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The Effects of International Remittances on Expenditure Patterns of the Left-Behind Households in Sub-Saharan Africa

Joseph B. Ajefu¹ & Joseph O. Ogebe²

Abstract

This article explores the effects of international remittances on the expenditure patterns of households in Sub-Saharan Africa. This article focuses on five countries in Sub-Saharan Africa, which are some of the destinations that account for the highest receipt of international remittances. We analyse both aggregate and distributional effects of international remittances on household's expenditure patterns. To investigate the distributional effect of international remittances, we adopt the instrumental variable quantile regression framework that allows us to simultaneously address the endogeneity of international remittances and possible heterogeneity in the impact of international remittances on household's expenditure patterns. We instrument for international remittances by using the economic conditions in migrants' countries as instrument for international remittances. Our results show that the receipt of international remittances increases expenditures on food, durables, education and health. Using the instrumental variable quantile regression, we find the effects of international remittances on household expenditure on food, durables, education, and health increases across the different expenditure quantiles.

Keywords: International remittances, Expenditure, Households, Sub-Saharan Africa

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1. Introduction

International remittances to Sub-Saharan Africa (SSA henceforth) constitutes a major component of capital inflow to the region compared to other types of external finance such as Official Development Assistance (ODA) and foreign portfolio inflows (World Bank, 2016; African Economic Outlook, 2016)³. In 2018, international remittances grew to \$ 46 billion from \$42 billion in 2017 (World Bank, 2019).

International remittances have been regarded as the most stable source of external finance and have resulted in significant increase in the percentage of remittances in the Gross Domestic Products (GDP) of many countries in SSA (Migration Policy Institute, 2019). Future projections of annual remittances flow to SSA are likely to exceed foreign direct investment (FDI) and ODA (World Bank, 2019).

Sub-Saharan African (SSA) region provides a good context to examine the effects of international remittances on expenditure patterns of households left-behind. Recent report shows that, notwithstanding the significant flow of migrant's remittances to households in SSA, the level of poverty and food insecurity in the region remain high, with severe implications on households' expenditure patterns. For instance, about 153 million individuals, which account for 26 percent of the population above 15 years of age in Sub-Saharan Africa, suffered from severe food insecurity in 2014/15 (FAO, 2016).

Migrants' international remittances have become important component of household's income, and these have significant implications for both household's expenditure patterns and development of the local economy. There has been an increased interest in development discourse on the manner in which migrant remittances are utilised by households in developing countries, and it has become an issue of a considerable debate. While a number of studies

³ International remittances refer to goods or money that are sent to households by migrants working outside their country (Adams and Cuecuecha, 2010a).

support the assertion that remittances can ease budget constraints and increase income of families left-behind as well as expenditure patterns (Acosta et al. 2008; Adams and Cuecuecha, 2010a; 2013; Jena, 2017; Ajefu, 2018). Other evidence shows that international remittances receiving-households may spend more on food consumption than investment in physical or productive assets (Ahlburg, 1991; Brown, Dennis, and Ahlburg, 1999; Chami et al., 2005). However, empirical analysis of the distributional effect of international remittances has received less attention.

Migrant households' receipt of international remittances could affect expenditure patterns and household's welfare through various channels. Receipt of remittances has been found to be useful as transitory income and a good supportive system for household's human and physical investments (Edward and Ureta, 2003; Yang, 2008; Adams and Cuecuecha, 2010a; Woodruff and Zenteno, 2007). For instance, Yang (2008) examines the expenditure behaviour of left-behind households of international remittances as a result of positive shock to income of Filipinos in overseas. The study shows that receipt of remittances is positively associated with human capital accumulation, entrepreneurship, ownership of different kinds of durable goods, and investments in capital-intensive enterprises. Moreover, remittances can lead to declines in labour supply of household members and an increase in consumption expenditure due to the receipt of remittances (Chami et al., 2005).

However, other existing studies have considered remittances to be fungible and are additional source of income for the households. Therefore, a few studies have shown that receipts of international remittances do not produce significant changes on how the household allocates its expenditure (Castaldo and Reilly, 2007; Adams et al., 2008; Ang et al., 2009).

In this paper, we contribute to the growing literature by exploring the aggregate and distributional effects of international remittances on expenditure patterns of left-behind households in Sub-Saharan Africa by using the Migration and Remittances' Household

Surveys implemented under the Africa Migration Project. The contribution of this paper is twofold. First, previous studies on remittances in developing countries largely focus on household-level analyses from one-country's studies (Koc and Onan, 2004; Adams and Cuecuecha, 2010a; 2010b; Alcaraz et al. 2012; Demurger and Wang, 2016; Randazzo and Piracha, 2018).

This paper fills the gap in the literature by using micro-analysis to investigate the effect of international remittances on expenditure patterns of five countries in Sub-Saharan Africa. In our analyses, we consider the following countries: Burkina Faso, Kenya, Nigeria, Senegal and Uganda. We combine the household surveys from these five countries (Burkina Faso, Kenya, Nigeria, Senegal and Uganda) to create a unique cross-country dataset, which includes detailed information on both the migrants and the households at the country of origin. The choice of these countries is influenced by the availability of data on household's migration, remittances and expenditure patterns from the Migration and Remittances Surveys implemented under the Africa Migration Project.

Second, our paper makes a methodological contribution by using a more robust method that simultaneously addresses the issue of endogeneity of international remittances and heterogeneity in expenditure patterns of households. Unlike the previous studies that investigate average effects of remittances (Adams and Cuecuecha, 2010a; 2010b; Alcaraz et al. 2012; Demurger and Wang, 2016), this paper, in addition to investigating the aggregate effect of international remittances, we also examine the distributional effect of international remittances on expenditure patterns of households in SSA. We employ instrumental variable quantile (IV-Quantile) regression to estimate the distributional impact of international remittances on household's expenditure patterns across various quantiles. This framework allows us to consider both the endogeneity of international remittances and possible heterogeneity in the impact of international remittances on household's expenditure patterns.

This paper is at the intersection of two literatures. First, it relates to studies on international remittances and its impacts in improving the household welfare, income inequality and reduction of poverty through increase in consumption expenditures (Taylor and Wyatt, 1996; Taylor and Mora, 2006; Koechlin and Leon, 2007; Yang, 2008; Adams and Cuecuecha, 2010a; Adams and Cuecuecha, 2010b; Imai et al. 2014; Agwu et al. 2017)⁴. For instance, Taylor and Wyatt (1996) examine the effects of international remittances on household-farms in rural Mexico. The authors show that remittances indirectly relieve credit and risk constraints of the household-farm production.

Further, Adams and Cuecuecha (2010a) investigate the effects of internal and international remittances on marginal spending behaviour of households in Guatemala. The findings from the study show that households receiving international remittances spend less at the margin of expenditure on food and more at the margin of education and housing compared to what they would have spent on these items without the receipt of remittances. However, findings by Clement (2011) show that, even though remittances significantly increase the household consumption level in Tajikistan, it has a negative impact on investment expenditures. These results are consistent with our findings of negative effects of international remittances on properties investments in SSA.

A second strand of literature speaks to the relevance of remittances on migrants' households by considering the broad benefits of remittances on recipient households in developing countries. Beyond the investment, asset accumulation, consumption and poverty-reducing effects of remittances (Adams, 1998; Osili, 2007; Woodruff and Zenteno, 2004); international remittances are positively associated with education attendance and healthcare expenditure (Amuedo-Dorantes and Pozo, 2011; Alcaraz et al. 2012; Amuedo-Dorantes and

⁴ Other related studies such as Imai et al. (2014) show that remittances flows have beneficial effects on economic growth and poverty reduction in 24 Asia and Pacific countries. Hence, remittances have the capacity to complement broad-based development efforts in these regions.

