Remittances and Household Expenditure Allocation Behavior in Kenya

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Abstract

This paper examines the effect of remittances on household spending in Kenya using household survey data from World Bank 2009 African Migration Project. A fractional multinomial logit model is used to estimate the effect of remittances on the share of expenditure on food, education, health, investments, consumer durables, housing and land, and 'others'.The results indicate that external remittances increase the share of total household expenditure allocated to education, consumer durables and housing and reduce the share of total household expendituredevoted to food and physical investments. Internal remittance has a positive effect on the share of total household expenditure devoted to food. Once endogeneity is controlled for, external remittances have a positive effect on household spending on investment while internal remittances reduce the share of expenditure on education and 'others'.

Key words: remittances, household expenditure, fractional multinomial logit, Kenya.

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1.0 Introduction

In the last decade, remittances both internal and external have become a significant source of household financial resources. The official recorded remittances from abroadto Kenya increased from US$0.61 billion in 2009 to US$1.95 billion in 2017 (Republic of Kenya, 2018).The vast amounts of remittances received by Kenya have ignited a debate on how remittances are spent by recipients. The economic contribution of remittances is shaped by how they are viewed by recipient households. First, households may perceive remittances as a transitory income/windfall gain and therefore spend them on human and physical capital investment. In this scenario, remittances will have a permanent effect on economic development of the remittance receiving country (Randazzo and Piracha, 2014, 2017). Secondly, households may view remittances as a compensatory income and consequently devote them mainly on present consumption. Though the higher expenditure on immediate consumption may boost domestic production, it may generate an indirect impact on inflation (Narayan et al., 2011). Finally, households may treat remittances like any other income. As a result, there will be novariation in household expenditure behaviour (Randazzo and Piracha, 2014, 2017).

Previous empirical studies in Kenya have shown that external remittances stimulate economic growth (Aboulezz, 2015; Kosgeiet al, 2016). In Kenya also, external remittances stimulatedemand for housing construction (Kagochiand Kiambigi, 2012) and revamp stock market performance (Njoroge, 2015). Existing studies also demonstrate that domestic and external remittances supplement household income (Johnson and Whitelaw, 1974; Hoddinott, 1994), increases household welfare (Kiiru, 2010), reduce income inequalities (Bang et al., 2016) and boost accumulation of physical capital (Jena, 2017). Moreover, studies show that remittances intensify household investment on education, health and entrepreneurship (Odipoet al., 2015). Despite the prominence of remittances in the Kenyan economy, it is unclear how they influence household expenditure behaviour.

Studies exploring the effect of remittances on household spending in Kenya (Ratha et al, 2011; Odipo et al, 2015) apply direct approach based on household survey data. However, the use of direct method to draw inferences about remittances uses yields only partial and incorrect conclusions since money is fungible (Taylor and Mora, 2006). Other studies (Simiyu, 2013) do notinclude consumer durables, physical investments, and housing and land items in the analysis. Therefore, this paper sets out to empirically analyze the effect of remittances on household expenditure allocation in Kenya while focusing on a broader array of household expenditure items. The paper seeks to answer the following research questions: What is the effect of external remittances on household expenditure allocation? What is the effect of internal remittances on household expenditure allocation?

This paper contributes to literature on the effect of remittances on household expenditure allocation in several ways. First, the paper examines the effect of remittances on householdexpenditure behaviourin Kenya, an area that has elicited little attention among authors probably because of paucity of household survey data on remittances. Second, unlike previous empirical studies, this paper applies estimation methodology that addresses both the bounded nature of expenditure shares and the potential endogeneityof remittances. Finally, to account for the possible differential effect of remittances on household expenditure by source of income transfer, this paper differentiatesthe effects of internal and external remittances separately.

From the policy perspective, the findings of this paper will be useful to Kenyan policy makers striving to leverage productive use of remittances. Specifically,the findings present evidence on whetherremittances are allocated on present consumption or on investmentand that's important for policy.

The rest of the paper is organized as follows. The section 2 summarizes literature on remittances. Section 3 describe the methodology, data used in the analysis, presents and discusses the results. Finally, section 4 provides summary and policy implications.

2.0Literature review

This section provides a brief summary of the theoretical and empirical literature review on the effect of remittances on household expenditure allocation. According to Adams and Cuecuecha (2010b) and Adams and Cuecuecha (2016) there are three views on how remittances are spent by recipients. The first view treats remittances as fungible. This means that households with or without remittances will have identical expenditure behaviour. The second view advance that remittances reduce liquidity constraints and induce behavioural change at the household level. This theory argues that remittances are mainly spent on present consumptionand leisure rather than on investment (Chami et al., 2008). As a result, remittances will contribute negatively to economic development in the receiving country.A third and a more optimistic hypothesis postulate that remittances are transitory type of income. The hypothesis also argues that remittances reduce household liquidity constraints and allow households to spend the receipts on investment in human and physical capital (Adams, 1998). Consequently, this hypothesis predicts that remittances will contribute positively to economic development.

