Why Do Migrants Remit? Empirical Evidence from Kenya

John N. Maara[1*], Damiano K. Manda[2] and Joy Kiiru[2]

[1]*University of Nairobi, Kenya.*
[2]*University of Nairobi School of Economics, Kenya.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: Remittances both external and internal are very important to the Kenyan economy. In view of this, this study improves the understanding of the drivers of remittances in Kenya. In addition, the study empirically tests the main theories of remittances namely altruism, self interest and implicit contractual agreement.
Methodology: This paper analyzes migrant's remittance behaviour in Kenya using household survey data from World Bank 2009 African Migration Project. Since a large share of migrants does not remit, Heckman sample selection model is suggested and estimated using Limited Information Maximum Likelihood method.
Results: The results show that external migrants have a higher probability to remit and, on average send higher levels of remittances back home relative to internal migrants. Internal and external migrants with higher levels of education prior to migration and employed migrants remit more both at extensive and intensive margins. External migrants have a higher probability to remit and send larger amounts of money to higher-income households while internal migrants have a higher probability to remit and send higher levels to lower-income households.
Conclusion: Therefore, the empirical results suggest that internal and external remittances are

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*Corresponding author: E-mail: johnmaara75@yahoo.com;

motivated by altruism and inter-temporal contractual agreement between a migrant and the household. The results also provide support for external remittances as being motivated by self-interest.

1. INTRODUCTION

External remittances have become a vital source of financial flows to the Kenyan economy for the last one decade. External remittances through the formal channels increased from US$0.61 billion in 2009 to US$1.72 billion in 2016 [1]. The official recorded inward remittances flows to Kenya in 2018 were estimated at US$ 2.7 billion [1]. The principal source of external remittances to Kenya is North America (51.54%) followed by Europe (32.31%) and the Rest of the World constitutes the remaining 16.14% of the total inflows [1]. It is important to note that, the true level of external remittances inflows to Kenya is likely to be much higher because the official figures fail to account for money transferred through informal channels such as *hawala*, friends and relatives.

Previous studies attribute the rapid growth in the levels of external remittances to Kenya to several factors. First, is an increase in the number of external migrants investing money back in Kenya due to attractive investment opportunities in the real estate sector [2]. Second, the significant increase in the number of Kenyans living in Diaspora and low rate of naturalization of emigrants in the high income countries [3]. Third, is the current Kenya constitution which, allows for dual citizenship thus enabling Kenya citizens to remit money back to the country. Finally is the improvement in data collection and proper classification of remittances by commercial banks.

As a source of income to Kenya, external remittance is a more appealing than other sources of foreign financing. This is because remittances have several desirable properties. First, their magnitude is large compared to foreign direct investment (FDI) and private debt and portfolio equity. External remittances are the leading source of foreign currency to Kenya and surpass revenues from tea, horticulture and tourism [2]. Second, external remittances are more stable and resilient to economic downturns relative to other private capital flows such as FDI and private debt and portfolio equity. Finally, external remittances have increased steadily over the years thus, providing a steady source of income [1].

Turning to internal remittances, it is important to note that like in other countries, the true size of domestic remittances in Kenya is not known. This could be due to lower recognition accorded to internal migration and also lack of recording of domestic remittances. Further, internal remittances are normally remitted through informal channels therefore making it difficult to record them [4]. Nevertheless, the levels of domestic remittances have increased in the last decade due to the rapid adoption of mobile-phone money transfer service.

Due to their large size, the government of Kenya regards external remittances as a key contributor to economic growth and development. The government has also crafted the Kenya Diaspora Policy to tap Diaspora remittances to at least 5% of the Kenya's GDP as outlined in the Second Medium Term Plan of the Kenya's *Vision 2030* [5]. Existing literature shows that external remittances play an important role in the Kenyan economy by stimulating economic growth [6,7] and demand for housing construction [8]. Empirical studies also reveal that domestic and external remittances supplement household income [9,10], increase household welfare [11], reduce income inequalities [12] and boost accumulation of physical capital [13]. Past studies also show that remittances intensify household investment in education, health and entrepreneurship [14].

Despite the prominence of remittances in the Kenyan economy, the determinants of internal and external remittances have not been comprehensively studied. Existing studies on the determinants in Kenya do not provide a comprehensive understanding. Some of the studies concentrate on internal remittances particularly urban to rural remittances [9,15,10, 16] and yet external remittances has turn out to be an important source of household income and foreign currency to the country. On the other hand, previous studies investigating the determinants of external remittances apply aggregate data [8] which may capture only a

small fraction of total remittance since a substantial part of remittance is sent through informal channels and thereby not recorded. This study thus uses a national-wide household survey dataset to empirically analyze the determinants of internal and external remittances in Kenya and thus avoid the data issues experienced by previous studies and provide comprehensive analysis of internal and external remittances using the same dataset. The study analyzes separately the determinants of internal and external remittances due to the fact that the sources of the two types of remittances are different. Therefore, the main objective of the study is to analyze the determinants of internal and external remittances in Kenya. In carrying out the analysis, this study uses Heckman two-step procedure to deal with problem of selection bias and therefore attain unbiased and consistent parameter estimates. Ignoring the conditional and unconditional marginal effects of Heckman's approach may lead to wrong interpretation of regressors on the dependent variable.

The findings of this study will be will be useful to Kenyan policy makers as it will provide comprehensive information on the determinants of both internal and external remittances. Identification of the drivers of remittances is crucial to policy makers striving to maximize benefits from the remittances.

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. PREVIOUS STUDIES

This section provides a brief summary of the theoretical and empirical literature review on explanations as to why migrants remit. From the seminal work of Lucas and Stark [17], there are three motives for why migrants remit. These are pure altruism, self-interest and inter-temporal contractual agreement. On altruistic motive, migrants care about the welfare of their family left back home and derive utility from their own consumption and that of their family members. In this case, migrants remit without expecting any reciprocation from their families. On self-interest motive, migrants remit for their own personal gains. For instance, migrants may remit with the hope of inheriting, for investment in assets, and in preparation for their coming back home [18].

The contractual agreement motive comprises implicit agreement between migrant and their family, which includes co-insurance, implicit loan-agreement and exchange motivation [19]. Therefore, remittance may represent payment in exchange of services provided by migrant's family in the country of origin. Such services include taking care of migrant's property or old parents [20,18].