Pozo, 2011; Amuedo-Dorantes et al. 2010); reduction of child labour (Bargain et al. 2015; Acosta, 2011), promoting financial inclusion (Anzoategui et al. 2014; Ajefu and Ogebe, 2019); informal insurance mechanisms or coping strategies for households exposed to income shocks (Amuedo-Dorantes and Pozo, 2006; Yang and Choi, 2007).

The main findings of this paper are summarised as follow: we find that the receipt of international remittance has a positive and significant effects on five expenditure classes. Also, the percentage increase in international remittances will increase household expenditure on durables by 0.516 percent; health :0.361 percent; education: 0.357 percent, food :0.233 percent and other expenditure :0.369 percent. Moreover, using the instrumental variable quantile regression, we find that the effect of international remittances on household expenditure on food, durables, education, and health increases as the amount of remittances received increases.

However, international remittances have negative impacts on household expenditure on properties. Specifically, expenditure on properties decreases as remittance increases, but the coefficient is not statistically significant.

The rest of the paper is structured as follows: Section 2 discusses the conceptual framework; Section 3 discusses the data and presents the descriptive statistics of the data; the identification strategy is presented in Section 4. Section 5 discusses the results and, section 6 presents the conclusion.

2. Conceptual Framework: Theories of Remittances

A number of studies provide theoretical explanations for the micro-economic determinants of international remittances. In Lucas and Stark (1985) analysis, migrant workers are motivated to remit to family or household members the left-behind based on three broad reasons which are: pure altruism, pure self-interest (absence of altruism), and tempered altruism or enlightened self-interest. Migrant workers are considered as altruistic when remittances

increase with an increase in wages but with decline in family income at home before the receipt of any remittances (Docquier and Rapoport, 2012).

Migrant's remittances can also be motivated by pure self-interest if migrant's remittances are targeted towards investments in fixed capital such as land, livestock, or house, and with the migrant's intention to return home later to claim ownership over the investments. In some instances, international remittances may be used for the acquisition of public assets to enhance prestige or political influence of the migrant (Lucas and Stark, 1985).

Moreover, tempered altruism or enlightened self-interest is another important determinant of a migrant's motivation to remit to family members left-behind. In this case, migrant remittances are considered as self-enforcing contractual arrangement between migrant and family's left-behind (Lucas and Stark, 1985). The salient idea behind this hypothesis is that, remittances to family left behind can either be a means of risk sharing or as an investment in accessing higher earnings streams. Empirical evidence lends credence to the altruistic, self-interest, and enlightened self-interest hypotheses as the motivations for remittances to family left behind (Agarwal and Horowitz, 2002; Foster and Rosenzweig, 2001; and Ilahi and Jafarey, 1999; Yang and Choi, 2007; Arun and Alku, 2010)⁵. However, some empirical studies find that remittances are motivated by either one or combination of altruistic, self-interest or investment, and insurance motives (Secondi, 1997; Osili, 2007; Gubert, 2002; Brown and Poirine, 2005).

Following the motivations for remittances, the manner of how households allocate remittance receipt across expenditure categories has been widely debated in the literature. Are households left-behind likely to spend remittance receipts on (un)productive consumption? The

⁵ Conversely, evidence from Kenya reveals that the amount of remittances sent by other siblings to family left-behind has been found to have no statistically significant effect on the amount sent by a sibling. However, the evidence shows some mild, but not unambiguous, support for sibling's remittances being driven by altruistic as well as independent motives. This evidence provides some support for altruistic as well as independent motives as potential determinants or motivations for sibling's remittances to family left behind (Jena, 2016).

existing literature identifies three strands of argument as explanations for how migrants' household allocate remittances receipt on different expenditure patterns.

First, remittances are like any other income (fungible) and they are spent in the same way as income from other sources (Adams et al. 2008). Remittances only increase households' income, and therefore, migrants' households are neither more likely nor less likely to spend remittance receipts on investment or consumption than non-migrants' households. However, De and Ratha (2012) argue that remittance receipt is not as fungible as other sources of transfer income, as the senders monitor its utilisation. The authors claim that the amount of receipt from remittances and its potential use are decided by both migrants and receiving households.

Second, it has been argued that the change in households' behaviour induced by the receipt of remittances is less beneficial to the development of the local economy. This is because migrants' households are likely to spend remittances on status-oriented or conspicuous consumption, which do not have productive contribution on the local economy (Chami et al. 2003; Castaldo and Reilly, 2007). Third, remittances receiving-households are more likely to invest in productive investment such as: housing, land, education and entrepreneurial activity (Massey and Parrado, 1998; Adams, 1991; Osili, 2004; Yang, 2005; Edwards and Ureta, 2003; woodruff and Zenteno, 2007)⁶. However, Lopez-Cordova (2005) finds mixed evidence for the analysis of the effects of remittances on health and education in Mexico.

3. Data and Descriptive Statistics

3.1 Data

We use data from the Migration and Remittances Households' Surveys conducted in 2009–2010 by the African Development Bank and the World Bank in five Sub-Saharan African

⁶ The World Bank (2006) suggests that remittances will lead to higher investments rather than consumption when factors such as remittances considered as transitory rather than permanent income; the senders attach conditions on how the remittances should be spent (e.g. on housing); the remittances are sent to household members that are more likely to use it for investment purposes; and households do not consider remittances as fungible income.

countries: Burkina Faso, Kenya, Nigeria, Senegal and Uganda (Plaza et al., 2011).^{7,8} The surveys were primarily conducted in order to improve the understanding of migration and remittances in Sub-Saharan Africa. Given that the household surveys are standardised across countries, we combine data for five countries and form a unique cross-country dataset. The dataset contains detailed information on both the migrants and the household left-behind which enable us to control both migrants and households' characteristics in our analysis.

The surveys were implemented under the Africa Migration Project and provided comprehensive information on migrants as well as on their households, including demographics, remittance receipt, housing conditions, assets, household expenditures, use of financial services, and employment status of household members. Moreover, in each country, the survey has a single-round cross-sectional data, providing information about households with internal, external, and no migrants. In addition, each of these three groups of households (internal, external, and no migrant) were considered as an independent sub-frame and random sampling was then used to select household within each group.

While the surveys are nationally representatives of Nigeria, Senegal and Uganda, teams in Burkina Faso and Kenya conducted the surveys only in areas with high incidence of migration. For Burkina Faso, 10 provinces and 78 primary sampling units were selected while 17 districts and 92 clusters in the districts were selected for Kenya (See Plaza et al., 2011).⁹

The surveys contained detailed information on various types of household expenditure. We classified the various household expenditures into: food, durables, properties, health and

⁷ The Migration and Remittances Households Survey data are well cited in the economic literature for analysis of remittances in Sub-Saharan Africa. Some papers that have used the Migration and Remittances Surveys data for the purpose of empirical investigation of remittances include Bredtmann et al. (2018), and Bargain and Boutin (2015).

⁸ We exclude South Africa from our sample because it is migrant-receiving country as against a migrant-sending country.

⁹ For each of the 5 countries in our sample, about 2000 households were interviewed and information on household members as well as those who migrated were collected.

education and other items (see Table 1).¹⁰ Information on households' consumption was collected at different frequencies (days, months and year). Food expenditure was collected at weekly frequency while other consumption expenditures (durables, properties, education, health and other items) were collected at monthly and annual basis. Since this study focuses on examining the impacts of international remittances on household's expenditure patterns, we aggregate the monthly and weekly expenditure to annual values.