Shefrin and Thaler (1988)develop an alternative model known as mental accounting theory which postulates that money is not fungible. Individuals compartmentalize money into different financial accounts from which different items are financed. Money is placed in a given account depending on its source. A change in income in a given mental account, for instance, a windfall, is an imperfect substitute for income variation in another account, for example, wage income. Subsequently, this leads to a change in the marginal propensity to consume on different goods depending on the source of the money.Davies et al. (2009) build on the works of Shefrin and Thaler (1988) and argue that remittances may be put into a separate mental accounting compartment because of three reasons. First, migrants may request remittances to be treated differently. Second, since the money is earned by another individual, households may perceive remittances as a sacrifice on the part of the remitter. Consequently, remittances are likely to be saved or spent on investments on education, health and nutrition. Conversely, if remittances are perceived as a gift from migrants, they are likely to be spent on luxury goods. Finally, remittances may be perceived as unpredictable source of household income. This increases the probability of the receipts being saved and reduces the probability of them being used for consumption.

Several empirical studies find mixed results on the effect of remittances on household expenditure allocation. Some works find a positive relationship between remittances and household spending on investment. For instance, Taylor and Mora (2006) examine the effect of external and internal migration on household expenditure in Mexico and find that relative to

households without migrants, households with external migrants have higher marginal spending on investment. Households with domestic migrants allocate a higher share of expenditure to services, health and housing than households without migrants.Similar findings are reported in Mexico by Rivera and Gonzalez (2009). The authors focus on the effect of external and internal remittances on expenditure allocation and find that a household with internal or external remittances spend more on education, health, durable goods and savings than a household without remittances. The study does not address for potential endogeneity of remittances. Failure to control for endogeneity may result to biased and inconsistent estimates (Cameron and Trivedi, 2009). Taylor and Mora (2006) and Rivera and Gonazalez (2009) estimate Engel curve using three stage least squares (3SLS) and seemingly unrelated regression (SUR) estimators, respectively. But, the authors fail to take into account the fact that budget shares are bounded between zero and one. Failure to use fractional response models in estimating budget shares may lead to inconsistent parameter estimates (Papke and Wooldridge, 1996). Adams and Cuecuecha (2010a) control for different sources of remittances and report a comparable finding in Guatemala. The estimates indicate that a household receiving internal and external remittances simultaneously spend more at the margin on investment on education and housing, and less at the margin on food than a household without remittances.

Some studies find that remittances have a positive effect on immediate consumption. For instance, Demurger and Wang (2016) find that in China, households allocate internal remittances mainly to consumption and less to education and family businesses. The argument that remittances are not used in a productive way is also supported by Clement (2011). The author examines the effect of internal and external remittances on household expenditure in Tajikistan and finds that external remittances have a positive effect on household consumption level and an adverse effect on household spending on investment. Nevertheless, the impact of internal remittances on household expenditure is ambiguous because it affects investment goods in opposing directions. Specifically, internal remittance reduces expenditure devoted to housing and agriculture while increasing expenditure on health. The estimates also indicate that remittances have no impact on other key investment expenditure categories like education. The author rationalizes this result with the fact that health expenditure is an impermanent priority while education and agriculture constitute long-term investment. The study concludes that internal remittances assist a household to attain basic level of consumption. Though informative, this study fails to consider other investment expenditure items such as housing and land, which this study also focuses on.

Some empirical works find that remittances have no impact on household expenditure allocation. For example, Castaldo and Reilly (2007) find that a household with both internal and external remittances has identical expenditure allocation to a household without remittances. The study fails to focus on education, health as well as housing and land expenditure categories. In Ghana, Adams et al. (2008) analyze the effect of external and internal remittances on household expenditure allocation on a wide array of consumption and investment goods. The estimated parameters indicate that a household with remittances do not spend more on food, education and housing compared to a similar household without remittances. A comparable finding is found in Senegal by Randazzo and Piracha (2014) who estimate the effect of household receiving external, internal and both external and internal remittances simultaneously on household

expenditure behaviour. Initially, the results show that external remittances are spent productively. But, results indicate that remittances have no impact on household expenditure when marginal spending is taken into account Yet, Tabuga (2008) using data from Philippines finds mixed results. A household allocate more remittances to consumption, education and housing.

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

Few studies use instrumental variable (IV) estimation strategy to address selection bias and endogeneity of remittances. Adams and Cuecuecha (2010b) examine the effect of external remittances on household consumption and investment in Indonesia using three-step nested logit model with instrumental variables. The results shows that households with remittances spend more at the margin on food and less at the margin on housing relative to what they would have spent on the goods without remittances. The authors rationalize that households with external remittances are poorer than other types of households and therefore allocate more remittances to consumption relative to investments.

To address for many zero expenditure observations in household expenditure, some authors use Tobit (Tabuga, 2007) and two-part (Amuedo-Dorantes and Pozo, 2014) estimators. Amuedo-Dorantes and Pozo (2014) finds that in Mexico, uncertainty and level of external remittance has a positive effect on expenditure allocated to physical, human and financial investment. This study focuses on household spending on human and physical capital but does not consider expenditure allocated to food item.

Some studies explore how bargaining power of individuals ina recipient householdinfluence expenditure allocation. Guzman et al. (2008) and Pajaron (2011) use fractional logit estimator to investigate how bargaining power of individuals in a recipient household affect expenditure behaviour in Ghana and Philippines, respectively. Guzman et al. (2008) finds that remittances have no impact on household expenditure allocation in a male-headed household. The results also indicate heterogeneity in expenditure allocation within the female headed households. Specifically, a female-headed household with external remittances devote a lower share of household expenditure share to food and a higher share of expenditure to education, health, consumer and durable goods, and other goods while a female-headed household with internal remittances has a higher expenditure share on health and education. This study does not address for potential endogeneity of remittances and therefore the results could be biased and

inconsistent. Pajaron (2011) find that a female-headed household spend more on food and 'others' and less on medical goods, alcohol, tobacco and household operations compared to a male-headed household. Dissimilar findings are reported by Gobel (2013) in Ecuador. The study finds that a female-headed household allocate more expenditure to food, housing, education and health and less on consumer durables and investments than a male headed household.

