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The effects of international remittances on expenditure patterns of the left-behind households in Sub-Saharan Africa

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Abstract

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

KEYWORDS

expenditure, households, international remittances, Sub-Saharan Africa

1 | INTRODUCTION

International remittances to Sub-Saharan Africa (SSA) constitute 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 (AfDB/OECD/UNDP, 2016; World Bank, 2016).[1] International remittances grew from $42 billion in 2017 to $46 billion in 2018 (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 the flow of annual remittances to SSA are likely to exceed foreign direct investment (FDI) and ODA (World Bank, 2019).

SSA region provides a good context to examine the effects of international remittances on expenditure patterns of left-behind households. A recent report shows that, notwithstanding the significant flow of migrants' 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, accounting for 26% of the population above 15 years of age in SSA, suffered from severe food insecurity in 2014/15 (FAO, 2016).

Migrants' international remittances have become an important component of the household's income, and these have significant implications for both the 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 utilized by households in developing countries, and it has become an issue of a considerable debate. While a number of studies support the assertion that remittances can ease budget constraints and increase income of families left-behind as well as expenditure patterns (Acosta, Calderon, Fajnzylber, & Lopez, 2008; Adams & Cuecuecha, 2010a, 2013; Ajefu, 2018; Jena, 2018), other evidence shows that households receiving international remittances may spend more on food consumption than investment in physical or productive assets (Ahlburg, 1991; Brown, Dennis, & Ahlburg, 1999; Chami, Fullenkamp, & Jahjah, 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 households' welfare through various channels. The receipt of remittances has been found to be useful as a transitory income and a good supportive system for households' human and physical investments (Adams & Cuecuecha, 2010a; Edwards & Ureta, 2003; Woodruff & Zenteno, 2007; Yang, 2008). For instance, Yang (2008) examines the expenditure behavior of left-behind households of international remittances as a result of positive shock to income of Filipinos in overseas. The study shows that the 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 a decline in labor 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 an 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 (Adams, Cuecuecha, & Page, 2008; Ang, Sugiyarto, & Jha, 2009; Castaldo & Reilly, 2007).

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 SSA 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 studies (Adams & Cuecuecha,

2010a, 2010b; Alcaraz, Chiquiar, & Salcedo, 2012; Demurger & Wang, 2016; Koc & Onan, 2004; Randazzo & 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 SSA. In our analyses, we consider the following countries: Burkina Faso, Kenya, Nigeria, Senegal, and Uganda. We combine the household surveys from these five countries to create a unique cross-country data set, 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 households' migration, remittances, and expenditure patterns from the Migration and Remittances' Household Surveys implemented under the Africa Migration Project.

Second, our paper makes a methodological contribution 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 & Cuecuecha, 2010a, 2010b; Alcaraz et al., 2012; Demurger & Wang, 2016), this paper, in addition to investigating the aggregate effect of international remittances, examines 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 households' 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 households' 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 (Adams & Cuecuecha, 2010a, 2010b; Imai, Gaiha, Ali, & Kaicker, 2014; Koechlin & Leon, 2007; Taylor & Mora, 2006; Taylor & Wyatt, 1996; Yang, 2008).[2] 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 behavior 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, they have 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), international remittances are positively associated with education attendance and healthcare expenditure (Alcaraz et al., 2012; Amuedo-Dorantes & Pozo, 2011; Amuedo-Dorantes, Georges, & Pozo, 2010); reduction in child labor (Acosta, 2011; Bargain & Boutin, 2015); promoting financial inclusion (Ajefu & Ogebe, 2019; Anzoategui, Demirgüç-Kunt, & Pería, 2014); informal insurance mechanisms or coping strategies for households exposed to income shocks (Amuedo-Dorantes & Pozo, 2006; Yang & Choi, 2007).