Table 1: Description of the expenditure categories

Category	Description
Food	cereals, legumes, oilseeds, tubers, vegetables, fruit, meat etc.
Durables	clothing, footwear, cost of mobile phone, internet, luxury goods, utilities, appliances, vehicles, computer, electronic goods.
Properties	house, land, home improvement, rent, mortgage, loan repayment.
Education	books, school supplies, uniforms, registration fees.
Health	doctor fees, lab fees, hospitalization, prescription.
Other goods	include expenditure on wedding, engagement, funerals etc.

3.2. Descriptive Statistics

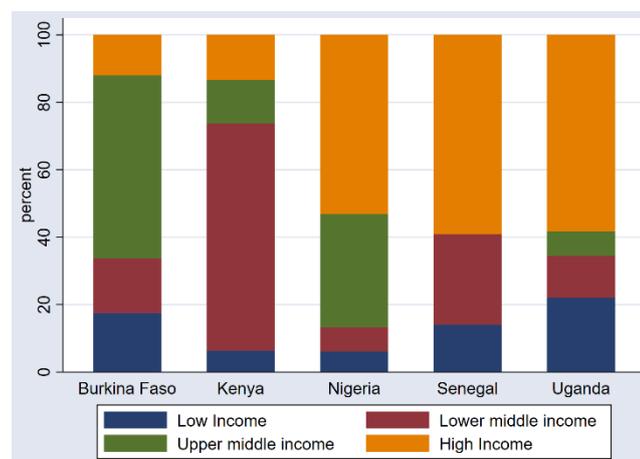
The distribution of international remittances by migrant's destination is presented in Figure 1. The distribution of international remittances varies across recipient countries. More than half of the remittances received in Burkina Faso came from upper-middle-income countries (54 percent), followed by low income (18 percent), lower-middle-income (16 percent) while only 12 percent came from high-income countries. In Kenya, two-third of the remittances received came from lower-middle-income countries, about 13 percent of remittances received came from upper-middle-income countries and high-income countries each, while 6 percent of remittances received came from low-income countries.

In Nigeria, more than half of the remittances received came from high-income countries, about 34 percent came from upper-middle-income countries, 7 percent came from lower-middle-income countries while only 6 percent came from low-income countries. In Senegal,

¹⁰ Randazzo and Piracha (2018) and Adams and Cueuruecha (2010a) also use similar expenditure classification.

most of the remittances (59 percent) received came from high-income countries, 27 percent came from lower-middle-income countries, 14 percent came from low-income countries while less than 1 percent came from upper-middle-income countries. In Uganda, about 58 percent of remittances received came from high-income countries, 22 percent came from low-income countries, 12 percent from lower-middle-income countries and only 7 percent came from upper-middle-income countries.

Figure 1: International remittances by migrant's destination



Source: Authors' Computation (2019).

Table 2 shows households' spending patterns across countries. Households in Burkina Faso spend more on food and less on education as well as properties. Total household expenditure per capita amounted to US\$210, out of which households spend US\$105 (50 percent) on food, US\$33 (16 percent) on durables, US\$11 (5 percent) on health, US\$8 (4 percent) on properties, US\$9 (4 percent) on education and US\$44 (21 percent) on other items. In Kenya, households spend more on properties and food, and the least on health. Total households' expenditure per capita was US\$3,975. Of the total expenditure per capita, households spend about US\$851 (21 percent) on properties, US\$834 (21 percent) on food, US\$6 (17 percent) on durables, US\$522 (13 percent) on education, US\$190 (5 percent) on health and US\$887 (22 percent) on other items.

Households in Nigeria spend more on food and the least on health. Household expenditure per capita amounted to US\$2,455, out of which households spend US\$806 (33 percent) on food, US\$694 (28 percent) on durables, US\$364 (15 percent) on properties, US\$154 (6 percent) on education, US\$43 (2 percent) on health and US\$394 (16 percent) on other items. Households in Senegal spend more on food and the least on education. The total household expenditure per capita was US\$981. Of the total expenditure per capita, households spend US\$352 (36 percent) on food, US\$277 (28 percent) on durables, US\$115 (12 percent) on properties, US\$42 (4 percent) on health, US\$26 (3 percent) on education and US\$160 (4 percent) on other items. Households in Uganda spend more on durables and the least on health. The total expenditure per capita amounted to US\$1,427 out of which households spend US\$418 (29 percent) on durables, US\$365 (26 percent) on food, US\$170 (12 percent) on education, US\$123 (9 percent) on properties, US\$31 (2 percent) on health and US\$320 (22 percent) on other items.

Table 2: Summary Statistics of Household Expenditure Patterns

	Food Expenditure (US\$)	Durables Expenditure (US\$)	Properties Expenditure (US\$)	Education Expenditure (US\$)	Health Expenditure (US\$)	Others Expenditure (US\$)	Total
Burkina Faso	105	33	8	9	11	44	210
Kenya	834	691	851	522	190	887	3,975
Nigeria	806	694	364	154	43	394	2,455
Senegal	352	277	115	26	42	169	981
Uganda	365	418	123	170	31	320	1,427

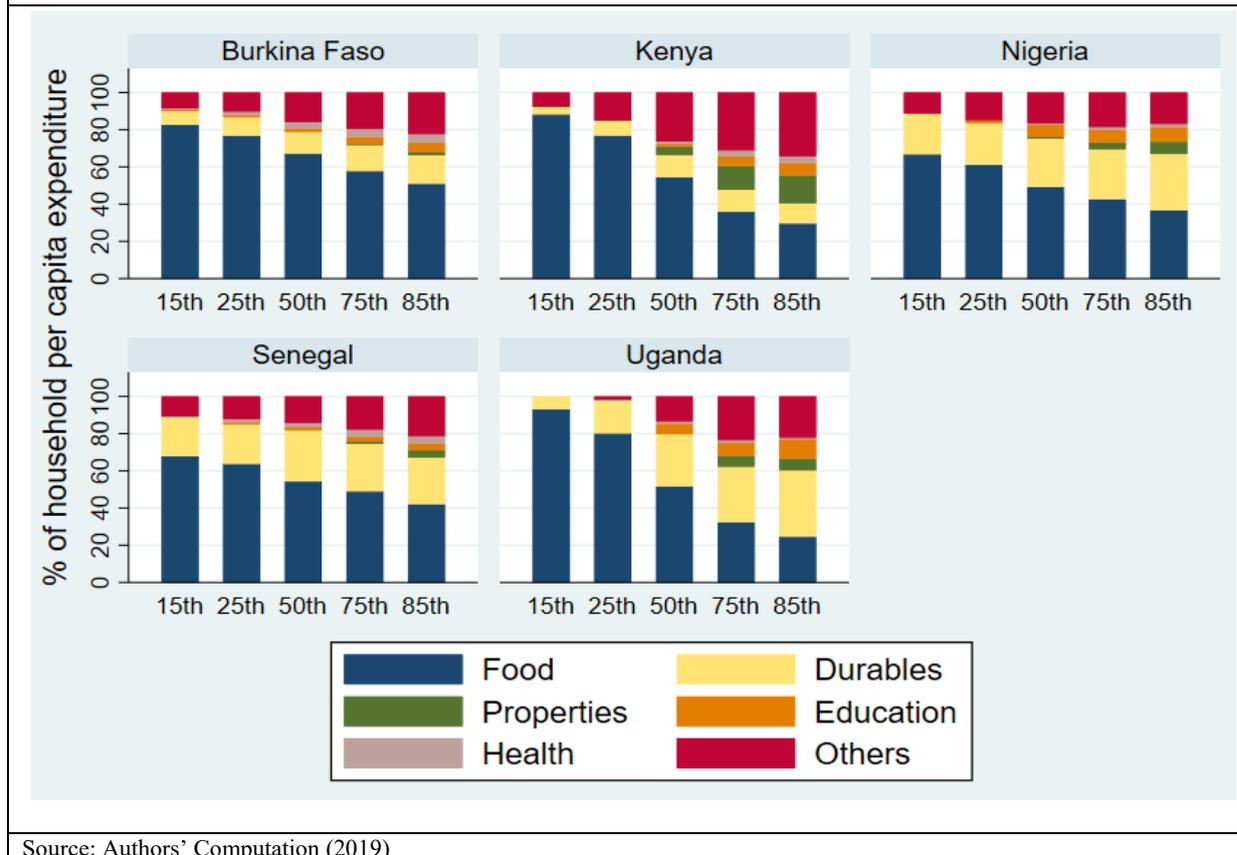
Source: Authors' Computation (2019)

Figure 2 shows per capita expenditure on food across quantiles. Household expenditure pattern varies across quantiles. In Burkina Faso, households switched consumption from food to durables and other products as their expenditure increase across quantiles. The share of household per capita expenditure on food in Burkina Faso dropped from 83 percent at 0.15 quantiles to 52 percent at 0.85 quantiles. Household expenditure per capita on durables increased from 8 percent at 0.15 quantiles to 16 percent at 0.85 quantiles, while other expenditure increased from 8 percent at 0.15 quantiles to 23 percent at 0.85 quantiles.