Few studies focus on studying the effect of remittances on household expenditure using panel (Adams and Cuecuecha, 2016) and cross-sectional data (Thapa and Acharya, 2017; Randazzo and Piracha, 2017). Adams and Cuecuecha (2016) use same data as Adams and Cuecuecha (2010b) to estimate the effect of external remittances on household investment in Indonesia. The estimates indicate that a household with remittances spend more at the margin on food and education compared to the counterfactual scenario of no remittances. Thapa and Acharya (2017) investigate the effect of external, internal and combination of external and internal remittances on household expenditure allocation in Nepal. The results indicate that external remittances increase the share of household expenditure devoted to durable goods. A household with internal remittances allocate a higher share of expenditure to food while a household receiving external and internal remittances simultaneously spend more on non-food and health. Dissimilar finding is reported in Senegal by Randazzo and Piracha (2017) who investigate the effect of external and internal remittances on household expenditure behaviour. The finding indicates that remittances have insignificant impact on household expenditure behaviour.

3.0Methodology

To examine the effect of remittances on household expenditure allocation, this study relies on Working-LeserEngel curve specificationfor expenditure (Working, 1943; Leser, 1963).In expenditure share form:

$$w_{ih} = \alpha_i + \beta_i \log(E_h) + \gamma_i Z_h + \theta_i R_h + \beta_i^* \log(E_h) R_h + \mu_{ih} \quad (1)$$

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

The dependent variable in equation (1) is theshare of total household expenditure allocated on each category of good (food, education, health, consumer durables, investments, housing and land, and 'others') and is bounded within the [0, 1] interval. According to Becker (2014), the popular approach is to apply OLS estimator to estimate the conditional mean as a linear combination of the explanatory variables. This approach is simple and the coefficients on $\beta's$ can be easily interpreted as marginal effects but it fails to take into account the bounded nature of the dependent variable. Also, the predicted values of the dependent variables are not guaranteed that they will lie within the $[0,1]$ interval. Additionally, equation (1) may be misspecified because of many zero expenditure observations (Stephenson, 2011).

To overcome limitations of OLS estimator, this study analyzes household expenditure allocation behaviour using fractional multinomial logit estimator (Buis, 2012). Fractional multinomial logit generalizes the univariate fractional logit estimator(Papke and Wooldridge, 1996) and focuses on

the conditional mean allocation of the budget shares across the expenditure categories. The conditional mean for budget share allocation with J expenditure categories can be written as:

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

Where w_i is the share of total household expenditure allocated by household i on different items j such that $j = 1,2.....J$ and J is the total number of expenditure categories. All $\beta's$ cannot be estimated separately under multinomial quasi-likelihood method (Mullahy, 2015). Therefore, normalization is used to set the coefficients of one expenditure item to be zero. That is, fractional multinomial logit model is normalized by setting the parameter estimates of the first equation to zero so that $\beta_1 = 0$. In this study expenditure on 'others' is chosen as the base/comparison group. The conditional expectation of the equations can be written as:

$$E\left[w_{ij} \mid X_i\right] = G_j(X_i \beta) = \frac{\exp(X_i \beta_j)}{1 + \sum_{k=1}^{J-1} \exp(X_i \beta_k}, \qquad j = 1,....., J-1 \tag{3}$$

$$E\left[w_{ij} \mid X_i\right] = G_j(X_i \beta) = \frac{1}{1 + \sum_{k=1}^{J-1} \exp(X_i \beta_k)} \tag{4}$$

If the fractional multinomial logitmodel is correctly specified, the quasi-maximum likelihood estimator provides consistent estimates of β because the log-likelihood function is a member of the linear exponential family (Gourieroux et al, 1984). The fractional multinomial logit regressionidentifies the ration of the conditional means between alternatives and thereforeit does not suffer from the problem of independence of irrelevant alternatives (IIA) which is common in the standard multinomial logit(Murteira and Ramalho, 2016). Specifically, $G_j / G_k = \exp(X_i \beta_j) / \exp(X_i \beta_k) \quad (j \neq k)$, which is functionally independent from the ratio of the other pairs.

Given that fractional multinomial logit estimator requires some normalization, the coefficients gives relative change to the reference group. As a result, the quasi maximum likelihood produces parameter estimates that are difficult to interpret (Mullahy, 2011). To compare the size of different models, this study calculates average marginal effects which show the effect of a change in one of the explanatory variable on the expected conditional mean of the budget share.