The main findings of this paper are summarized as follows: we find that the receipt of international remittance has a positive and significant effect on five expenditure classes. Also, the percentage increase in international remittances will increase household expenditure on durables by 0.516

%; health: 0.361%; education: 0.357%, food: 0.233%, and other expenditures: 0.369%. Moreover, using the IV-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

Many 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 who are left behind based on three broad reasons: pure altruism, pure self-interest (absence of altruism), and tempered altruism or enlightened self-interest. Migrant workers are considered altruistic when remittances increase with an increase in wages but with a decline in family income at home before the receipt of any remittances (Docquier & Rapoport, 2012).

Migrants' remittances can also be motivated by pure self-interest if their remittances are targeted toward investments in fixed capital such as land, livestock, or house, and with their 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 & Stark, 1985).

Moreover, tempered altruism or enlightened self-interest is another important determinant of a migrant's motivation to remit to left-behind family members. In this case, migrant remittances are considered as self-enforcing contractual arrangement between the migrant and family's left-behind (Lucas & Stark, 1985). The salient idea behind this hypothesis is that remittances to the 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 & Horowitz, 2002; Arun & Alku, 2010; Foster & Rosenzweig, 2001; Ilahi & Jafarey, 1999; Yang & Choi, 2007).[3] However, some empirical studies find that remittances are motivated by either one or the combination of altruistic, self-interest or investment, and insurance motives (Brown & Poirine, 2005; Gubert, 2002; Osili, 2007; Secondi, 1997).

Following the motivations for remittances, the manner of how households allocate remittance receipt across expenditure categories has been widely debated in the literature. Are left-behind households likely to spend remittance receipts on (un)productive consumption? The existing literature identifies three strands of argument as explanations for how migrants' households allocate remittance 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 utilization. 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' behavior 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 does not have productive contribution on the local economy (Castaldo & Reilly, 2007; Chami et al., 2005). Third, households who receive remittances are more likely to invest in productive investments such as housing, land, education, and entrepreneurial activity (Adams, 1991; Edwards & Ureta, 2003; Massey & Parrado, 1998; Osili, 2004; Woodruff & Zenteno, 2007; Yang, 2005).[4] 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 countries in SSA: Burkina Faso, Kenya, Nigeria, Senegal, and Uganda (Plaza, Navarrete, & Ratha, 2011).[5,6] The surveys were primarily conducted to improve the understanding of migration and remittances in SSA. Given that the household surveys are standardized across countries, we combine data for five countries and form a unique cross-country data set. The data set contains detailed information on both the migrants and the household left behind, which enables 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) was considered as an independent sub-frame, and a random sampling was then used to select household within each group.

While the surveys are national 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).[7]

The surveys contained detailed information on various types of household expenditure: food, durables, properties, health, education, and other items (see Table 1).[8] Information on households' consumption was collected at different frequencies (days, months, and years). Food expenditure was collected on a weekly basis, while other consumption expenditures (durables, properties, education, health, and other items) were collected on a monthly and yearly basis. Since this study focuses on examining the impacts of international remittances on households' expenditure patterns, we aggregate the monthly and weekly expenditure to annual values.

3.2 | Descriptive statistics

The distribution of international remittances by migrants' destination is presented in Figure 1. The distribution of international remittances varies across recipient countries. More than half of the

TABLE 1 Description of the expenditure categories

Category	Description
Food	Cereals, legumes, oilseeds, tubers, vegetables, fruit, meat, etc.
Durables	Clothing, footwear, mobile phones, Internet, luxury goods, utilities, appliances, vehicles, computers, 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	Expenditure on wedding, engagement, funerals, etc.

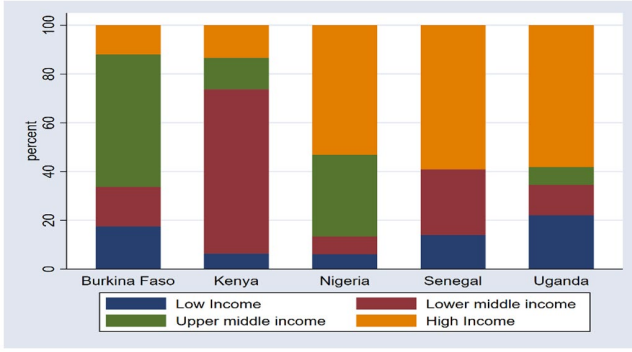

FIGURE 1 International remittances by migrants' destinations. *Source: Authors' computation (2019)* [Colour figure can be viewed at wileyonlinelibrary.com]