Households in Kenya switched their consumption from food to properties and other products as their expenditure increase across quantiles. The share of household per capita expenditure on food reduced significantly from 80 percent at 0.15 quantiles to 30 percent at 0.85 quantiles, while those of properties increased from less than 1 percent at 0.15 quantiles to 15 percent at 0.85 quantiles. Also, households per capita consumption on other products increased from 8 percent at 0.15 quantiles to 34 percent at 0.85 quantiles.

Furthermore, households switched consumption from food to durables as their expenditure increase across quantiles in Nigeria, Uganda and Senegal. The share of household per capita expenditure on food in Nigeria dropped from 67 percent at 0.15 quantiles to 39 percent at 0.85 quantiles, while household per capita expenditure on durables increased from 22 percent at 0.15 quantiles to 32 percent at 0.85 quantiles. Similarly, household per capita expenditure on food in Uganda dropped significantly from 93 percent at 0.15 quantiles to 25 percent at 0.85 quantiles, while household per capita expenditure on durables increased from 7 percent at 0.15 quantiles to 36 percent at 0.85 quantiles. The share of household per capita expenditure on food in Senegal dropped from 68 percent at 0.15 quantiles to 42 percent at 0.85 quantiles, while household per capita expenditure on durables increased from 21 percent at 0.15 quantiles to 25 percent at 0.85 quantiles.

Figure 2: Distribution of Household Expenditure Pattern



Source: Authors' Computation (2019)

Table 3 presents the descriptive statistics which show the mean values of international remittances as well as household and migrants' characteristics. International remittance per capita had the highest in Kenya and the least in Burkina Faso. Per capita remittance in Kenya and Nigeria was at the average of US\$1,109 and US\$512, respectively. Households in Senegal and Uganda received US\$264 and US\$221 per individual, while households in Burkina Faso received only US\$14 per individual.

Table 3: Descriptive statistics

	Burkina Faso	Kenya	Nigeria	Senegal	Uganda
Remittances per capita (US\$)	14	1,109	512	264	221
Household Characteristics					
Rural area	0.9	0.5	0.4	0.3	0.3
No. of children (5-15 yrs old)	3.9	0.9	1.8	3.1	1.5
Household head (HH henceforth) has an elderly member (>65)	0.4	0.4	0.1	0.6	0.1
HH has at least a member with college educational attainment.	0.3	0.7	0.8	0.3	0.7
Migrant's Relationship to HH					
Child	0.5	0.6	0.4	0.5	0.3
Partner	0.0	0.2	0.0	0.2	0.1
Sibling	0.4	0.2	0.4	0.3	0.4

Parent	0.6	0.2	0.3	0.3	0.1
Others	0.1	0.1	0.2	0.2	0.1
Reason for Migration					
Work	0.9	0.7	0.7	0.9	0.9
Education	0.0	0.2	0.2	0.1	0.1
Family	0.0	0.1	0.2	0.1	0.1
Others	0.1	0.0	0.0	0.0	0.0
Education status of migrants					
Not educated	0.8	0.0	0.0	0.5	0.1
Primary	0.2	0.1	0.0	0.2	0.2
Secondary	0.1	0.5	0.4	0.3	0.4
Tertiary	0.0	0.5	0.6	0.2	0.3

Source: Authors' Computation (2019)

Most of the households in Nigeria, Senegal and Uganda lived in the urban areas while most of the households in Burkina Faso lived in rural areas. Half of the households in Kenya lived in the rural areas. Household in Burkina Faso had the highest number of children while households in Kenya had the least number of children. About 60 percent of households in Senegal had at least an elderly member each, while 40 percent of households in Kenya and Burkina Faso had at least an elderly member each. About 10 percent of households in Nigeria and Uganda had at least an elderly member each. Also, 80 percent of households in Nigeria had at least a member each that attended college while 70 percent of households in Kenya and Uganda had at least a member each that attended college. In addition, about 30 percent of households in Burkina Faso and Senegal had at least a member that attended college. Most of the migrants are children of the household heads and the major reason identified for migration is to work. Also, most migrants from Burkina Faso are not educated while those from Nigeria and Kenya are mostly educated.

4. Empirical Strategy

To estimate the impact of international remittances on the consumption behaviour of the left-behind household, we use the following equation:

$$Y_j = \beta_0 + \beta_1 R_j + \beta_2 X_j + \beta_3 H_j + \delta_c + \varepsilon_j \quad (1)$$

where Y_j is expenditure pattern in household j (food, durables, properties, education, health and other items); R_j is the amount of international remittances for household j ; H_j denotes covariates for household j ; X_j represents migrants' characteristics in each household¹¹; δ_c is country-dummies¹², and ε_j represents error term. Our main coefficient of interest is β_1 , it captures the effect of remittance receipt on household expenditure patterns. For the control variables, we use number of children between 5-15 years, number of the elderly people in the households (above 65 years), household member with at least a college educational attainment, rural dummy, migrants' relationship with head of household, reason for migration, and migrants' destination dummies. We estimate equation (1) using Ordinary Least Squares (OLS henceforth) regression.

3.1 *Instrumental variable approach*

A major concern that arises from the use of OLS regression (Equation 1) is the endogeneity of remittance receipts due to omitted variables and reverse causation. Our estimates may be biased as a result of omitted variables such as negative shocks (e.g. droughts, loss of employment, or loss of agricultural yield) that are correlated with household's receipts of remittances and the consumption expenditure. We expect the true coefficient of β_1 to be positive, that is, remittance receipts increase household's consumption expenditure. However, the coefficient of β_1 from Equation (1) using OLS may be upward or downward bias than the expected or even negative.

Further, an econometric analysis of the effects of international remittances on expenditure patterns of left-behind households might be bias due to reverse causality, in which

¹¹ This is vector a of dummy variables which captures migrant characteristics. For education status of migrant, it takes the value of 1 if a household has at least – primary school education and zero otherwise. A similar analogy is applicable to other classes under the education status of the migrant. Also, a similar analogy is applicable to other migrant characteristics such as migrant's relationship to household head and reason for migration.

¹² This helps to control for observed and unobserved heterogeneity at migrants' locations or destinations.

international remittances may influence the expenditure patterns of left-behind households, and the expenditure patterns of left-behind households may also determine the amount of international remittances received from migrants by a household. Therefore, an investigation of the impact of international remittances on expenditure patterns that fails to consider the possibility of reverse causality between these two variables might lead to misleading conclusions.