Further, according to the new economics of labor migration theory, migration constitutes substitution for imperfect markets in a migrant's homeland [21,22,23,24]. A household initially invests in human capital of its members and then finance their migration to urban areas or to foreign countries [22]. When a migrant starts working, he/she remits to the family during times of shock (such as death, sickness or poor harvest), to increase consumption and augment household investment. On the other hand, if a migrant faces shock such as unemployment at the destination, the family provides financial assistance to the migrant. This way, remittance enables the family and migrant to co-insure one another.

Brown and Poirine [25] develop a different hypothesis of remittance known as weak altruism which is based on parental behaviour. In this theory, investment in education is formulated within informal family arrangement that enforce on children the task to return remittance to parents to reciprocate for investment in human capital. In the first period, a family invest in human capital of children. In the second period, after effective migrant's life abroad, a migrant remit to compensate for investment in human capital. Parents use remittance to finance consumption in their subsequent years just like other endowment or pension fund.

An alternative model developed by Glytsos [26] postulates that migrants have an objective to return home quickly with a certain amount of savings (savings target). The ability of a migrant to remit is taken as the supply side and the family claim as the demand side of the remittance function. The migrant and the family embark on a tug-of-war governed by bargaining power of the two parties. While the migrant desires to minimize income leakage through remittances and consumption and maximize on saving, the family tries to maximize benefits from remittances, relative to that of its neighbours. The level of remittance therefore varies with migrant's income, per-capita income of the

migrant sending country and the bargaining power of the two-parties.

Motivations to remit are extended by Naiditch and Vranceanu [27] who theorize that if family members and friends have less information regarding a migrant's income abroad, the migrant may remit to signal their success in a foreign country in the eyes of household members and friends left behind. Migrants care about status and prestige. Since remittance indicates migrant's success abroad, less-successful migrants send more remittances to hide their financial challenges and thus create an impression that they have succeeded. But, the genuinely successful migrants remit more than the less-successful migrants to show their actual booming economic situation in the host country.

Several empirical studies have been done to analyze the determinants of remittances using different methodologies in their analysis. Some earlier empirical studies [9,15,17,28] use ordinary least squares (OLS) in the estimation and thus overlook non-remitters in their analysis. These studies overlook data censoring problem of the dependent variable (remittances) and thus, may lead to biased and inconsistent estimates of the determinants of remittances if scale of censorship (zero remittance observations) is significant [29]. The censored nature of the dependent variable (remittances) is due to the fact that some migrants do not send any remittances in a given year [30,31].

To address the problem of data censoring, previous studies [32,33,34,35,30] use Tobit/ censored normal regression model [Tobin, 36]. For instance, Banerjee [32] apply Tobit and two-stage selection model to analyze the decision to remit and level of remittance sent by migrants in Delhi to their place of origin. The study finds that levels of remittances sent are positively correlated to number of dependants in a household and migrant's level of education and negatively related to migrant's length of stay abroad. Brown [33] examines remittance behavior of Pacific Island migrants residing in Sydney and find that migrants remit more if they have higher income, return intention and if migration trip is financed by the family. Cox et al. [34] use cross-sectional dataset from Peru to analyze the determinants of transfers from offspring to parents and vice versa. The findings supports exchange motive and also reveal that levels of remittance are positively correlated to family pre-transfer income. A key shortcoming of

Tobit estimator in addressing censorship is that it rests on strong distribution assumptions of homoskedasticity and normality. Therefore, it yields inconsistent parameter estimates if error term is heteroskedastic or non-normal [29,37]. To address the problems due to distributional assumption of Tobit model, some studies use Censored Least Absolute Deviation (CLAD) estimator developed by Powell [38].

CLAD specification relies on weaker assumptions than Tobit model and produces robust and consistent parameter estimates even in presence of heteroscedasticity and non-normality [29,37]. De la Briere et al. [39] and Gubert [40] apply CLAD estimator to analyze the determinants of internal and external remittances in Dominican Sierra and Kayes region in Western Mali, respectively. Specifically, De la Briere et al. [39] test between insurance and investment motivations to remit. The estimates indicate that motivation to remit vary with migration destination (domestic vs. external migration) and gender of the remitter. Women migrants to US remit more when their parents are ill, while men fail to remit unless they are the only migrants from the household. Gubert [40] supplements CLAD specification with Tobit estimator and finds that remittances insure households against adverse shocks arising from drop in grain output and death in a family. However, both De la Briere et al. [39] and Gubert [40] fails to address for selection in receiving of remittances. Therefore, their parameter estimates may be biased. Furthermore, CLAD estimator generates less-efficient estimates meaning that the computed standard errors are inappropriate for drawing inferences [29]. Recent studies apply two-stage estimators: double-hurdle [41] and Heckman [42] sample selection model to relax Tobit's assumption that the decision to remit is a single-step decision so that the probability to remit and level of remittance are determined simultaneously.

Heckman sample selection approach is used by several previous studies [10,16,43,44,45,46,31] to investigate the drivers of remittances. For instance, Hoddinott [16] finds that remittances to Central Kenya from migrant sons increase with parental landholdings while inheritable land assets have a stronger effect if a household has multiple migrant sons. Hoddinott [10] finds that migrant sons from Western Kenya send more domestic remittances to wealthier parents with the ability to offer reward for remittances beyond a threshold, inform of inheritable land. Moreover,

remittances increase with number of adult sons in a family and migrant's education. One drawback of empirical studies of Hoddinott [10,16] is that they use unrepresentative datasets from specific geographical area. The studies also consider urban to rural remittances and investigate remittance behaviour of only one gender: sons. The authors fail to include exclusion restriction in the sample selection model suggesting their parameter estimates are likely to be biased and inconsistent. Further, the studies do not generate marginal effects that are necessary to explain the effect of regressors on probability and level of remittances.

A similar econometric approach is applied by Garip [47] to explore the determinants of remittances in Thailand. The author models remittance behaviour using an integrated approach that considers migration as a mechanism for selection. The selection and outcome equations are measured as binary variables. Thus, a variant of Heckman's two-step specification known as censored bivariate probit estimator is applied. Consistent with exchange theory of remittances, the estimated parameters shows that number of migrants from the same household and presence of inheritable assets positively impacts on the probability to remit.