remittances received in Burkina Faso came from upper-middle-income countries (54%), followed by low-income (18%), lower-middle-income countries (16%), while only 12% came from high-income countries. In Kenya, two-thirds of the remittances received came from lower-middle-income countries, about 13% from upper-middle-income countries and high-income countries each, and 6% from low-income countries.

In Nigeria, more than half of the remittances received came from high-income countries, about 34% from upper-middle-income countries, 7% from lower-middle-income countries, and only 6% from low-income countries. In Senegal, most of the remittances (59%) received came from high-income countries, 27% from lower-middle-income countries, 14% from low-income countries, and less than 1% from upper-middle-income countries. In Uganda, about 58% of remittances received came from high-income countries, 22% from low-income countries, 12% from lower-middle-income countries, and only 7% from upper-middle-income countries.

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%) on food, US$33 (16%) on durables, US$11 (5%) on health, US$8 (4%) on properties, US$9 (4%) on education, and US$44 (21%) 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%) on properties, US$834 (21%) on food, US$6 (17%) on durables, US$522 (13%) on education, US$190 (5%) on health, and US$887 (22%) on other items.

TABLE 2 Summary statistics of household expenditure patterns

	Expenditure (US$)						Total (US$)
	Food	Durables	Properties	Education	Health	Others	
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).

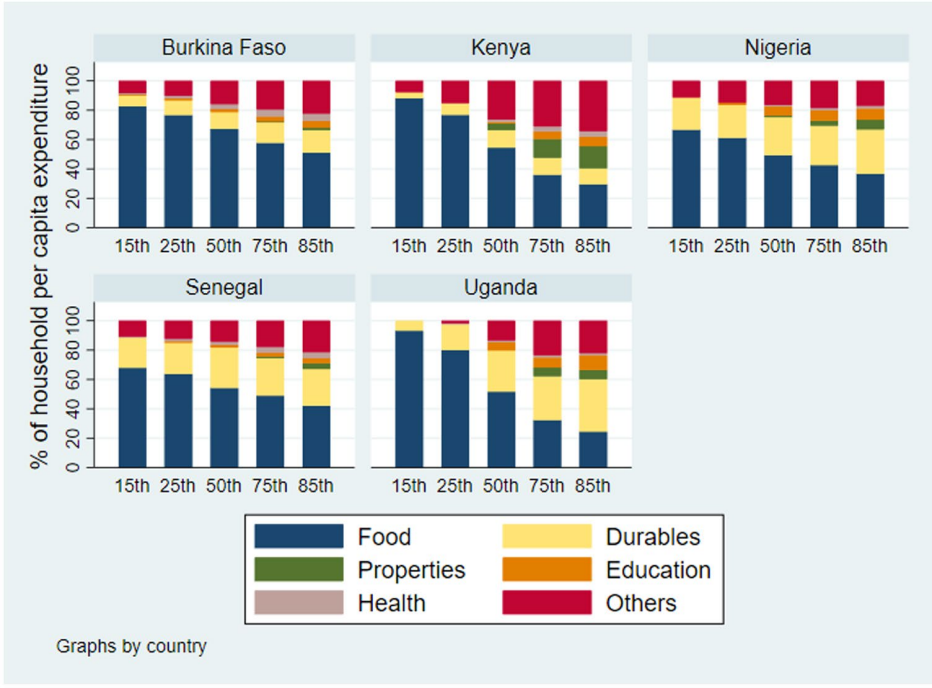

FIGURE 2 Distribution of household expenditure pattern. *Source: Authors' computation (2019)* [Colour figure can be viewed at wileyonlinelibrary.com]

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%) on food, US$694 (28%) on durables, US$364 (15%) on properties, US$154 (6%) on education, US$43 (2%) on health, and US$394 (16%) 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%) on food, US$277 (28%) on durables, US$115 (12%) on properties, US$42 (4%) on health, US$26 (3%) on education, and US$160 (4%) 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%) on durables, US$365 (26%) on food, US$170 (12%) on education, US$123 (9%) on properties, US$31 (2%) on health, and US$320 (22%) on other items.