To mitigate the potential bias that emanates from the possible endogeneity of our results, we adopt an instrumental variable approach by using the variation in the mean expected earnings in the sending countries over the past three years (2007-2009).¹³ This captures the economic conditions in the migrants' destinations, and it is calculated as mean income multiplied by mean employment rate in the migrants' destinations¹⁴. Our paper follows studies by Bargain and Boutin (2015), Amuedo-Dorantes and Pozo (2010) and Amuedo-Dorantes et al. (2010), which exploit variation in expected earnings and labour market conditions in migrants' destination to examine the effect of remittances on the consumption behaviour of the left-behind household.

Our choice of the instrument is based on the identifying assumption that recent economic conditions or labour shocks at migrants' destinations are likely to affect the ability and desirability of remitting to households left-behind. But the economic conditions and labour market shocks at migrants' destinations are not likely to be correlated with the consumption

¹³ The countries of the migrants include the following: **Burkina Faso** (Germany, France, Libya, Togo, USA, Niger, Benin, Switzerland, Nigeria, Gabon, Ghana, Italy, Other African countries, Mali, Côte d'Ivoire); **Kenya** (Australia, USA, Rwanda, UAE, UK, Netherlands, Italy, Uganda, Tanzania, South Africa, India, Germany, Canada, Sudan, Norway, Congo, Liberia, Sweden, Denmark, Belgium, Switzerland, Israel, Libya, Saudi Arabia, China, Zimbabwe, Somali, France, Tanzania, Ethiopia, Holland, Russia, Iraq, Egypt); **Nigeria** (UK, USA, Canada, Germany, Belgium, Spain, Italy, Holland, France, Benin, South Africa, Ghana, Togo, Mali, Cote d'Ivoire and Senegal); **Senegal** (Belgium, Spain, USA, UK, Morocco and South Africa); **Uganda** (Kenya, Tanzania, UK, Sudan, Canada, Rwanda, South Africa, USA, India, Iraq, France, UAE, Germany, Libya, Congo, Burundi, Japan and Australia).

¹⁴ Because our analysis is at the level of the households, we compute aggregate mean expected earnings for each household with more than one migrant living in different destinations. In this case, we sum the mean expected earnings across different destinations and divide by the number of destinations of the migrants for the households.

behaviour of the left behind households. The relevance of the instrument is tested in the first-stage regression result shown in Table A1 of the Appendix shows that the instruments (mean expected earnings in the sending countries) are correlated with remittance receipt. The level of statistical significance indicates that the instrument used in the 2SLS-IV regressions help predict household remittance-receipt for the sample of countries used in our analysis. In addition, the under-identification and weak identification tests show that the instrument used is relevant. We check for the strength of the instrument used in our analysis using the F-statistic. From Table 1A in the Appendix, it shows that the F-statistic for strength of instrument is 51.12, which is larger than the threshold of 10 used as the rule-of-thumb for the strength of instrument.

Based on the argument for the exogeneity or orthogonality (exclusion restriction) of the instrument used in our analysis, it is unlikely that the instrument (interaction of mean income and employment rate) directly affect the expenditure patterns of left-behind households or correlated with unobserved variables that can affect the expenditure patterns of the left-behind households. However, we are unable to statistically test the assumption for the validity of the instrument used in our analysis.

Given the variation observed across expenditure quantiles (see Figure 2), we employ the Chernozhukov and Hansen (2008)'s instrumental variable quantiles regression¹⁵, using the Machado and Santos Silva's (2018) method to estimate the impact of international remittances on household's expenditure pattern across various quantiles (0.15, 0.25, 0.50, 0.75 and 0.85). Based on this, Equation 1 is re-specified below:

$$Q_{\tau}(Y_j) = \beta_0^{\tau} + \beta_1^{\tau}R_j + \beta_2^{\tau}X_i + \beta_3^{\tau}H_j + \delta_c^{\tau} + \varepsilon_j^{\tau}, \text{ where}$$

$$Q_{\tau}(Y_j) \text{ is independent of } Z,$$

¹⁵ The Chernozhukov and Hansen (2008) IVQREG2 is robust to weak instruments and was implemented using Stata.

Where τ is the τ^{th} quantile, Z is an instrument and other variables remain as defined. Following the works of Bargain and Boutin (2015), and Amuedo-Dorantes and Pozo (2010), we assume that more recent economic conditions (the interaction of mean income and mean employment rate) at migrant's destination affect the probability of receiving remittances but are not correlated with the household's expenditure. Based on this, we use the interaction of mean income and employment rate at the migrants' destination as an instrument. We use information from World Development Indicators (WDI) on income and employment rates in the remittance-sending countries from 2007-2009 to construct the instrument. Hence, the instrument is mean income multiplied by mean employment rate.

5. Results and Discussions

Table 4 shows the OLS result of the impact of international remittances on household's expenditure patterns in Africa. Out of the six expenditure classes considered, international remittances have significant effects on social indicators (education and health) as well as durables. Specifically, per capita remittances have positive impacts on education and health. On the average, a 1 percent rise in per capita remittances will increase household per capita expenditure on education by 0.108 percent, the expenditure on health by 0.057 percent and expenditure on durables by 0.062 percent. These findings imply that as international remittances increase for households in SSA, households' expenditure on human capital accumulation and durable investment increases – education, health and durables. The receipts of international remittances are targeted towards increasing the expenditure on these categories of items (education, health and durables) rather than expenditure on food and properties.

Moreover, the findings of the study, however, reveal that receipt of international remittances has no statistically significant effect on food, properties and other expenditures. In addition, household characteristics such as the number of dependents (children and the elderly

people), education status of household head and location have significant effects on various per capita expenditure classes.

Given that the OLS results could produce biased estimates in the presence of endogeneity caused by omitted variables such as negative shocks (e.g. droughts, loss of employment, or loss of agricultural yield) that are correlated with household's receipts of remittances and the consumption expenditure, we estimate the impact of international remittances on household's expenditure pattern using the two-stage least squares (2SLS) instrumental variable regression.

The impact of migrant remittances on household expenditures differ across various expenditure components. Households in Kenya, Nigeria, Senegal, and Uganda spend significantly more on food compared to households in Burkina Faso. Households in Nigeria and Uganda have significantly higher expenditure on education than households in Burkina Faso; households in Nigeria and Senegal spend significantly more on durables compared to households in Burkina Faso. Also, households in Kenya and Nigeria spend significantly more on properties and other goods compared to households in Burkina Faso. In terms of health, households in Senegal spend more on health compared to households in Burkina Faso. Households in Kenya and Nigeria spend more on other goods than households in Burkina Faso while households in Uganda spend significantly less on other goods than households in Burkina Faso.

Table 4: International Remittances and Household Expenditure Pattern (OLS Results)

VARIABLES	(1) Food	(2) Durables	(3) Properties	(4) Education	(5) Health	(6) Others
Log of remittance per capita	0.001 (0.012)	0.062*** (0.016)	0.019 (0.025)	0.108*** (0.021)	0.057*** (0.019)	-0.004 (0.019)
Number of children (5-15 years old)	-0.082*** (0.014)	-0.102*** (0.020)	-0.053* (0.030)	0.092*** (0.025)	-0.065*** (0.022)	-0.104*** (0.023)
Number of elderly people (>65)	0.015 (0.047)	-0.213*** (0.063)	-0.100 (0.096)	-0.249*** (0.082)	0.245*** (0.072)	-0.092 (0.074)
HH has at least a member with college	0.040 (0.025)	0.098*** (0.034)	0.081 (0.051)	0.104** (0.044)	0.092** (0.038)	0.068* (0.039)
Location (Rural=1)	-0.461***	-1.065***	-0.809***	-0.440***	0.022	-0.580***