Apart from methodological issues one may categorize remittances studies to various groups. First is that most studies that focus on the determinants of internal remittances are based on cross-section data due to lack of panel and time series data [9,15,17,28]. For instance, Johnson and Whitelaw [9] analyze the determinants of urban to rural remittances using data gathered from Kenya and finds that the share of migrant income remitted is negatively correlated with migrant's wage. Another study on Kenya [15] finds that the probability to remit varies with migrant's intention to return home while the amount remitted varies with migrant's level of income and that remittances are inversely related to duration of migration. Similar studies on other African countries [17,28] reveal that internal migrants with higher level of schooling remit higher amounts. Their finding is consistent with loan repayment theory but refute altruism motivation. Phan and Coxhead [46] find that the level of urban to rural remittance intensifies with migrant wages, lower attachment with migration destination and lower rural household income. The studies further find that migrant sons remit more to a household with large herd of cattle and large income. In line with

insurance motivation, results show that migrants send higher amounts of money to families facing higher risk of losing cattle and crops due to drought.

Some studies focusing on studying international remittances use time series, panel and cross-sectional data. For example, Straubhaar [48] and Aydas et al. [49] use time series data to analyze the determinants of external remittances in Turkey. Straubhaar [48] focuses on remittance from Germany to Turkey for the period 1963 to 1982 and find a positive effect on remittances of economic situation in the host country, migrant's confidence in safety and liquidity of their investment in the home country. However, interest rate and exchange rate does not affect remittances significantly. Building on ideas of Straubhaar [48], Aydas et al. [49] study the determinants of aggregate remittances from abroad using data for the period 1979 to 1993. The findings suggests that inflation, military regime and black market premium has an adverse effect on remittances while economic growth has a positive and significant effect on remittances.

Leuth and Ruiz-Arranz [50] use dataset of bilateral remittance flows to analyze the determinants of remittances in eleven countries in Europe and Asia. Empirical results support mixed motives. As per altruistic hypothesis, remittances are positively correlated to dependency ratio in the home country. Surprisingly, remittances do not increase after natural disaster in the home country. Furthermore, remittances are responsive to investment climate in home and host country and positively associated with business cycle in the home country indicating that remittances are motivated by investments. Alleyne et al. [51] investigates the determinants of remittances in English-speaking Caribbean countries and find that they are influenced by altruism and investment motives. Frankel [52] uses dataset of Leuth and Ruiz-Arranz [50] and finds that remittances are countercyclical with regard to income in the home country and cyclical with respect to income in the host country. Ahmed and Martinez-Zarzoso [53] use same approach as Leuth and Ruiz-Arranz [50] to explore the link between transaction costs on bilateral remittances inflows to Pakistan from 23 host countries. Results indicates that increase in transaction cost curtail remittances suggesting that higher remittance transaction costs may deter remittances or encourage the use of informal remittance channels.

Connell and Brown [54] and Holst and Schrooten [55] use household survey to analyze remittance behaviour of migrants residing in Australia and Germany, respectively. Connell and Brown [54] find that households with skilled workers remit more than households without skilled workers. Remittances sent by households with skilled workers do not decline over time. However, remittances sent by households without skilled workers diminish sharply after 15 years of migration. Holst and Schrooten [55] finds that income has insignificant effect on remittances while migrant's country of origin and degree of integration in the host country are important determinants of remittances. Empirical studies based on cross-sectional data are able to discriminate between different motivations to remit quite easily than studies using time series data [56]. However, they are subject to estimation issue of selection bias because not all migrants remit within a given time period. Failure to address for selection in the receipt of remittance may yield biased estimates of the determinants of remittances [Adams, 57]. Empirical studies using cross-sectional data also face the problem of reverse causality. For instance, investment made by remittances in the past may increase current household income subsequently leading to a biased estimate on the positive effect of household income on remittances [57].

Several empirical studies use gendered approach to analyze the determinants of remittances [58,30, 31]. VanWey [58] use data from Nang Rong Thailand to scrutinize motivations to remit and finds that women have a higher probability to remit than men. Decomposition analysis indicates that gender differences in treatment are more significant than endowment differences in explaining the entire gender differences in remittances. Estimated coefficients also indicate that women's remittance behaviour is strongly motivated by altruism while men behave more contractually. Dissimilar findings are reported by Niimi and Reilly [30] in Vietnam. The authors find that women and men remit for altruistic and insurance reasons but women are more reliable remitters than men. Another key finding is that endowment differences (associated with household head status, labour market earnings and age differences) are more significant than treatment differences in explaining the entire gender difference in remittances. In India, Mahapatro [31] finds a positive and significant relationship between household income and levels of

remittances sent by both genders, suggesting migrants behave contractually. The study also finds gender differences in migrant's remittance behaviour. Specifically, education has a positive effect on women's remittance behaviour but does not have significant impact on men's remittance decision.

Whilst empirical works of VanWey [58], Niimi and Reilly [30] and Mahapatro [31] emphasize how the determinants of remittances are influenced by gender, their analyses have shortcomings. VanWey [58], for instance, analyze the probability to remit and not levels of remittances. Niimi and Reiily [30] measure remittance using money/goods sent home and/or money/goods given to relatives during migrant's visits. Thus, the dataset does not distinguish between the two actions as amount remitted is the overall value of money/goods that migrant remitted/gave to their relatives in the area of origin during the one year period before the survey. The authors use only migrant characteristics in the analysis as the survey fails to collect information on households from which the migrant originated. This means that the parameter estimates may be biased due to omitted variables [Adams, 57]. Furthermore, Mahapatro [31] focuses on remittances without controlling for migration destination (internal or external migration).

Some studies test remittance theories to assess what motivates migrants to send money back home. For instance, Agarwal and Horowitz [43] examine altruistic versus risk sharing motive in Guyana. Stemming from differences in remittance behaviour of sole and multiple migrants, the study concludes that remittances are altruistically motivated. Brown and Poirine [25] use data from Tongan and Samoan households living in Australia to explore weak altruism theory. The hypothesis is supported by the study and therefore the authors propose combining theories of private intergenerational transfers, human capital investments and remittances when exploring migrant's remittance behaviour. Despite the fact that household income is potentially endogenous, the authors fails to use instrumental variable estimation method and therefore their results may be biased.

Using Mexican data, Amuedo-Dorantes and Pozo [35] test between family-provided versus self-provided insurance motives. The authors find that migrants exposed to higher income risk have a higher probability to remit and also send a

larger fraction of income for insurance purposes, than migrants with lower income risks. Naufal [59] use data from Nicaragua to examine altruism and self-interest motivations for remitting. In line with Agarwal and Horowitz [43], the author finds empirical evidence in support of altruism. Migrant remittance behaviour also exhibits heterogeneity as female migrants are more altruistic relative to their male counterparts. Bouoiyour and Miftah [44] explore altruism and welfare hypothesis and find dissimilar findings in Morocco. The estimates show that remittances are motivated by altruism since migrants have a higher probability to remit and also send higher amounts if a household is in need of financial support from the migrant. Additionally, migrants remit more if they are employed and if there are fewer migrants in the family. The results also show that migrants remit more if the family had paid for migration suggesting remittances are motivated by implicit family agreement. This study lends support to mixed motivation to remit fusing altruism and implicit family arrangements.