Remittances are potentially endogenous to equation (1) due to correlation between remittances and the error term. That is, remittances may be correlated with unobserved household characteristics which also influence how the household allocate expenditure. Also, the impact of remittances on household expenditure may run on the reverse direction (Amuedo-Dorantes and Pozo, 2014). Therefore, to reveal the true impact of remittances on expenditure allocation,this study uses instrumental variable estimation strategy. A binary probit is first used to estimate the probability of household receiving remittances. Explanatory values include exogenous variables in equation (1) and an instrument. Subsequently, the probit estimates are used to compute the

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

3.1 Variable Measurement and Descriptive Statistics

The dependent variable in this paper is the share of expendituredevoted to food, consumer and durable goods (CD), education, health, investment, housing and land, and 'other' goods. Table 1 shows descriptions of what the expenditure categories contains.Expenditure categories had different recall periods/frequency of consumption (weekly, and six months). Therefore, comparable consumption categories were computed by multiplying weekly expenditure by four and dividing six months expenditure by six to get monthly household expenditure. Budget share for a particular item was obtained by dividing household's monthly expenditure on an item (measured in Kenyan shilling) by household's total monthly expenditure.

The explanatory variables in this paper were guided by empirical literature. The variables constructed include per-capita household expenditure, remittances: measured as binary indicator with internal (international) remittances taking the value of 1 if a household received internal (external) remittances, and 0 if otherwise, household characteristics that included household head age, age square of household head, household head gender; household's demographic composition captured using proportion of children below age of 6 years, children aged 6 to 15 years, men (women) aged above 16 years and individuals aged above 65 years in the household; household human capital variable measured by proportion of household members > 15 years with primary, secondary or tertiary education level of education. Other explanatory variables included household's location, wealth, income measured by per capita household expenditure and household head's employment status.

Descriptive statistics (Table 2) shows that on average, the surveyed households allocated largest share of total household expenditure (46%) to food followed by consumer durables (27%) while only 1.5% is devoted to physical investments. The statistics also showed that households without remittances allocated a higher share of expenditures on food item than households without remittances. In particular, households with remittances allocated around 5% points less onfood than households without remittances.

3.2 Data

This paper used single round cross-sectional data from the 2009 Migration and Remittances Household Survey for Kenya. The survey was administered as a part of the African Migration Project to enhance understanding of migration, remittances and their impacts in the Sub-Sahara Africa and it focused on Kenya, Uganda, Nigeria, Senegal, Burkina Faso and South Africa. The primary investigator for the Kenyan Household Survey was University of Nairobi. The household survey was based on two-stage sampling procedure drawn by the Kenya National Bureau of Statistics (KNBS). This nationally representative survey eventually collected data

from 1,942 households in 17 districts covering the eight regions of Kenya. Of the surveyed households, 51% were drawn from rural areas while 49% were based in urban areas. Majority of the surveyed households had external migrants (37%), followed by internal (29%) while 34% had non-migrants. Further, the data was gathered for 8,343 non-migrant and 2,245 migrant individuals. The household survey gathered detailed information on households, migrants, remittances as well as the different types of household expenditure items.

3.3 Results

The average marginal effects of the regression of the effect of external and internal remittances when remittances are treated as exogenous are presented on Table 3 and Table 4 respectively. The results show thatexternal remittances have a negative and significant effect on the share of household expenditure on food and investment in physical capital. Having external remittances reduces the share of household expenditure allocated to food and investment by 36.0% and 6.0%, respectively. A household with external remittances allocate a higher share of expenditure to education, consumer durables and, housing and land than a household without remittances. Specifically, a household with external remittance allocate 11.0%, 19.8% and 8.5% more to education, consumer durables and housing and land in comparison to a household without remittances. The coefficient on the interaction term is significant for all expenditure categories apart from the expenditure on 'others'. This means that the effect of external remittances on food and investment is larger for a household with higher per-capita income. Conversely, the effect of external remittances on education, health and, housing and land is less for a household with higher per-capita income.

The results in Table 3.4 indicate that household per-capita income is negatively and significantly correlated with the share of total expenditure allocated to food. A unit increase in per-capita household income reduces expenditure on food by 14.6%. The finding that a larger household spend less on food is consistent with Engel's law which postulate that as a household's total expenditure increase, the average budget sharedevoted on food declines. A comparable finding is found by Shahzadi (2010) in a similar study in Pakistan. Household income is negatively related to the share of expenditure on consumer durables and 'others'.The coefficient on the variable of interest, internal remittances, is significant only on the food budget share. The results show that a household with internal remittances allocate 24.1% more to food than a household without remittances. Demurger and Wang (2016) found a similar finding in China that internal remittances have a positive effect on immediate consumption. The interaction term is positive and significant for the budget share on housing and negative and significant for the budget share allocated to food and investment.

When endogeneity of remittances is controlled for, the results (Table 5) show that external remittances have a positive and significant effect on the share of expenditure allocated to physical investment. A household with external remittances, on average, spend 21.9% more on physical investment compared to a similar household without remittances. Previous authors also find a similar result (Adams, 1998); Taylor and Mora, 2006; Adams and Cuecuecha, 2010b; Adams and Cuecuecha, 2013; Amuedo-Dorantes and Pozo, 2014). This result may suggest that recipients perceive external remittances as a windfall and therefore spend more on accumulation of physical capital. This finding supports the optimistic view that recipients use remittances

productively. The coefficients on the interaction between household per-capita income and predicted probability of household receiving external remittances are negative on budget share on health and investment. This suggests that the effect of external remittances on health and investment is smaller for higher-income households.