	(0.065)	(0.089)	(0.134)	(0.115)	(0.101)	(0.103)
Country (ref Burkina Faso)						
Kenya	0.817*** (0.112)	-0.310** (0.152)	1.243*** (0.230)	0.064 (0.196)	-0.054 (0.172)	0.342* (0.176)
Nigeria	1.281*** (0.124)	0.988*** (0.168)	0.557** (0.255)	1.172*** (0.218)	-0.110 (0.191)	0.542*** (0.196)
Senegal	0.422*** (0.101)	0.675*** (0.137)	-0.289 (0.208)	-0.154 (0.178)	0.281* (0.156)	0.299* (0.159)
Uganda	0.367*** (0.128)	0.115 (0.174)	0.223 (0.265)	0.601*** (0.226)	-0.164 (0.198)	-0.578*** (0.203)
Migrant's Relationship to head						
Child	0.061 (0.117)	-0.016 (0.158)	0.089 (0.241)	0.143 (0.205)	0.384** (0.180)	0.241 (0.184)
Partner	0.386*** (0.128)	0.422** (0.175)	0.577** (0.265)	0.352 (0.226)	0.407** (0.198)	0.538*** (0.203)
Sibling	0.038 (0.119)	0.139 (0.162)	0.163 (0.246)	-0.003 (0.210)	0.282 (0.184)	0.099 (0.188)
Others	0.136 (0.114)	-0.068 (0.155)	-0.092 (0.235)	0.080 (0.201)	-0.022 (0.176)	0.117 (0.180)
Reason for migration						
Parent	0.000 (0.172)	0.027 (0.234)	0.089 (0.355)	0.303 (0.303)	0.263 (0.265)	0.102 (0.272)
Work	-0.052 (0.133)	0.023 (0.181)	-0.119 (0.275)	-0.532** (0.235)	0.071 (0.206)	-0.201 (0.211)
Education	0.024 (0.135)	0.276 (0.183)	0.405 (0.278)	-0.259 (0.237)	0.489** (0.208)	0.083 (0.213)
Family	-0.059 (0.125)	0.000 (0.170)	-0.301 (0.258)	-0.438** (0.220)	-0.184 (0.193)	-0.298 (0.198)
Others	-0.152 (0.199)	-0.115 (0.270)	0.360 (0.410)	-0.435 (0.350)	-0.128 (0.307)	-0.001 (0.314)
Education status of migrants						
Not educated	-0.161 (0.132)	-0.337* (0.179)	-0.193 (0.272)	-0.566** (0.232)	-0.354* (0.203)	-0.544*** (0.208)
Primary	-0.104 (0.117)	-0.317** (0.160)	-0.350 (0.242)	-0.112 (0.207)	-0.234 (0.181)	-0.325* (0.185)
Secondary	-0.113 (0.112)	0.222 (0.152)	0.046 (0.230)	0.181 (0.197)	0.028 (0.172)	0.264 (0.176)
Tertiary	0.059 (0.119)	0.588*** (0.162)	0.690*** (0.246)	0.325 (0.210)	0.178 (0.184)	0.725*** (0.188)
Constant	5.296*** (0.199)	4.359*** (0.271)	1.743*** (0.411)	2.335*** (0.350)	1.666*** (0.307)	4.396*** (0.314)
Observations	1,698	1,698	1,698	1,698	1,698	1,698
R-squared	0.334	0.419	0.218	0.175	0.094	0.272

Source: Authors' Computation (2019). Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5 presents the instrumental variable (2SLS) regression estimates which collaborate the results of the OLS estimates in terms of household's expenditure patterns on durables, education and health. Specifically, the result shows that the receipt of international remittance has a positive and significant effect on five expenditure classes. A percentage increase in international remittances will increase household's expenditure on durables by 0.516 percent; health by 0.361 percent; education by 0.357 percent, food by 0.233 percent,

while other expenditure will increase by 0.369 percent. However, the result suggests that household expenditure on properties (such as spending on housing, land, home improvement, rent, mortgage, and loan repayment) is less responsive to changes in the receipt of international remittances. The results are consistent with the findings from Randazzo and Piracha (2018); Yang (2005); and Adams and Cuecuecha (2010), which show that international remittance increases household expenditure on education. For instance, in Philippine, the depreciation of the exchange rates during the Asian financial crisis increased international remittances from Filipino migrants, which led to increased educational expenditure in the left behind households (Yang, 2005). Evidence in Guatemala showed that households receiving international remittances spend more education goods (Adams and Cuecuecha, 2010). These findings support the growing view that remittances can help increase the level of investment in human and physical capital in remittance-receiving countries.

Furthermore, household expenditure varies significantly across countries. Expenditure patterns of household in most of the countries considered are skewed towards food and durables, as they spend more on these items compared to households in Burkina Faso. This implies that households in Kenya, Nigeria and Uganda considered their expenditure on food and proprieties as most important among other expenditure classes (durables, education, health and others). For households in Kenya and Nigeria, they spend more on both food and proprieties than households in Burkina Faso but spend less on health. Households in Nigeria spend more on education, while households in Senegal spend less on education compared to households in Burkina Faso. Also, Kenyan households spend less on durables compared to households in Burkina Faso, while households in Senegal and Uganda spend less on other goods compared to households in Burkina Faso. In terms of health and other expenditure, households in all the countries considered spend relatively less compared to households in Burkina Faso. This

implies that Burkina Faso households prioritize their expenditure on health compared to other expenditure classes.

Table 5: International Remittances and Household Expenditure Pattern (IV Results)

VARIABLES	(1) Food	(2) Durables	(3) Properties	(5) Education	(6) Health	(7) Others
Log of remittance per capita	0.233***(0.076)	0.516***(0.116)	-0.175(0.148)	0.357***(0.130)	0.361***(0.117)	0.369***(0.123)
Number of children (5-15 years old)	-0.087***(0.017)	-0.110***(0.026)	-0.062*(0.033)	0.109***(0.029)	-0.063***(0.026)	-0.122****(0.027)
Number of elderly people (>65)	-0.001(0.052)	-0.228****(0.079)	-0.075(0.101)	-0.260****(0.089)	0.233****(0.080)	-0.098(0.084)
HH has at least a member with college educational attainment	0.086****(0.029)	0.126****(0.045)	0.118***(0.057)	0.126***(0.050)	0.097***(0.045)	0.069(0.048)
Location (Rural=1)	-0.472****(0.073)	-1.048****(0.112)	-0.855****(0.143)	-0.421****(0.125)	0.042(0.113)	-0.567****(0.119)
Country (ref Burkina Faso)						
Kenya	0.360*(0.195)	-1.280****(0.296)	1.643****(0.379)	-0.537(0.331)	-0.666***(0.298)	-0.499(0.315)
Nigeria	0.794****(0.202)	0.012(0.308)	0.939***(0.393)	0.594*(0.344)	-0.724***(0.310)	-0.314(0.328)
Senegal	-0.227(0.213)	-0.519(0.325)	0.120(0.415)	-0.825***(0.363)	-0.407(0.326)	-0.656*(0.345)
Uganda	0.215(0.147)	-0.182(0.224)	0.307(0.286)	0.400(0.250)	-0.321(0.225)	-0.849****(0.238)
Migrant's Relationship to HH						
Child	-0.016(0.133)	-0.239(0.203)	0.173(0.259)	0.064(0.227)	0.279(0.204)	0.067(0.216)
Partner	0.032(0.187)	-0.299(0.285)	0.862***(0.364)	-0.008(0.318)	-0.105(0.286)	-0.045(0.303)
Siblings	0.076(0.131)	0.127(0.200)	0.188(0.256)	0.003(0.224)	0.280(0.202)	0.104(0.213)
Others	0.097(0.127)	-0.173(0.194)	-0.087(0.248)	0.033(0.217)	-0.094(0.195)	0.027(0.206)
Parent	-0.072(0.202)	-0.371(0.308)	0.226(0.393)	0.133(0.344)	0.029(0.310)	-0.236(0.328)
Reason for migration						
Work	0.003(0.151)	-0.068(0.230)	-0.036(0.294)	-0.711****(0.257)	0.021(0.231)	-0.343(0.244)
Education	0.047(0.152)	0.186(0.231)	0.454(0.295)	-0.388(0.258)	0.425*(0.233)	-0.025(0.246)
Family	0.050(0.140)	0.056(0.214)	-0.264(0.273)	-0.478***(0.239)	-0.083(0.215)	-0.298(0.228)
Others	-0.059(0.220)	-0.033(0.335)	0.294(0.428)	-0.450(0.375)	-0.121(0.337)	0.015(0.356)
Education status of migrants						
Not educated	-0.048(0.152)	-0.304(0.231)	-0.189(0.295)	-0.635***(0.258)	-0.316(0.232)	-0.517***(0.246)
Primary	-0.039(0.134)	-0.335(0.204)	-0.257(0.261)	-0.140(0.228)	-0.264(0.205)	-0.355(0.217)
Secondary	-0.203(0.137)	-0.082(0.208)	0.182(0.266)	0.056(0.233)	-0.163(0.209)	-0.004(0.221)
Tertiary	-0.113(0.153)	0.143(0.233)	0.833****(0.298)	0.160(0.261)	-0.119(0.235)	0.395(0.248)
Constant	4.924****(0.232)	4.071****(0.353)	1.861****(0.451)	2.245****(0.395)	1.397****(0.355)	4.269****(0.375)
Observations	1,607	1,607	1,607	1,607	1,607	1,607
R-squared	0.212	0.162	0.190	0.116	-0.048	0.117