Also, some studies focuses only on internal or international remittance while others analyze both in the same study. Our study analyzes the determinants of internal and international remittances using cross section data and uses methodology that takes into account for reverse causation and selection in the receipt of remittances. The study will also control for original household characteristics.

3. METHODOLOGY

Data on remittances are only available for remitters. This raises the possibility of bias in the data used to estimate remittance equation. The potential for bias arises because remitters may be systematically different from non-remitters. Estimation of remittances that is restricted to remitters may return parameter estimates that are biased and inconsistent [37]. To address the problem of sample selection bias, this study uses sample selection model [42], also known as type-2 Tobit model [60]. Heckman model can be estimated using two-step procedure commonly known as Limited Information Maximum Likelihood (LIML) method or using a one step Maximum Likelihood (MLE)/Full Information Maximum Likelihood (FIML) approach. FIML is based on stronger distribution assumptions and its estimates are less robust than those of Heckman two-step procedure [61]. Therefore, two-step procedure is applied. Following

Hoffmann and Kassouf [62], the first stage of Heckman's procedure is given by equation (1).

$$D_i^* = X^{'}\beta + \mu_i \tag{1}$$

$$\Pr(D_h = 1 \mid X) = \Phi\left(X_i^{'}\beta\right) \tag{2}$$

where, D_i^* is the latent (non-observable) discrete migrant decision of whether to or not remit, D is the observable discrete migrant decision of whether to or not remit so that $D_i = 1$ if $D_i^* > 0$ and $D_i = 0$ if $D_i^* \leq 0$; β is a vector of parameters to be estimated, $X_i^{'}$ is a vector of exogenous explanatory variables and μ_i is the error term. Equation (1) is estimated using binary probit estimator as defined by equation (2). The probit maximum likelihood estimates are then used to compute a set of inverse Mills ratio (IMR)/ expected value of error for each migrant i. The IMR is derived as:

$$\lambda_i = \frac{\phi(X_i^{'}\beta)}{\Phi(X_i^{'}\beta)} \tag{3}$$

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

$$E(Y_i \mid D_i = 1) = W_i^{'}\beta + \rho\sigma_\varepsilon\lambda(X_i^{'}\beta) \tag{4}$$

Assuming that $\rho\sigma_\varepsilon = \beta_\lambda$ the equation (4) can be rewritten as:

$$E(Y_i \mid D_i = 1) = W_i^{'}\beta + \beta_\lambda(X_i^{'}\beta) \tag{5}$$

where $Y_i = W_i^{'}\beta + \varepsilon_i$ is observed if $D_i = 1$ for migrants who decide to remit, and 0 if otherwise. $W_i^{'}$ and $X_i^{'}$ are vector of explanatory variables, ρ is the correlation between the unobserved determinants of probability to remit and unobserved determinants of level of remittance and σ_ε is the standard error of ε.

The estimated coefficient of the IMR indicates the presence of sample selection bias. If the coefficient is statistically significant, inclusion of IMR as an additional variable increases efficiency of the estimation. If the coefficient of IMR is statistically insignificant, then the equations (1) and (2) can be estimated separately using two-part or double hurdle models [29]. Cameron and Trivedi [29] propose the use of exclusion restriction to identify Heckman selection model. The model would otherwise be identified by non-linearity of IMR. As noted by Cameron and Trivedi [29], identification based on non-linearity of IMR creates severe multicollinearity and inflated standard error which leads to biased and inconsistent parameter estimates. Identification of Heckman model requires that at least one independent variable in the selection equation be excluded from the outcome equation [31].

The estimated parameters of the regressors that are common to both selection and outcome equations cannot be interpreted as standard elasticities. This is due to the inclusion of IMR in the outcome equation. Greene [37] and Hoffmann and Kassouf [62] derive the conditional marginal effect ([see 63] for an alternative derivation of marginal effects of log-transformed Heckman model). Let X_{ki} represent variables common to the selection and outcome equations, the marginal effect of the regressor is written as:

$$\frac{\partial E(Y_i \mid D_i^* > 0)}{\partial X_{ki}} = \beta_k - \frac{\gamma_k}{\sigma_\mu}\beta_\lambda\delta_i \qquad (6)$$

The marginal effect given in equation (6) comprises of a change in the level of remittances due to a change in X_{ki} for migrants sending remittances. This effect is known as the conditional marginal effect for a continuous variable. The conditional marginal effect of a binary variable is given by $E(\Delta Y_i \mid D^* > 0) = \beta_i + \beta_\lambda\Delta\lambda$, where $\Delta\lambda$ is the change in the IMR when a binary explanatory variable moves from 1 to 0 as characterized by equation (7).

$$\Delta\lambda = \frac{\phi\left(\gamma'\overline{X}_{(1)}/\sigma_\mu\right)}{\Phi\left(\gamma'\overline{X}_{(1)}/\sigma_\mu\right)} - \frac{\phi\left(\gamma'\overline{X}_{(0)}/\sigma_\mu\right)}{\Phi\left(\gamma'\overline{X}_{(0)}/\sigma_\mu\right)} \qquad (7)$$

Y_i is the natural logarithm of remittances and therefore, the conditional marginal effect given by

equation (6) and (7) corresponds to a relative change in levels of remittances. The estimated percentage level of remittance due to a unit increase in X_{ki} is $[\exp(c)-1]100$, where c denotes the estimated value of the conditional marginal effect.

Following Hoffmann and Kassouf [62], the unconditional relative marginal effect of continuous variables common to both selection and outcome equation on the expected level of remittances is given by:

$$\frac{\partial}{\partial X_{ki}}\ln E(g_i) = \beta_k - \frac{\gamma_k}{\sigma_\mu}\beta_\lambda\delta_i +$$
$$\left[\Phi\left(\frac{\gamma'X_i}{\sigma_\mu}\right)\right]^{-1}\varphi\left(\frac{\gamma'X_i}{\sigma_\mu}\right)\frac{\gamma_k}{\sigma_\mu} \qquad (8)$$

The first two terms on the right hand side (e_I) of equation (8) shows the effect associated with a change in remittances for migrants who remit and the last term (e_{II}) is the impact associated with the change in the probability to remit. The percentage change in the level of remittances due to an increase in X_{ki} is $[\exp(e_I + e_{II})]100$. The unconditional marginal effect for a binary variable is given by:

$$\Delta\ln E(g_i) = \Delta\ln E(g_h \mid D_i^* > 0) +$$
$$\Delta\ln\Phi(-\alpha_\mu) \qquad (9)$$

where, the first term on the right hand side (e_I) and the second term (e_{II}) of equation (9) are defined above.

