmadasa et al., (2019) 2019 argues that increased ownership of agricultural land creates increased demand for labor within the households hence raising the opportunity cost of



completing higher education. From these contradictory findings, the effect of ownership of agricultural land on the education of household members is still unclear.

On marital status represented by a dummy variable if an individual is single while holding other factors constant, the impact is positive and significant on education completion at all levels. However, males had a higher probability of completing education at all levels than females. These findings are in agreement with other researchers. Matano & Ramos (2013) found out that when an individual is single, his/her probability of achieving higher education increases than when he/she is married. In Bangladesh, Field & Ambrus (2008) reports a 0.22% increase in the years of schooling when an individual delays marriage by one year. Both studies are in agreement that, with marriage in question, the probability of obtaining higher education decreases.

On the location of households, the study findings indicated that there was a positive and significant impact on completed education of household members in urban areas implying a higher probability of completing a higher level of education than when in rural areas. This is in line with findings from Ghana by Mumuni & Koomsoon (2019) who noted that children in urban areas spend 2.4 hours more in school than their rural counterparts citing poverty, lack of enough resources, and geographical isolation as the main challenges in rural areas as compared to urban regions. Also, some schools are located far away therefore children have to endure long distances to and from school. This leads to a wastage of time that would have been used in learning. In some cases, some children have to assist in carrying out some domestic chores before leaving for school. All these factors reduce the time that individuals in rural areas would have spent in school.

On the gender dimensions of remittances on education, results indicated that remittances impact negatively on completion of all levels of education for males. However, remittances had a positive and statistically significant impact on education for females. These findings corroborate with Azizi (2018) who found out that remittances improve enrolments of females in school than the males. However, these findings contradict Busquet et al., (2013) & Dietz, Gatskova & Ivlevs (2015) who concluded that boys have a higher probability of attending higher education as compared to girls since girls are more likely to attend to household chores than boys.

## CHAPTER FIVE

### SUMMARY, CONCLUSION, AND RECOMMENDATION

#### 5.1 Introduction

This chapter summarizes the research findings and derives conclusions from the findings. It further looks at the policy implications from the study findings and presents areas for further research.

#### 5.2 Summary of findings

In developing countries, remittance inflows continue being a major source of income, Kenya included. In this regard, several studies have been undertaken to examine the impact of such flows on key socioeconomic indicators including the education of household members. Most of these studies have been undertaken in Latin America and Asia while the few from Africa are mostly in West Africa. Besides, most of them have overlooked the endogeneity nature associated with remittances. Different measures of education such as school enrolments/attendance, private tutoring, educational expenditures among others have been used in the studies. Therefore, results across these studies are heterogeneous hence warranting a new look.

In lieu of this, this study investigated how remittance affects the probability of household members completing different levels of education by using data from the 2009 Kenya Migration Household survey. Employing an ordered probit and an ordered IV probit estimation with a dummy variable for households receiving remittances as the main independent variable and several other control variables that included household size, urban dimension, age of household members, single for the marital status of an individual and a dummy variable for owning agricultural land as a wealth variable. Instrumentation was based on a dummy for the number of aged individuals in the household (above 65 years) and a dummy for those owning a bank account. Observations totaled 8,094 individuals in the survey.

Results from the ordered probit technique indicated that living in a household that remittances increase the probability that one completes primary education at -0.0001, secondary education at 0.0046, and tertiary education at 0.0029. With the ordered IV probit technique, remittance recipient households increase the probability of completing primary education by -0.001 secondary education by 0.001, and tertiary education by 0.001. Concerning the gender

perspective of the impact, remittance has a positive impact on the education of females but a negative effect on the education of the males.

### **5.3 Conclusion**

Based on the study findings, the study concludes that remittances have a significant effect on the education of household members but differ according to the level of education. This implies that remittances lead to growth in human-capital formation which in the long-run enhances poverty reduction. Differences in gender over the effect of remittances on human capital formation also exist. Females have a higher probability of completing higher levels of education while males have a negative probability of completing education.

### **5.4 Policy Implication**

The key finding of the study that remittance inflows impact positively on education implies that remittances have an important role in supporting the attempts by governments and households in educating household individuals. Therefore, increasing remittance flows to Kenya can significantly increase investments in the education of household members. Hence, policies towards increasing remittances via regulations in the financial sector that would help lower transaction costs associated with remittances should be enhanced. These results also imply that while increasing remittances to Kenyan households will increase school completion probabilities, there exists a significant difference in the human capital formation of whether an individual in a recipient household is male or female. Males have a lower probability of school completion than females. Therefore, targeting policies towards them would enhance human capital formation and contribute to their empowerment.

### **5.5 Areas for Further Research**

The focus of this study was limited to the effect of international remittances on the level of school completed by household members and the gender differences in the effect in Kenya. The study proposes further investigation of this relationship by incorporating domestic remittances and other sources of income and employing more recent data.

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## APPENDIX

**Table A1: Results for normality test**

Variable	Observations	W	V	z	Prob>z
edduc	8,343	0.99351	27.626	8.841	0.00000
rem	8,343	0.99992	0.339	-2.879	0.99801
male	8,343	0.99998	0.102	-6.080	1.00000
urban	8,343	0.99997	0.118	-5.693	1.00000
single	8,343	0.99998	0.105	-5.993	1.00000
agric	8,343	0.99987	0.539	-1.645	0.95006
bankacc	8,343	0.99995	0.197	-4.324	0.99999
oldage	8,343	0.99698	12.869	6.806	0.00000