Source: Authors' Computation (2019). Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The instrumental variable quantile result is presented in Table 6 and Figure 3. The result shows that household expenditure increases as the amount of remittances received increases. International remittances have the highest impact on household durable expenditure while remittances have the least impact on health expenditure.

The result shows that the effect of international remittances on household expenditure on food increases as the amount of remittances received increases. A percentage increase in international remittances will increase household food expenditure by 0.174 percent at 0.25 quantiles, 0.202 percent at 0.5 quantiles, 0.228 percent at 0.75 quantiles and 0.243 percent at 0.85 quantiles. International remittances have no significant impact on household food expenditure at 0.15 quantiles.

A percentage increase in international remittances will increase household expenditure on durable expenditure by 0.428 percent at 0.15 quantiles, 0.448 percent at 0.25 quantiles, 0.495 percent at 0.5 quantiles, 0.558 percent at 0.75 quantiles, while no significant impact is observed at 0.85 quantiles. International remittances have a negative impact on household expenditure on properties. At 0.15 quantiles, a percentage increase in international remittance will reduce household expenditure on properties by 0.327, while at 0.25 quantiles and 0.50 quantiles, it will decline by 0.306 percent and 0.222 percent respectively.

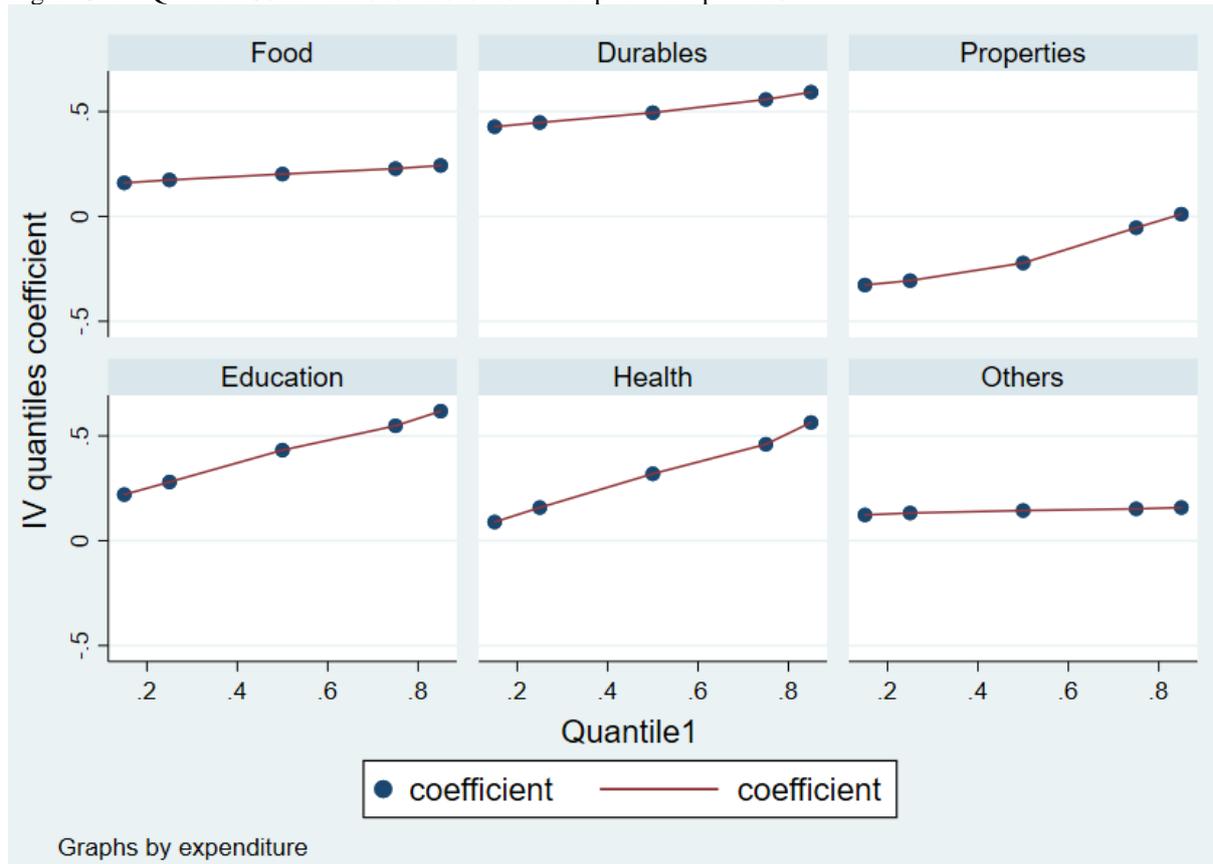
Furthermore, international remittances have significant impact on household expenditure on education across all quantiles. A percentage increase in international remittances will increase household expenditure on education by 0.220 percent at 0.15 quantiles, 0.280 percent at 0.25 quantiles, 0.432 percent at 0.50 quantiles, 0.548 percent at 0.75 quantiles and 0.618 percent at 0.85 quantiles. In addition, a percentage increase in international remittances will enhance household expenditure on health by 0.319 percent at 0.50 quantiles and 0.564 percent at 0.85 quantiles. International remittances have no significant impact on other household's expenditure across the various percentiles.

Table 6: International Remittances and Household's Expenditure Pattern (IV quantile)

Quantile	Food	Durables	Properties	Education	Health	Others
τ (0.15)	0.160(0.115)	0.428***(0.123)	-0.327**(0.142)	0.220*(0.1253)	0.089(0.173)	0.123(0.409)
τ (0.25)	0.174*(0.101)	0.448***(0.096)	-0.306**(0.136)	0.280**(0.112)	0.158(0.148)	0.132(0.292)
τ (0.50)	0.202**(0.083)	0.495***(0.135)	-0.222**(0.129)	0.432***(0.166)	0.319**(0.148)	0.144(0.198)
τ (0.75)	0.228***(0.086)	0.558**(0.282)	-0.054(0.187)	0.548**(0.246)	0.460(0.208)	0.152(0.207)
τ (0.85)	0.243**(0.096)	0.593(0.371)	0.011(0.224)	0.618**(0.300)	0.564**(0.269)	0.158(0.249)
Observations	1607	1607	1607	1607	1607	1607

Source: Authors' Computation (2019). Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 3: IV Quantile Coefficients for Household's Expenditure patterns



Source: Authors' Computation (2019)

In Table 7, we present the results of reduced form regressions. Reduced form estimation provides a simple approach to test the null hypothesis that the coefficients of the instrument Z_j and other covariates X_j used in our analysis are simultaneously equal to zero. The reduced form estimation is an OLS regression of the expenditure patterns of left-behind household as the dependent variable on the instrument and covariates or regressors used in our analysis. The results from Table 7 shows that, except for household's expenditures on properties, we find positive association between a migrant's economic condition and household's expenditure on food, durables, education, health and others.