The appropriateness of Heckman model over alternative double hurdle model can also be tested using the procedure suggested by Puhani [64]. This method entails assessing the degree of collinearity of Heckman's lambda (IMR) with explanatory variables in the Heckman model using mean variance inflation factor (VIF). A sufficient condition for the presence of collinearity for given explanatory variable is a high VIF. Puhani [64] suggest that a value of 20 defines a high VIF.

It is important to note that household expenditure that proxy household income in this study is potentially endogenous. Endogeneity may arise

from reverse causality and due to the fact that remittances may influence household income by affecting labour supply of the household members left behind. Following Gubert [40] and Bouoiyour and Miftah [44], we use the predicted value of per-capita household expenditure as an indicator of household income. The per-capita household expenditure is regressed on a set of covariates which measures household's human and physical capital: age, gender, household head level of education and employment status, share of household members with formal education and household ownership of land (See Table A1 in Appendix). Subsequently, the OLS estimates are used to compute predicted/fitted values of household income.

3.1 Variable Measurement and Descriptive Statistics

The dependent variable (remittance sent) applied in the analysis is measured in two ways: as a binary variable taking the value of 1 if a migrant remitted in the last one year and 0, if otherwise and secondly, logarithm of amount remitted in Kenya shillings (Ksh). The explanatory variables included depend on the variables identified in the literature and also dataset limitation. The variables include migrant's age and education prior to migration, current employment status, migrant's gender and marital status, migration destination and duration of migration. Explanatory variables relating to household in the migrant's place of origin include age and gender as well as employment status of household head, household location, household income, household size and number of migrants from the household. Household demographic variables included in the regression are household size and share of children in the household (that is individuals less than 15 years).

Table 1 provides the summary statistics for the key variables included in the analysis. The first, second and third column reports the summary statistics for non-remitters, remitters and for the entire sample, respectively. The last column outlines t-test for mean differences between remitters and non-remitters.

A lower proportion (46.2%) of internal migrants remitted compared to international migrants (53.8%). More remitters (92.2%) were employed than non-remitters (46.8%). Being employed increases migrant's incomes and hence their capacity to remit compared to unemployed migrants. The mean per capita household

expenditure for households receiving remittance was lower (12389) than for households without remittance (25589). More migrants from rural areas (58.7%) remitted compared to migrants from urban areas (41.3%). This suggests that migrants originating from rural areas could be more altruistic than their counterparts from urban areas. It may also be the case that rural households are more dependent on remittance income relative to urban households thus compelling migrants to remit more. A lower proportion of non-remitters (29.5%) originated from women-headed house-holds compared to men-headed households (70.5%). This result probably suggests that a migrant is more likely to remit to a female-headed household than to a male-headed household.

3.2 Data

The data used in this paper is drawn from the 2009 Migration and Remittances Household Survey for Kenya. The survey is single-round, cross-sectional survey and gathers information concerning households with domestic, external and without migrants. It was administered as part of the African Migration Project to enhance understanding of migration, remittances and their impacts in Sub-Saharan Africa. The African Migration Project applied a similar methodology developed by World Bank for all the six countries studied (Kenya, Uganda, Nigeria, Senegal, Burkina Faso and South Africa). The Kenya Household Survey was conducted by University of Nairobi. The household survey was based on two-stage sampling procedure drawn by the Kenya National Bureau of Statistics (KNBS). It adopted the 1999 Kenya Housing and Population Census to map out survey areas. To address population growth, migration and changes in administrative units (such as boundary changes and new districts) that had arisen since the 1999 population census, the 2005 Kenya Integrated Household Budget Survey, the 2006 Financial Services Deepening Survey, and existence of remittance service providers (for example M-PESA, Western Union and Money Gram) were also considered in blueprinting the sampling framework. Officials from KNBS, village elders and administrative officers assisted in mapping out sampling clusters with higher numbers of external migrants.

In total, 17 districts comprising 91 clusters were selected. In clusters having a high concentration of migrants, there were insufficient households with migrants for the sample to be drawn

Table 1. Descriptive statistics for all migrants, non-remitters and remitters

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

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

randomly. The selection of households to be interviewed entailed relisting households in each cluster to determine internal, external and non-migrant households. Each of the three groups of households was considered as an independent sub-frame and random sampling was consequently employed to select households within each group. In total, 1,942 households in 17 districts spanning the eight regions of Kenya were surveyed. Of the surveyed households, 51% were drawn from rural areas while 49% were based in urban areas. Majority of the surveyed households had external migrants (37%), followed by internal (29%) while 34% had no migrants. Further, the data was gathered for 8,343 non-migrant and 2,245 migrants.

4. RESULTS AND DISCUSSION

The first step of Heckman two-step approach is the selection equation, which estimates the drivers of remittances, and the second step is the outcome model, which estimates the level of remittances. It is worth noting that the inclusion of predicted values of household expenditure in the remittance equation may cause bias in the standard error. Therefore, the parameter estimates are computed using bootstrapped standard errors (5o replications). The parameter estimates of Heckman's lambda/IMR for the three remittance equations are positive and statistically significant. This indicates that there is sample selection bias whose impact is addressed by inclusion of IMR. The VIF of IMR in the level/outcome equation is well below threshold of 20 suggested by Puhani [64]. This means there is no severe collinearity between IMR and regressors. As indicated earlier, the parameter estimates of the two-step sample selection model cannot be interpreted as marginal effects. Therefore, we compute the marginal effects of the selection equation, conditional and unconditional marginal effects to explore the impact of covariates on the probability to remit (extensive margin) and amounts of remittances sent (extensive margin), for all the models.

Empirical results for the determinants of remittances in general (regardless of their origin) are presented in Table 2. The results show that most variables are significant and with expected sign. For instance, each additional year of migrant's age increases the probability to remit by 1.9 percentage points. Further, an additional

year of migrant's age increases unconditional level of remittance by 108.0[1] percent.