The results (Table 6) show that after accounting for endogeneity, internal remittances have a negative and significant impact on expenditure allocated to education. A household with internal remittances spend 83.9% less on education compared to a household without remittances. This finding is in line with that of Demurger and Wang (2016) who finds that in China, internal remittances have a negative impact on educational expenditure. Similarly, Kollner (2013)and Zhu et al. (2016) reported that remittances have a negative impact on expenditure on education. However, the finding in this study is in conflict with that of Taylor and Mora (2006) and Bansak et al. (2015) who finds a positive and significant correlation between internal remittances and expenditure allocated to education. This result may suggest that recipients (lower income households) perceive internal remittances as a permanent source of income and therefore choose to spend less on human capital. Therefore, the result in this study is in line with pessimistic hypothesis which postulates that remittances are not used productively.

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

4.0 Conclusions

This paper empirically examined the effect of remittances on household expenditure allocationbehaviourin Kenya usingcross-sectional data from 2009 World Bank Household Survey for African Migration Project. Empirical results indicatethat international remittances have a positive impact on the share of total household expenditure allocated to education, consumer durables and, housing and land.Households receiving international remittances allocate a lower share of total expenditure to food and investments compared to households without remittances. Onceendogeneity is controlled for, results show that remittances have a positive and significant impact on share of expenditure devoted to investments and negative effect onexpenditure on food. Theresults therefore suggest that households treat external remittance as a transitory income and are likely to contribute to economic development positively. The results also indicate that recipients perceive internal remittance as permanent source of income and therefore they are unlikely to contribute to economic development.

Policies that direct external remittances to productive investments need to be put in place, for example policies like preferential loans or grants for business ventures for the migrant households. The government should also offer tax breaks on imported capital goods by external

migrants. Policies to increase the flow of diaspora remittances to Kenya are required. The government and remittance service providers should strive to reduce remittance transaction costs. Kenya Revenue Authority should also prolong the tax amnesty on remittance income sent by international migrants back home beyond 30th June 2018.

Policy makers trying to maximize positive effect of domestic remittances on economic development should devise policies to divert remittances to productive uses. The government of Kenyaought to create conducive business environment. The government ought to carry out awareness campaigns to sensitize people in migrant communities particularly in rural areas on the benefits of investment in education. Moreover, the free primary and education programs need to be strengthened because they are likely to ameliorate the adverse effect of internal remittances on investment in education.

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Table 1: Description of the expenditure categories

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

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

Table 2: Descriptive Statistics for Explanatory Variables

Variable	Households without Remittances (N=1156)		Households with Remittances (N=773)		All Households (N=1929)		Difference in means
	Mean	s.d	Mean	s.d	Mean	s.d	
Food	0.477	(0.259)	0.432	(0.255)	0.459	(0.046)	0.046***
Education	0.076	(0.134)	0.087	(0.140)	0.080	(0.137)	-0.011
Health	0.031	(0.071)	0.044	(0.094)	0.036	(0.081)	-0.013***
Investment	0.013	(0.059)	0.017	(0.074)	0.015	(0.065)	-0.004
Consumer durables	0.268	(0.212)	0.266	(0.221)	0.267	(0.216)	0.002
Housing and land	0.118	(0.165)	0.128	(0.174)	0.122	(0.169)	-0.010
Others	0.017	(0.054)	0.026	(0.087)	0.021	(0.069)	-0.010***
Proportion of children (0-5) years	10.410	(15.324)	8.840	(14.575)	9.782	(15.045)	1.570**
Proportion of children (6-15) years	16.867	(20.150)	18.708	(21.420)	17.603	(20.681)	-1.841*
Proportion of male >15 years	36.564	(28.570)	29.983	(26.375)	33.933	(27.893)	6.554***
Proportion of female >15 years	34.240	(24.437)	39.243	(23.258)	36.240	(24.091)	-5.115***
Proportion of household members >15 years having primary education	61.321	(30.446)	57.526	(31.764)	59.803	(31.027)	3.795**
Proportion of household members >15 years having secondary education	40.725	(37.048)	35.675	(34.333)	38.706	(36.063)	5.050***
Proportion of household members >15 years having university education	9.298	(24.586)	5.455	(17.381)	7.761	(22.066)	3.843***
Proportion of elderly in the household (>65 years)	6.135	(15.629)	11.395	(20.965)	8.238	(18.132)	-5.260***
Age of the Household head in years	44.936	(14.512)	51.929	(16.725)	47.732	(15.806)	-6.993***
Gender of the Household head	0.766	(0.424)	0.545	(0.498)	0.678	(0.467)	0.220***
Household head working status	0.777	(0.417)	0.582	(0.494)	0.699	(0.459)	0.195***
Location of household	0.465	(0.499)	0.579	(0.494)	0.511	(0.500)	-0.114***
Households owns agricultural land	0.571	(0.495)	0.712	(0.453)	0.627	(0.484)	-0.141***
Household size	4.202	(2.381)	4.432	(2.270)	4.294	(2.339)	-.230**
Total per-capita expenditure (Kshs '000)	16.922	(56.746)	11.342	(27.730)	14.691	(4.751)	5.581**

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

Table 3: Average Marginal Effects of Fractional multinomial logit model estimation of effect of international remittance on household expenditure allocation