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 increased across quantiles. The share of household per capita expenditure on food in Burkina Faso decreased from 83% at 0.15 quantiles to 52% at 0.85 quantiles. Household expenditure per capita on durables increased from 8% at 0.15 quantiles to 16% at 0.85 quantiles, while other expenditure increased from 8% at 0.15 quantiles to 23% at 0.85 quantiles.

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

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

Table 3 presents the descriptive statistics that show the mean values of international remittances as well as household and migrants' characteristics. International remittance per capita was 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.

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. Households in Burkina Faso had the highest number of children, while households in Kenya had the least number of children. About 60% of households in Senegal had at least an elderly member each, while 40% of households in Kenya and Burkina Faso had at least an elderly member each. About 10% of households in Nigeria and Uganda had at least an elderly member each. Also, 80% of households in Nigeria had at least a member each who attended college, while 70% of households in Kenya and Uganda had at least a member each who attended college. In addition, about 30% of households in Burkina Faso and Senegal had at least a member who attended college. Most of the migrants are children of the household heads, and the major reason identified for migration is 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 behavior of the left-behind household, we use the following equation:

$$Y_j = \beta_0 + \beta_1 R_j + \beta_2 X_j + \beta_3 H_j + \delta_c + \varepsilon_j \tag{1}$$

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 years old)	3.9	0.9	1.8	3.1	1.5
Household head (HH) 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
Migrants' 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).

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 household[9]; δ_c is country-dummies[10]; and ε_j represents error term. Our main coefficient of interest is β_1, which captures the effect of remittance receipt on household expenditure patterns. For the control variables, we use the number of children between 5 and 15 years, number of the elderly people in the households (>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) regression.

4.1 | 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 households' 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 biased due to reverse causality, in which 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 by a household from migrants. 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).[11] This captures the economic conditions in the migrants' destinations, and it is calculated as a mean income multiplied by the mean employment rate in the migrants' destinations.[12] Our paper follows studies by Bargain and Boutin (2015), Amuedo-Dorantes and Pozo (2010), and Amuedo-Dorantes et al. (2010), which exploit variations in expected earnings and labor market conditions in migrants' destination to examine the effect of remittances on the consumption behavior of the left-behind household.

Our choice of the instrument is based on the identifying assumption that recent economic conditions or labor shocks at migrants' destinations are likely to affect the ability and desirability of remitting to left-behind households. But the economic conditions and labor market shocks at migrants' destinations are not likely to be correlated with the consumption behavior 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, which 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 two-stage least square (2SLS)–IV-quantile regressions helps 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. Table A1 in the Appendix 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 affects the expenditure patterns of left-behind households or is 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 Chernozhukov and Hansen's (2008) IV-quantile regression,[13] using Machado and Santos Silva's (2018) method to estimate the impact of international remittances on households' expenditure pattern across various quantiles (0.15, 0.25, 0.50, 0.75, and 0.85). Based on this, Equation 1 is redefined as follows:

$$Q_\tau(Y_j) = \beta_0^\tau + \beta_1^\tau R_j + \beta_2^\tau X_i + \beta_3^\tau H_j + \delta_c^\tau + \varepsilon_j^\tau$$

where $Q_\tau(Y_j)$ is independent of Z, τ is the τ^{th} quantile, Z is an instrument, and other variables remain as defined earlier. 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 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 to 2009 to construct the instrument. Therefore, the instrument is the mean income multiplied by mean employment rate.