Men remit more at the extensive margin (level of remittance) than women. Specifically, being male increases the conditional level of remittances by 19.0[2] percent. Highly educated migrants remit more than illiterate migrants. Secondary education is positively related to the probability to remit and unconditional level of remittance. Similarly, having tertiary level of education increases the conditional and unconditional level of remittances. Employment has a positive effect on the conditional and unconditional level of remittances. Other significant determinants of remittances include duration of migration, household head age and gender, household income and location and number of migrants. Migrants living outside Kenya have 14.9 percentage points higher probability to remit than domestic migrants. Being an external migrant has a positive and significant effect on the conditional and unconditional level of remittance. Similar result is reported by Nwosu et al. [65]. This result underscores the importance of analyzing the determinants of external and internal remittances separately as opposed to unrestricted sample.

Empirical results for the determinants of external remittances are reported in Table 3. The results indicate that each year of migrant's age increases the probability to remit by 1.7 percentage points and the unconditional remittance by 106.0%. This means that older migrants have higher probability to remit and send higher levels of remittances than younger migrants. This is not surprising since older migrants are likely to earn more due to their higher work experience and thus remit more. The coefficient on the quadratic term is negative indicating that the relationship between migrant's age and remittances is nonlinear. Being a migrant with secondary (tertiary) education increases the probability to send external remittances by 25.2 (15.5) percentage points relative to being an illiterate migrant. Secondary and tertiary education is positively associated with unconditional external remittances. This result suggests that highly educated migrants remit more to reimburse education loan advanced by the family and it is consistent with contractual agreement [23].

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[1] $([\exp(0.0192+0.0587)]*100)$

[2] $([\exp(0.1738)-1])*100)$

Table 2. Heckman regression results of the determinants of remittances

Explanatory variables	Selection coefficient	Level coefficient	Probability	Cond. level	Uncond. level
Migrant age in years	0.0483**(0.0220)	0.1056**(0.0425)	0.0192***(0.0088)	0.0587(0.0436)	0.2164***(0.0809)
Age squared	-0.0005* (0.0003)	-0.0011**(0.0005)	-0.0002*(0.0001)	-0.0006(0.0005)	-0.0023**(0.0010)
Migrant gender	0.0268(0.0734)	0.1999(0.1193)	0.0106(0.0306)	0.1738*(0.1220)	0.1854(0.2858)
Marital status	0.2346***(0.0787)		0.0932***(0.0313)	-0.2279***(0.0759)	0.8127***(0.2853)
Migrant has primary education	-0.0090(0.1112)	0.1159(0.1735)	-0.0036(0.0442)	0.1246(0.1666)	0.0224(0.4244)
Migrant has secondary education	0.2732**(0.1236)	0.3941*(0.2012)	0.1086**(0.0489)	0.1345(0.1708)	1.1400**(0.4909)
Migrant has tertiary education	0.1595(0.1117)	0.5906***(0.1794)	0.0634(0.0444)	0.4367***(0.1557)	0.8360*(0.4432)
Duration of migration in years	0.0117(0.0119)	0.0536***(0.0201)	0.0047(0.0047)	0.0422**(0.0200)	0.0656(0.0449)
Duration of migration squared	-0.0007*(0.0004)	-0.0014**(0.0007)	-0.0003(0.0002)	-0.0007(0.0006)	-0.0029(0.0015)
Employment status of migrants	1.1653***(0.1068)	1.2394**(0.4824)	0.4631***(0.0418)	0.1074(0.4657)	4.6127***(0.4220)
Household head age in years	-0.0019(0.0019)	-0.0088***(0.0030)	-0.0008(0.0007)	-0.0069**(0.0028)	-0.0107*(0.0072)
Household head gender	0.2444***(0.0773)	0.2214(0.1483)	0.0956***(0.0294)	-0.0133(0.1440)	0.9505***(0.2858)
Employment status of household head	-0.2441***(0.0915)	-0.2596(0.1687)	-0.0975***(0.0318)	-0.0225(0.1795)	-0.9662***(0.3513)
Number of household members	0.0072(0.0156)	0.0143(0.0224)	0.0029(0.0062)	0.0072(0.0203)	0.0317(0.0594)
Household income	-0.2410***(0.0550)	0.2310*(0.1408)	-0.0958***(0.0218)	0.4651***(0.1447)	-0.7272***(0.2176)
Proportion of children <15 years living in household	0.0010(0.0016)	0.0020(0.0028)	0.0004(0.0007)	0.0011(0.0026)	0.0043(0.0063)
Location of household	0.1681**(0.0663)	-0.2451**(0.1102)	0.0667(0.0263)	-0.4085***(0.1190)	0.4684*(0.2532)
International migrant	0.3748***(0.0665)	1.7113***(0.1772)	0.1490***(0.0265)	1.3472***(0.1747)	2.0941***(0.2733)
Household has multiple migrants	-0.3826***(0.0659)	-0.6316***(0.1852)	-0.1516***(0.0258)	-0.2671(0.1774)	-1.6312***(0.2490)
Constant	-1.5604**(0.6822)	0.2519(1.8113)			
Mills lambda	1.4825**(0.6244)				
Rho (ρ)	0.8264				
Sigma (σ)	1.7940				
Number of observations	2107				
Censored observations	1073				
Uncensored observations	1034				
Wald chi2(20)	574(0.0000)				

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

Migrant's duration of stay at the host country is a significant predictor of level of external remittance sent. All else equal, an additional year of migrant's stay in foreign country increases the conditional level of remittance by 6.0%. This effect appears to diminish with time as stipulated by the negative coefficient on the squared term. This result implies that the level of external remittance do not follow inverted U-shaped profile. Hence, our result is inconsistent with remittance decay hypothesis. As opposed to being unemployed, employment increases the probability to remit from abroad by 47.3%. Employment has a positive and significant effect on the unconditional external remittance. This implies that employed migrants have a higher capacity to remit. This finding aligns with altruistic hypothesis [44].

A large household in migrant's place of origin is positively and significantly associated with the probability to remit. An additional household member increases the probability to send external remittance by 1.5 percentage points. The result suggests that external remittances are responsive to high dependencies in the household and it is compatible with altruistic hypothesis (Lucas and Stark, 1985). A unit increase household income reduces the probability to send external remittance by 11.8 percentage points. One unit increase in household income increases the conditional remittances by 106.1% and reduces the unconditional level of external remittance by 183.2%. The negative relationship between household income and remittances may indicate that remittances are motivated by altruism. The positive effect on conditional level of remittances may suggest that remittances are motivated by self-interest [18].

Compared to urban households, rural households receive lower amounts of external remittances. Specifically, being a migrant from rural area reduces the conditional level of external remittances by 36.5%. The result may suggest that rural households participate less in external migration. This could be due to the high costs associated with external migration. Having several migrants from the same household at the area of origin reduces the probability to remit from abroad by 15.2 percentage point. This result suggests that migrants share the responsibility of supporting relatives left behind. However, the finding refutes the bequest motive that postulates

that remittances should increase with number of migrants [10,43].