Variable	Food	Educ.	Health	CD	Inv.	Hous.	Others
Proportion of children (0-5) years	0.0002	-0.0020***	0.0009**	-0.0005	0.0005*	0.0012*	-0.0003
	(0.0008)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0007)	(0.0003)
Proportion of children (6-15) years	0.0001	-0.0008	0.0007*	0.0015*	0.0005*	0.0013**	-0.0004
	(0.0008)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0007)	(0.0003)
Proportion of male >15 years	0.0016**	-0.0022***	0.0002	-0.0008	0.0002	0.0011*	-0.0002
	(0.0008)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0007)	(0.0003)
Proportion of female >15 years	0.0008	-0.0019***	0.0004	-0.0006	0.0003	0.0012*	-0.0003
	(0.0008)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0007)	(0.0003)
Proportion of HH members >15 years with primary educ.	0.0005	0.0002	0.0002	-0.0001	0.0001	0.0002	-0.0000
	(0.0004)	(0.0003)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0001)
Proportion of HH >15 years with secondary education	-0.0006**	0.0007***	-0.0003**	0.0005**	0.0001	-0.0003	-0.0001**
	(0.0002)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with tertiary education	0.0003	0.0003	0.0005	-0.0004	-0.0002*	0.0001	0.00001
	(0.0003)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >65 years	0.0005	-0.0011***	0.0003**	0.0007	0.0000	-0.0003	-0.0001
	(0.0005)	(0.0003)	(0.0002)	(0.0004)	(0.0001)	(0.0003)	(0.0001)
Age of the Household head in years	0.0004	0.0008**	0.0007***	-0.0021***	-0.0002	-0.0000	0.0003**
	(0.0005)	(0.0003)	(0.0002)	(0.0004)	(0.0001)	(0.0004)	(0.0001)
Gender of the Household head	0.0054	-0.0091	0.0028	0.0067	0.0008	-0.0054	-0.0009
	(0.0143)	(0.0094)	(0.0065)	(0.0147)	(0.0045)	(0.0128)	(0.0047)
Household head working status	0.0003	0.0000	-0.0002*	-0.0004	0.0001	0.0001	0.0001
	(0.0005)	(0.0003)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0001)
Location of household	-0.0137	0.0160	0.0117**	-0.0139	0.0095	-0.0185	0.0089**
	(0.0119)	(0.0081)	(0.0056)	(0.0124)	(0.0047)	(0.0109)	(0.0042)
Households owns	-0.0787)***	0.0060	0.0128**	-0.0188	0.0115**	0.0415	0.0258***

agricultural land		(0.0080)	(0.0061)	(0.0119)	(0.0051)	(0.0109)	(0.0052)
Household size	-0.0194***	0.0090***	0.0000	0.0079***	0.0009	0.0010	0.0005
	(0.0030)	(0.0018)	(0.0012)	(0.0030)	(0.0009)	(0.0026)	(0.0008)
Log of total per-capita expenditure	-0.1473***	0.0149	0.0120	0.0664***	0.0077***	0.0407***	0.0057***
	(0.0060)	(0.0042)	(0.0029)	(0.0062)	(0.0019)	(0.0049)	(0.0018)
Receive external remittance	-0.3599***	0.1091**	0.0331	0.1979**	-0.0505*	0.0846***	-0.0142
	(0.1011)	(0.0515)	(0.0366)	(0.0977)	(0.0030)	(0.0775)	(0.0026)
Log of total per-capita expenditure*external remittance	0.0418***	-0.0123**	-0.0034***	-0.00224**	0.0050*	-0.0105***	0.0018
	(0.0118)	(0.0059)	(0.0043)	(0.0110)	(0.0030)	(0.0087)	(0.0026)

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

Table 4: Average Marginal Effects of Fractional multinomial logit model estimation of effect of internal remittance on household expenditure allocation

Variable	Food	Educ.	Health	CD	Inv.	Hous.	Others
Proportion of children (0-5) years	0.0007	-0.0022***	0.0005	0.0011	0.0002	0.0016	0.0002
	(0.0008)	(0.0005)	(0.0002)	(0.0009)	(0.0003)	(0.0008)	(0.0002)
Proportion of children (6-15) years	0.0003	-0.0009**	0.0004	-0.0011	0.0000	0.0014*	-0.0000
	(0.0008)	(0.0004)	(0.0002)	(0.0008)	(0.0003)	(0.0008)	(0.0002)
Proportion of male >15 years	0.0016*	-0.0018***	0.0003	-0.0006	0.0001	0.0008	-0.0002
	(0.0009)	(0.0005)	(0.0002)	(0.0008)	(0.0003)	(0.0008)	(0.0003)
Proportion of female >15 years	0.0015*	-0.0019***	0.0003	-0.0004	0.0001	0.0006	-0.0001
	(0.0008)	(0.0005)	(0.0002)	(0.0009)	(0.0003)	(0.0008)	(0.0002)
Proportion of HH >15 years with primary education	-0.0007	-0.0000	0.0000	-0.0001	0.0000	0.0002	0.0000
	(0.0003)	(0.0003)	(0.0001)	(0.0003)	(0.0001)	(0.0003)	(0.0001)
Proportion of HH >15 years with secondary education	-0.0009***	0.0008***	-0.0002	0.0001	0.0000	0.0001	0.0000
	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with tertiary education	0.0005	0.0000	0.0001	-0.0006**	-0.0002*	0.0002	0.0001
	(0.0004)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >65 years	0.0005	-0.0010***	0.0001	0.0001	-0.0002	0.0001	-0.0001
	(0.0005)	(0.0003)	(0.0001)	(0.0004)	(0.0002)	(0.0004)	(0.0001)
Age of the Household head in years	0.0008*	0.0012***	0.0005	-0.0031***	-0.0001	0.0002	0.0004***
	(0.0005)	(0.0003)	(0.0002)	(0.0004)	(0.0002)	(0.0004)	(0.0001)
Gender of the Household head	0.0292	-0.0094	0.0012	-0.0233	0.0121**	-0.0081	-0.0016
	(0.0157)	(0.0094)	(0.0053)	(0.0153)	(0.0049)	(0.0124)	(0.0044)
Household head working status	-0.0005	0.0005*	-0.0000	-0.0007	0.0001	0.0007***	-0.0001
	(0.0006)	(0.0002)	(0.0000)	(0.0005)	(0.0001)	(0.0003)	(0.0001)
Location of household	-0.0270**	0.0123	0.0128	-0.0027	0.0016	-0.0061	0.0091**
	(0.0122)	(0.0077)	(0.0040)	(0.0119)	(0.0042)	(0.0095)	(0.0040)
Households owns	-0.0640***	0.0076	0.0068	0.0088	0.0182***	0.0044	0.0181***