Table 7: Reduce form

VARIABLES	(1) Food	(2) Durables	(3) Properties	(5) Education	(6) Health	(7) Others
Number of children (5-15 years old)	-0.090*** (0.015)	-0.116*** (0.021)	-0.060* (0.033)	0.106*** (0.028)	-0.067*** (0.024)	-0.126*** (0.025)
Number of elderly people (>65)	0.000 (0.047)	-0.224*** (0.066)	-0.076 (0.100)	-0.257*** (0.086)	0.235*** (0.075)	-0.096 (0.077)
HH has at least a member with a college educational attainment	0.081*** (0.027)	0.114*** (0.037)	0.122** (0.057)	0.117** (0.049)	0.088** (0.042)	0.060 (0.043)
Location (Rural=1)	-0.466*** (0.067)	-1.035*** (0.094)	-0.860*** (0.142)	-0.412*** (0.122)	0.051 (0.106)	-0.557*** (0.108)
Country (ref Burkina Faso)						
Kenya	0.716*** (0.116)	-0.491*** (0.163)	1.375*** (0.247)	0.010 (0.212)	-0.114 (0.183)	0.066 (0.188)
Nigeria	1.138*** (0.128)	0.776*** (0.180)	0.680** (0.273)	1.123*** (0.235)	-0.188 (0.203)	0.233 (0.208)
Senegal	0.219** (0.108)	0.472*** (0.152)	-0.216 (0.230)	-0.139 (0.198)	0.287* (0.171)	0.053 (0.175)
Uganda	0.307** (0.129)	0.024 (0.181)	0.237 (0.274)	0.542** (0.236)	-0.177 (0.204)	-0.702*** (0.209)
Migrant's Relationship with HH						
Child	0.080 (0.116)	-0.026 (0.163)	0.101 (0.248)	0.212 (0.213)	0.428** (0.184)	0.219 (0.189)
Partner	0.400*** (0.128)	0.516*** (0.180)	0.585** (0.272)	0.556** (0.234)	0.466** (0.203)	0.539*** (0.208)
Siblings	0.074 (0.119)	0.122 (0.167)	0.189 (0.254)	-0.000 (0.218)	0.277 (0.189)	0.101 (0.193)
Others	0.123 (0.115)	-0.117 (0.161)	-0.106 (0.244)	0.071 (0.210)	-0.055 (0.181)	0.067 (0.186)
Parent	0.098 (0.174)	0.007 (0.245)	0.098 (0.371)	0.394 (0.319)	0.293 (0.276)	0.034 (0.283)
Reasons for Migration						
Work	0.083 (0.135)	0.110 (0.190)	-0.097 (0.288)	-0.588** (0.247)	0.146 (0.214)	-0.215 (0.220)
Education	0.070 (0.137)	0.237 (0.192)	0.436 (0.291)	-0.353 (0.250)	0.461** (0.216)	0.011 (0.222)
Family	0.029 (0.127)	0.009 (0.178)	-0.248 (0.271)	-0.511** (0.233)	-0.116 (0.201)	-0.331 (0.206)
Others	-0.091 (0.199)	-0.103 (0.279)	0.318 (0.423)	-0.498 (0.364)	-0.170 (0.315)	-0.036 (0.323)
Education status of migrants						
Not educated	-0.041 (0.138)	-0.287 (0.193)	-0.194 (0.293)	-0.624** (0.251)	-0.305 (0.218)	-0.505** (0.223)
Primary school	0.000 (0.122)	-0.247 (0.171)	-0.287 (0.259)	-0.079 (0.222)	-0.203 (0.192)	-0.292 (0.197)
Secondary school	-0.068 (0.115)	0.215 (0.162)	0.081 (0.245)	0.262 (0.211)	0.045 (0.183)	0.209 (0.187)
Tertiary	0.076 (0.123)	0.561*** (0.172)	0.691*** (0.261)	0.450** (0.224)	0.174 (0.194)	0.695*** (0.199)
Instrument (income*employment)	0.070*** (0.021)	0.156*** (0.029)	-0.053 (0.044)	0.108*** (0.038)	0.109*** (0.033)	0.111*** (0.034)
Constant	4.261*** (0.322)	2.601*** (0.452)	2.360*** (0.685)	1.227** (0.589)	0.367 (0.510)	3.217*** (0.522)
Observations	1,607	1,607	1,607	1,607	1,607	1,607
R-squared	0.362	0.425	0.217	0.176	0.097	0.284

Source: Authors' Computation (2019). Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

6. Conclusion

International remittances are important sources of livelihood for many households in developing countries. In this paper, we examine the aggregate and distributional effects of international remittances on household's expenditure patterns of households in Sub-Saharan Africa. To evaluate the causal effect of international remittances, we use the economic conditions in migrants' countries as instrument for international remittances. Unlike the previous studies that examined only the aggregate effect of remittance receipts, we investigate the distributional effect of remittances using instrumental variable quantile regression.

The results from the aggregate effect estimates show positive and statistically significant effect of international remittances on expenditure on food, durables, education, health and other items. Using the instrumental variable quantile regression, we also find positive and significant effect of international remittances on household expenditure on food, durables, education, and health across the expenditure distribution.

Moreover, a percentage increase on international remittances has stronger effects on household expenditure on education and health than household expenditure on food and other items at the upper end of the distribution. Our findings further show that households in Sub-Saharan Africa spend greater proportions of remittances received on education and health than other items. However, we find negative effect of international remittances on household's acquisition of properties. The results of this study suggest that policy interventions that aim to promote the inflow or increase in international remittances to developing countries can have positive effect on household's expenditure patterns on items such as food, education, durables and health.

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Appendix

Table 1A: First Stage Regression

Variables	Remittances
Instrument (income*employment)	0.302*** (0.042)
Number of children (5-15 years old)	-0.011 (0.031)
Number of elderly (>65)	0.007 (0.096)
HH has at least a member with a college educational attainment	-0.024 (0.054)
Location (Rural=1)	0.025 (0.135)
country	
Kenya	1.53*** (0.235)
Nigeria	1.481*** (0.26)
Senegal	1.92*** (0.219)
Uganda	0.399 (0.262)
Migrant's Relationship to head	
Child	0.413* (0.236)
Partner	1.581*** (0.26)
Sibling	-0.008 (0.242)
Others	0.108 (0.232)
Parent	0.731** (0.354)
Reason for migration	
Work	0.346 (0.274)
Education	0.098 (0.277)
Family	-0.091 (0.258)
Others	-0.136 (0.404)
Education status of migrants	
Not educated	0.032 (0.279)
Primary	0.17 (0.246)
Secondary	0.576** (0.234)
Tertiary	0.81*** (0.249)
Constant	-2.849*** (0.653)
Observations	1607
F-stat	51.12 ***
Underidentification test (Anderson canon. corr. LM statistic)	50.24***
Weak identification test (Cragg-Donald Wald F statistic)	51.12

Source: Authors' Computation (2019). Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1