Results of the drivers of internal remittances are presented in Table 4. Migrant's age is positively linked to the levels of domestic remittances. For each additional year of migrant's age, the unconditional level of internal remittances increases by 112.1%. This result suggests that an older migrant on average, remit larger amount of money than a younger migrant. An older migrant is likely to have higher earning potential due to higher work experience. The quadratic term has a negative and significant coefficient indicating an inverted-U relation between internal remittances and migrant's age.

A migrant having secondary education increases the conditional internal remittances by 94.8% while having tertiary education increases the conditional domestic remittances by 210.8%, all else equal. This suggests that highly educated migrants send higher amounts of domestic remittances than migrants without formal education. Similar result is achieved by Lucas and Stark [17] as well as Bollard et al. [65]. The marginal effects of migrant's duration of stay at the destination suggest a statistically significant increase in the probability to remit (1.5 percentage points) and unconditional (101.4%) remittance levels. The relationship between migration duration and remittances is non-linear and thus it is consistent with remittance decay hypothesis.

Being employed significantly increases the probability to remit by 45.9 percentage points compared to being unemployed. The results also suggest that employment increases the unconditional level of internal remittances in a statistically significant manner. This suggests that employment is an important determinant of internal remittances. Our result is consistent with altruistic motivation [28]. Conforming to results from Bouoiyour and Miftah [44], the marginal effects of household income indicates that household income is negatively correlated with the probability to remit and amount of remittances sent. On average, a unit increase in household income reduces the probability to remit by 7.0% and the unconditional domestic remittances by 83.2%. This result means that internal migrants remit more to lower income households relative to their higher income counterparts. This result suggests that domestic remittances are motivated by altruism [17].

Table 3. Heckman regression results of the determinants of international remittances

Explanatory variables	Selection coefficient	Level coefficient	Probability	Cond. level	Uncond. level
Migrant age in years	0.0432*	0.0844*	0.0171*	0.0410	0.2067*
	(0.0267)	(0.0512)	(0.0105)	(0.0448)	(0.1134)
Age squared	-0.0005	-0.0009	-0.0002	-0.0004	-0.0024
	(0.0003)	(0.0007)	(0.0001)	(0.0006)	(0.0014)
Migrant gender	-0.0137	0.2533*	-0.0603	0.2671*	0.0894
	(0.0943)	(0.1500)	(0.0392)	(0.1477)	(0.3848)
Marital status	0.2882**		0.1140**	-0.2892**	1.0668**
	(0.1142)		(0.0451)	(0.1139)	(0.4641)
Migrant has primary education	0.1622	-0.0844	0.0636	-0.2444	0.5415
	(0.2296)	(0.3514)	(0.0893)	(0.2719)	(0.9620)
Migrant has secondary education	0.6716***	0.2172	0.2524***	-0.4120	2.4464***
	(0.2105)	(0.4301)	(0.0732)	(0.3678)	(0.8119)
Migrant has tertiary education	0.3972**	0.2598	0.1553*	-0.1335	1.5962*
	(0.2163)	(0.3692)	(0.0833)	(0.2904)	(0.9048)
Duration of migration in years	0.0053	0.0633*	0.0021	0.0580*	0.0545
	(0.0203)	(0.0346)	(0.0080)	(0.0267)	(0.0885)
Duration of migration squared	-0.0001	-0.0014	-0.0000	-0.0013	-0.0011
	(0.0007)	(0.0014)	(0.0003)	(0.0009)	(0.0032)
Employment status of migrants	1.1965***	1.3021	0.4731***	0.1017	5.1485***
	(0.1094)	(0.6813)	(0.0434)	(0.6737)	(0.5042)
Household head age in years	-0.0038	-0.0014	-0.0015	0.0024	-0.0148
	(0.0028)	(0.0045)	(0.0011)	(0.0040)	(0.0120)
Household head gender	0.1531	0.2542	0.0603	0.1022	0.7072
	(0.1000)	(0.1842)	(0.0392)	(0.1880)	(0.4150)
Employment status of household head	-0.1169	-0.0291	-0.0466	0.1045	-0.4486
	(0.1229)	(0.2214)	(0.0575)	(0.1719)	(0.5283)
Number of household members	0.0368	0.0268	0.0146*	-0.0101	0.1511
	(0.0258)	(0.0429)	(0.0102)	(0.0300)	(0.1134)
Household income	-0.2983***	0.4241*	-0.1179***	0.7234***	-0.8694**
	(0.0819)	(0.2777)	(0.0324)	(0.2187)	(0.3512)
Proportion of children <15 years living in household	0.0002	0.0070*	0.0001	0.0068*	0.0045
	(0.0030)	(0.0040)	(0.0012)	(0.0038)	(0.122)
Location of household	0.0578	-0.3959**	0.0229	-0.4539**	-0.0054
	(0.1081)	(0.1858)	(0.0427)	(0.1911)	(0.4406)
Household has multiple migrants	-0.4071***	-0.7350***	-0.1591***	-0.3325	-1.9057***
	(0.0987)	(0.2360)	(0.0376)	(0.2325)	(0.4080)
Constant	-0.5475	1.7840			
	(0.9613)	(2.2050)			
Mills lambda	1.6541**				
	(0.8340)				
Rho (ρ)	0.8941				
Sigma (σ)	1.8500				
Number of observations	1001				
Censored observations	445				
Uncensored observations	556				
Wald chi2(20)	78.09				
	(0.0000)				