agricultural land	(0.0129)	(0.0081)	(0.0042)	(0.0117)	(0.0053)	(0.0096)	(0.0042)
Household size	-0.0189***	0.0092***	-0.0005	0.0091***	0.0013	-0.0003	0.0001
	(0.0033)	(0.0019)	(0.0010)	(0.0030)	(0.0010)	(0.0025)	(0.0008)
Log of total per-capita expenditure	-0.1455***	0.0071	0.0043	0.0831***	0.0128	0.0343	0.0039**
	(0.0070)	(0.0043)	(0.0019)	(0.0067)	(0.0028)	(0.0055)	(0.0017)
Receive internal remittance	0.2408**	-0.0660	-0.0034	-0.0788	0.0106	-0.0665	-0.0368
	(0.1057)	(0.0527)	(0.0260)	(0.1053)	(0.0316)	(0.0858)	(0.0268)
Log of total per-capita expenditure*internal remittance	-0.1455*	0.0082	-0.0004	0.0096	-0.0005***	0.0088***	0.0047
	(0.0070)	(0.0064)	(0.0033)	(0.0127)	(0.0038)	(0.0103)	(0.0034)

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

Table 5: Average Marginal Effects of Fractional multinomial logit model estimation of effect of international remittance on household expenditure allocation

Variable	Food	Educ.	Health	CD	Inv.	Hous.	Others
Proportion of children (0-5) years	0.0004	-0.0020***	0.0010**	-0.0005	0.0006*	0.0009	-0.0003
	(0.0009)	(0.0005)	(0.0004)	(0.0007)	(0.0003)	(0.0008)	(0.0003)
Proportion of children (6-15) years	0.0003	-0.0008*	0.0008**	-0.0016**	0.0006*	0.0010	-0.0003
	(0.0008)	(0.0005)	(0.0004)	(0.0007)	(0.0003)	(0.0007)	(0.0003)
Proportion of male >15 years	0.0018**	-0.0021***	0.0003	-0.0008	0.0002	0.0009	-0.0002
	(0.0009)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0008)	(0.0003)
Proportion of female >15 years	0.0010	-0.0019***	0.0005	-0.0006	0.0003	0.0001	-0.0002
	(0.0009)	(0.0005)	(0.0004)	(0.0008)	(0.0003)	(0.0003)	(0.0003)
Proportion of HH >15 years with primary education	-0.0004	0.0002	0.0002	-0.00001	0.0001	-0.0003	-0.0000
	(0.0004)	(0.0003)	(0.0002)	(0.0004)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with secondary education	-0.0006***	0.0007***	-0.0003**	0.0005**	0.0000	-0.0003*	-0.0001**
	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with tertiary education	0.0003	0.0003	0.0001	-0.0005	-0.0002	-0.0002	0.0001
	(0.0003)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >65 years	0.0004	-0.0011***	0.0003	0.0007	-0.0001	-0.0001	-0.0001
	(0.0006)	(0.0003)	(0.0002)	(0.0005)	(0.0001)	(0.0004)	(0.0001)
Age of the Household head in years	0.0002	0.0008**	0.0007***	-0.0020***	-0.0003*	0.0003	0.0003**
	(0.0004)	(0.0004)	(0.0002)	(0.0005)	(0.0002)	(0.0026)	(0.0001)
Gender of the Household head	0.0118	-0.0087	0.0055	0.0027	0.0074	-0.0186	-0.0000
	(0.0162)	(0.0114)	(0.0076)	(0.0168)	(0.0055)	(0.0125)	(0.0047)
Household head working status	0.0000	-0.0000	-0.0003**	-0.0002	0.0000	0.0004	0.0001
	(0.0006)	(0.0004)	(0.0001)	(0.0005)	(0.0007)	(0.0003)	(0.0001)
Location of household	-0.0177	0.0140*	0.0099*	-0.0112	0.0070	-0.0106	0.0087*
	(0.0123)	(0.0075)	(0.0055)	(0.0144)	(0.0047)	(0.0113)	(0.0052)
Households owns	-0.0775***	0.0060	0.0126*	-0.0192	0.0103*	0.0421***	0.0258***