5 | RESULTS AND DISCUSSIONS

Table 4 shows the OLS result of the impact of international remittances on households' 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 average, a 1% increase in per capita remittances will increase household per capita expenditure on education by 0.108%, the expenditure on health by 0.057%, and expenditure on durables by 0.062%. 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 toward 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 the 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 households' receipts of remittances and the consumption expenditure, we estimate the impact of international remittances on expenditure pattern of households using the 2SLS–IV-quantile regression.

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

Table 5 presents the instrumental variable (2SLS) regression estimates that collaborate the results of the OLS estimates in terms of households' 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 households' expenditure on durables by 0.516%, health by 0.361%, education by 0.357%, food by 0.233%, and others by 0.369%. 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 of Randazzo and Piracha (2018), Yang (2005), and Adams and Cuecuecha (2010a), which show that international remittance increases household expenditure on education. For instance, in the Philippines, the depreciation of the exchange rates during the Asian financial crisis increased international remittances from Filipino migrants,

TABLE 4 International remittances and household expenditure pattern (OLS results)

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	**Food**	**Durables**	**Properties**	**Education**	**Health**	**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 educational attainment	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*** (0.065)	−1.065*** (0.089)	−0.809*** (0.134)	−0.440*** (0.115)	0.022 (0.101)	−0.580*** (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)
Migrants' 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)
Parent						
Reason for migration	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)

(Continues)

TABLE 4 (Continued)

Variables	(1) Food	(2) Durables	(3) Properties	(4) Education	(5) Health	(6) Others
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

Note: Standard errors in parentheses.

***$p < .01$; **$p < .05$; *$p < .1$.

Source: Authors' computation (2019).

TABLE 5 International remittances and household expenditure pattern (IV Results)

	(1)	(2)	(3)	(5)	(6)	(7)
Variables	**Food**	**Durables**	**Properties**	**Education**	**Health**	**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)

(Continues)

TABLE 5 (Continued)

Variables	(1) Food	(2) Durables	(3) Properties	(5) Education	(6) Health	(7) Others
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

Note: Standard errors in parentheses.

***$p < .01$; **$p < .05$; *$p < .1$.

Source: Authors' computation (2019).

TABLE 6 International remittances and households' 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	1,607	1,607	1,607	1,607	1,607	1,607

Note: Standard errors in parentheses.

***$p < .01$; **$p < .05$; *$p < 0.1$.

Source: Authors' computation (2019).

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 & Cuecuecha, 2010a). 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 toward food and durables, as households spend more on these items compared to those 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). Households in Kenya and Nigeria spend more on both food and properties 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 than those in Burkina Faso. Also, Kenyan households spend less on durables than those in Burkina Faso, while households in Senegal and Uganda spend less on other goods than those in Burkina Faso. In terms of health and other expenditure, households in all the countries considered spend relatively less than those in Burkina Faso. This implies that Burkina Faso households prioritize their expenditure on health compared to other expenditure classes.

The IV-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 they 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% at 0.25 quantiles, 0.202% at 0.5 quantiles, 0.228% at 0.75 quantiles, and 0.243% at 0.85 quantiles. International remittances have no significant impact on household food expenditure at 0.15 quantiles.