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

Table 4. Heckman regression results of the determinants of internal remittances

Explanatory variables	Selection coefficient	Level coefficient	Probability	Cond. level	Uncond. level
Migrant age in years	0.0487	0.1613**	0.0186	0.0953	0.2032*
	(0.0337)	(0.0686)	(0.0129)	(0.0713)	(0.1093)
Age squared	-0.0004	-0.0015*	-0.0002	-0.0009	-0.0019
	(0.0004)	(0.0008)	(0.0002)	(0.0008)	(0.0014)
Migrant gender	0.1000	0.1727	0.1423***	0.0369	0.3549
	(0.0944)	(0.1852)	(0.0409)	(0.1983)	(0.3027)
Marital status	0.1766*		0.0673**	-0.2392*	0.5138**
	(0.0932)		(0.0356)	(0.1263)	(0.2567)
Migrant has primary education	-0.1287	0.3465	-0.0487	0.5217	-0.2470
	(0.1587)	(0.2863)	(0.0594)	(0.3249)	(0.4994)
Migrant has secondary education	-0.0488	0.6003***	-0.0185	0.6667*	0.0817
	(0.1675)	(0.3301)	(0.0633)	(0.3425)	(0.5565)
Migrant has tertiary education	-0.0013	1.1323***	-0.0005	1.1341***	0.4276
	(0.1687)	(0.3082)	(0.0643)	(0.3146)	(0.5747)
Duration of migration in years	0.0389**	0.0520	0.0148**	-0.0008	-0.0064***
	(0.0178)	(0.0416)	(0.0068)	(0.0019)	(0.0021)
Duration of migration squared	-0.0019***	-0.0018	-0.0007***	0.0008	-0.0064***
	(0.0006)	(0.0018)	(0.0002)	(0.0019)	(0.0021)
Employment status of migrants	1.2048***	1.8286*	0.4592***	0.1965	4.2023***
	(0.1535)	(1.0473)	(0.0550)	(1.0283)	(0.5277)
Household head age in years	-0.0003	-0.0210***	-0.0001	-0.0205***	-0.0090
	(0.0033)	(0.0055)	(0.0012)	(0.0055)	(0.0105)
Household head gender	0.3706***	0.2820	0.1423***	-0.2135	1.1903***
	(0.1061)	(0.3140)	(0.0409)	(0.3271)	(0.3554)
Employment status of household head	-0.3901***	-0.7551**	-0.1487***	-0.2267	-1.4229***
	(0.1254)	(0.3499)	(0.0480)	(0.3544)	(0.4380)
Number of household members	-0.0180	-0.0036	-0.0069	0.0208	-0.0538
	(0.0224)	(0.0427)	(0.0085)	(0.0457)	(0.0704)
Household income	-0.1840	-0.3627	-0.0701*	-0.1134	-0.6736***
	(0.0976)	(0.2355)	(0.0373)	(0.2380)	(0.3218)
Proportion of children <15 years living in household	0.0005	-0.0069	0.0002	-0.0076*	-0.0011
	(0.0027)	(0.0049)	(0.0011)	(0.0047)	(0.0090)
Location of household	0.2796***	-0.0249	0.1056***	-0.4053*	0.8005**
	(0.0945)	(0.2101)	(0.0373)	(0.2118)	(0.3232)
Household has multiple migrants	-0.3855***	-0.5554**	-0.1492***	-0.0449	-1.3615***
	(0.0945)	(0.2730)	(0.0368)	(0.2982)	(0.3273)
Constant	-1.5668	5.3539*			
	(1.0326)	(3.2354)			
Mills lambda	1.9428*				
	(1.1782)				
Rho (ρ)	0.9782				
Sigma (σ)	1.9862				
Number of observations	1107				
Censored observations	629				
Uncensored observations	478				
Wald chi2(20)	125.68				
	(0.0000)				

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

Internal migrants have a 10.6 percentage points higher probability to remit to a rural household relative to an urban household. The marginal effects of the conditional and unconditional level

of domestic remittance show that being a migrant from rural household decreases the conditional remittances by 33.3% and increase unconditional level of domestic remittances by 74.1%. This result implies that rural households may be more dependent on domestic remittances than urban households. The result reflects scarcity of income generating activities in rural areas than in urban neighbourhoods.

5. CONCLUSIONS

This paper empirically analyzes the determinants of internal and external remittances at the individual level using single round cross-sectional dataset from the 2009 World Bank Household Survey for African Migration Project for Kenya. Empirical analysis returns several key findings. The results indicates that no single theory sufficiently explain migrant remittance behaviour in Kenya. The study finds that external migrants remit more at the extensive and intensive margin than internal migrants. Migrants with higher levels of education prior migration remit more than migrants without formal education supporting the hypothesis that remittances are driven by inter-temporal contractual agreement between household and the migrant. Employed migrants have a higher probability to remit and send higher amounts of external and internal remittances than unemployed migrants. The positive relationship between migrant's employment and remittances suggests that external and internal migrants remit for altruistic reasons. The results on the influence of household characteristics on migrant's remittance behaviour reinforce the hypothesis that external and internal remittances are dictated by altruistic motive. Among the sub-sample of remitters, external migrants from higher income households are found to send higher amounts of remittances. This result seems to support theory that migrants remit for self-interest reasons.

From policy perspective, the Kenyan government ought to pursue policies that promote external migration and favour migration of skilled individuals. Policies that improve migrant's success in domestic and foreign labour markets are also required. The government also needs to put policies in place to encourage internal and external remittances. The government should endeavour to reduce remittance transaction costs mainly by stimulating competition in the remittance transfer market. This is achievable through encouraging microfinance institutions to participate in the remittance market; creating a more effective financial framework for remittances; fostering the disclosure of remittance fees charged by money transfer service providers; improve ability of migrants to compare fees charged by different remittance transfer service providers and promoting adoption of modern and better technologies in money transfer market. To encourage external remittances, the government should facilitate reduction and abolition of illegal fees charged by migrant recruitment agencies on external migrants. This can be attained by regulating and monitoring migrant recruitment agents.

Migration may generate information asymmetry. Neither a household nor a migrant can accurately observe each other's action. While a household may not accurately know the migrant's occupation or income, a migrant may not perfectly observe the household's actual need and use of remittances. Therefore, future studies may analyze the effect of information flows between a migrant and the household in shaping migrant's remittance behaviour. In our study, the level of household income is included as a regressor. Yet, in developing countries like Kenya, household income may be uncertain. Thus, it is important for future studies to investigate its effect on the probability to remit and amount of remittances. Empirical analysis of the link between migrant's intention to return home and migrant's legal status on migrant's remittance behaviour would also be important.

NOTE

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

Table A. 1. OLS regression results for imputation of household income

Variable	Coefficient
Household head age in years	-0.0048(0.0048)
Household head age squared	0.00003(0.00004)
Household head gender	0.0767(0.0553)
Household head has primary education	0.1827*(0.1093)
Household head has secondary education	-(0.0471)(0.1299)
Household head has tertiary education	0.3032**(0.1139)
Household head is employed	-0.1996***(0.0674)
Proportion of household members >15 years having primary education	0.0106***(0.0012)
Proportion of household members > 15 years having secondary education	0.0060***(0.0011)
Proportion of household members > 15 years having tertiary education	0.0133***(0.0013)
Household owns land	-0.2928***(0.0570)
Constant	8.0019(0.2044)
R-squared	0.3077
Adjusted R-squared	0.3041
Number of observations	2107

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

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