agricultural land	(0.0134)	(0.0090)	(0.0068)	(0.0130)	(0.0059)	(0.0099)	(0.0050)
Household size	-0.0207***	0.0086***	-0.0007	0.0087***	0.0002	0.0034	0.0004
	(0.0035)	(0.0015)	(0.0014)	(0.0030)	(0.0010)	(0.0026)	(0.0010)
Log of total per-capita expenditure	-0.1534***	0.0055	0.0087	0.0732***	0.0097***	0.0479***	0.0084***
	(0.0096)	(0.0070)	(0.0040)	(0.0098)	(0.0033)	(0.0081)	(0.0033)
Receive external remittance	-0.2868	-0.0517	0.0935	0.2361	0.2187**	-0.2979	0.0880
	(0.3611)	(0.1882)	(0.1454)	(0.3768)	(0.0988)	(0.2847)	(0.1010)
Log of total per-capita expenditure*external remittance	0.0460	0.0102	-0.0052**	-0.0345	-0.0179**	0.0106	-0.0092
	(0.0361)	(0.0161)	(0.0139)	(0.0330)	(0.0088)	(0.0273)	(0.0094)

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

Table 6: Average Marginal Effects of Fractional multinomial logit model estimation of effect of internal remittance on household expenditure allocation

Variable	Food	Educ.	Health	CD	Inv.	Hous.	Others
Proportion of children (0-5) years	0.0011	-0.0020***	0.0008**	-0.0019**	0.0002 (0.0003)	0.0013*	0.0005*
	(0.0009)	(0.0005)	(0.0003)	(0.0010)		(0.0008)	(0.0003)
Proportion of children (6-15) years	0.0008	-0.0008	0.0006*	-0.0019**	0.0000	0.0011	0.0001
	(0.0009)	(0.0005)	(0.0003)	(0.0009)	(0.0004)	(0.0008)	(0.0002)
Proportion of male >15 years	0.0023**	-0.0016***	0.0006	-0.0017	-0.0001	0.0004	0.0001
	(0.0011)	(0.0006)	(0.0004)	(0.0011)	(0.0004)	(0.0008)	(0.0003)
Proportion of female >15 years	0.0025	-0.0017***	0.0007*	-0.0017	-0.0001	0.0001	0.0003
	(0.0011)	(0.0006)	(0.0004)	(0.0011)	(0.0004)	(0.0009)	(0.0003)
Proportion of HH >15 years with primary education	-0.0003	-0.0001	-0.0001	0.0002	-0.0000	0.0004	-0.0001
	(0.0003)	(0.0002)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0001)
Proportion of HH >15 years with secondary education	-0.0007***	0.0008***	-0.0001	-0.0001	-0.0000	0.0000	0.0001
	(0.0002)	(0.0002)	(0.0001)	(0.0003)	(0.0001)	(0.0002)	(0.0001)
Proportion of HH >15 years with tertiary education	0.0007	0.0003	0.0002*	-0.0012***	-0.0003	-0.0000	0.0003**
	(0.0005)	(0.0003)	(0.0001)	(0.0004)	(0.0002)	(0.0002)	(0.0002)
Proportion of HH >65 years	0.0006	-0.0010***	0.0002	-0.0001	-0.0002	0.0005	-0.0000
	(0.0005)	(0.0003)	(0.0001)	(0.0004)	(0.0002)	(0.0004)	(0.0001)
Age of the Household head in years	0.0002	0.0012***	0.0003	-0.0023***	-0.0000	0.0006	0.0002
	(0.0007)	(0.0003)	(0.0002)	(0.0006)	(0.0003)	(0.0004)	(0.0002)
Gender of the Household head	0.0762**	-0.0047	0.0203	-0.0884**	0.0131	-0.0352	0.0172*
	(0.0408)	(0.0221)	(0.0133)	(0.0408)	(0.0147)	(0.0274)	(0.0093)
Household head working status	-0.0006	0.0006*	-0.0001	-0.0006	0.0001	0.0008***	-0.0001
	(0.0008)	(0.0003)	(0.0001)	(0.0005)	(0.0009)	(0.0003)	(0.0001)
Location of household	-0.0276**	0.0121*	0.0124***	-0.0022	0.0020	-0.0056	0.0089***
	(0.0138)	(0.0063)	(0.0046)	(0.0115)	(0.0043)	(0.0100)	(0.0032)
Households owns	-0.0778***	0.0058	0.0014	0.0274**	0.0183**	0.0120	0.0128***

agricultural land	(0.0159)	(0.0095)	(0.0047)	(0.0135)	(0.0088)	(0.0110)	(0.0040)
Household size	-0.0170***	0.0094***	0.0002	0.0067**	0.0013	-0.0013	0.0008
	(0.0036)	(0.0019)	(0.0012)	(0.0030)	(0.0010)	(0.0026)	(0.0011)
Log of total per-capita expenditure	-0.1423***	-0.0057	0.0052*	0.0928***	0.0146***	0.0363***	-0.0009
	(0.0107)	(0.0070)	(0.0030)	(0.0097)	(0.0048)	(0.0079)	(0.0030)
Receive internal remittance	0.4115	-0.8387***	0.0368	0.6226	0.1129	0.0164	-0.3616**
	(0.4732)	(0.3042)	(0.1210)	(0.4714)	(0.1493)	(0.3559)	(0.1749)
Log of total per-capita expenditure*internal remittance	-0.0156	0.1095***	0.0082	-0.1283*	-0.0107	-0.0218	0.0588**
	(0.0702)	(0.0398)	(0.0177)	(0.0696)	(0.0239)	(0.0468)	(0.0242)

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