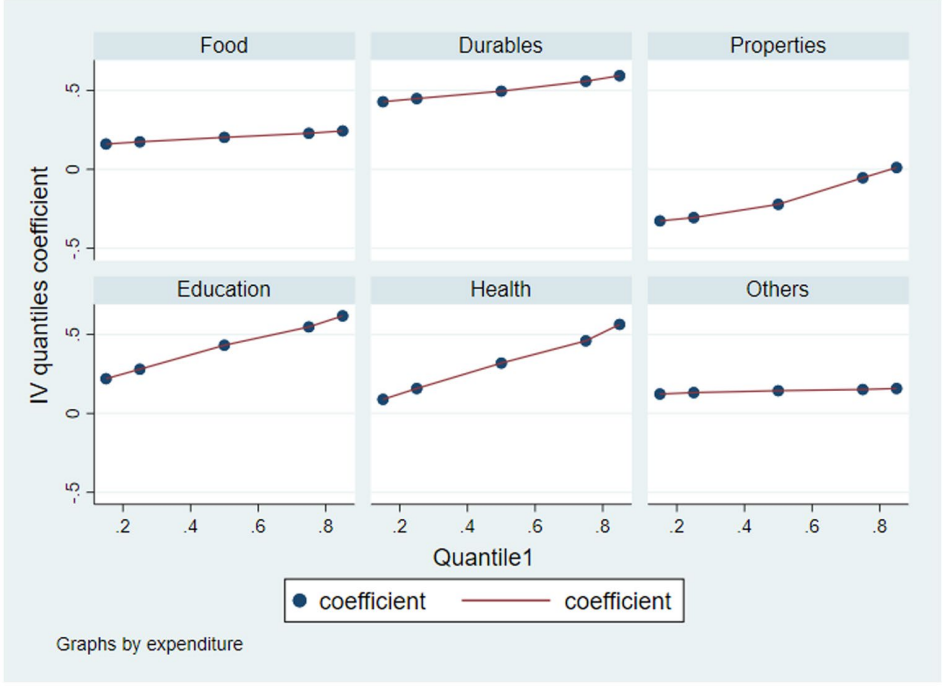

FIGURE 3 Instrumental variable quantile coefficients for households' expenditure patterns. *Source: Authors' computation* (2019) [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 7 Reduced form estimation

	(1)	(2)	(3)	(5)	(6)	(7)
Variables	**Food**	**Durables**	**Properties**	**Education**	**Health**	**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)
Migrants' 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)

(Continues)

TABLE 7 (Continued)

Variables	(1) Food	(2) Durables	(3) Properties	(5) Education	(6) Health	(7) Others
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

Note: Standard errors in parentheses.

***$p < .01$; **$p < .05$; *$p < .1$.

Source: Authors' computation (2019).

A percentage increase in international remittances will increase household expenditure on durable expenditure by 0.428% at 0.15 quantiles, 0.448% at 0.25 quantiles, 0.495% at 0.5 quantiles, 0.558% 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% and 0.222%, respectively.

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

In Table 7, we present the results of reduced form regressions. The 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 households' expenditures on properties, we find a positive association between a migrant's economic condition and household's expenditure on food, durables, education, health, and others.

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 households' expenditure patterns in SSA. To evaluate the causal effect of international remittances, we use the economic conditions in migrants' countries as an 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 IV-quantile regression.

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

Moreover, a percentage increase in 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 SSA spend greater proportions of remittances received on education and health than other items. However, we find a negative effect of international remittances on households' 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 a positive effect on expenditure patterns of households on items such as food, education, durables, and health.

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DATA AVAILABILITY STATEMENT

The data and Stata do-file that support the findings of this study are available upon request from the corresponding author.

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ENDNOTES

[1] International remittances refer to goods or money sent to households by migrants working outside their country (Adams & Cuecuecha, 2010a).

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

[3] 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).

[4] 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 who are more likely to use them for investment purposes; and households do not consider remittances as fungible income.

[5] The Migration and Remittances Households Survey data are well cited in the economic literature for analysis of remittances in SSA. Some papers that have used the Migration and Remittances' Household Surveys' data for the purpose of empirical investigation of remittances include Bredtmann, Flores, and Otten (2019), and Bargain and Boutin (2015).

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

[7] For each of the five countries in our sample, about 2,000 households were interviewed and information on household members as well as those who migrated was collected.

[8] Randazzo and Piracha (2018) and Adams and Cuecuecha (2010a) also use similar expenditure classification.

[9] This is a vector of dummy variables that captures migrant characteristics. For education status of migrant, it takes the value of 1 if a household has at least one primary school education and 0 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 migrants' relationships to household head and reason for migration.

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

[11] 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).

[12] 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.

[13] Chernozhukov and Hansen's (2008) IVQREG2 is robust to weak instruments and was implemented using Stata.

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APPENDIX

TABLE A1 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)
Migrants' 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

Note: Standard errors in parentheses.

***$p < .01$; **$p < .05$; *$p < .1$.

Source: Authors' computation (2019).