Remittance Receipts by Ghana's Households: Understanding Their Distribution and the Impact on Investment in Basic Education

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Abstract

In discussions on the uses and impacts of remittances in developing countries, there is often the view that remittances are generally used by households to augment meagre incomes, thereby suggesting that these transfers are used for mainly day-to-day consumption purposes, with little effect on households' investment portfolio. Using data from the 2012/2013 Ghana Living Standards Survey (GLSS), this paper sheds light on the nature and distribution of remittances receipts, and assesses the impact of remittances on a component of human capital investment. More specifically, we examine the impact of households' receipt of remittances on their investment in basic education.

In analysing the remittances received by households, we use descriptive statistics to examine the composition of households' remittance receipts by identifying the different forms of remittances and their distributions by the sex of household head, age group of household head, and urban-rural locale, among others. Regarding the evaluation of the impact of remittances on households' investment in basic education, we employ econometric techniques and a counterfactual framework, with the investment in basic education proxied by households' expenditures on the education of children in primary or lower secondary school.

Our findings show that while the receipts of remittances have little effect on households' expenditure on basic education, the receipts of international remittances have a considerable favourable impact on households' investment in basic education. These results are robust to different impact evaluation methods, namely the *inverse-probability-weighted regression adjustment* (ipwra) method and the *propensity score matching* (psm) technique. In view of the tendency for the recipients of international remittances to be relatively better-off households, these findings suggest that the effects of remittance receipts on households' expenditure on basic education could have an adverse effect on Ghana's welfare distribution. Additionally, international remittances offer an opportunity for enhancing Ghana's human capital.

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1. Introduction

Over the past few decades, the subject of remittances has featured prominently in discussions on livelihoods and development in developing countries. One of the reasons accounting for the increasing recognition of the importance of remittances is the large volumes of international monetary transfers that many residents of developing countries receive. The global growth in remittance-facilitation services is ample evidence of the current status of remittance transfers as a significant industry. While international migrant remittances have generally been the main focus of public discussion on remittance transfers and their impact, it is helpful to acknowledge that the domestic flow of remittances is also very much a feature of the interactions between households in developing countries.

In the context of household livelihood activities, a remittance may be defined as a monetary or in-kind transfer from one household to another, and for which no direct or explicit repayment is required. In discussions on the uses and impact of remittances in developing countries, there is often the view that remittances are generally used by households to augment meagre incomes, thereby suggesting that these transfers are used for mainly day-to-day consumption purposes, with little effect on households' investment portfolio. Using a nationally representative household survey dataset for Ghana, this paper highlights the impact of remittances on a component of human capital investment. More specifically, we examine the impact of households' receipt of remittances on their investment in basic education. To this end, we explore the composition of households' remittance receipts, and employ econometric techniques and a counterfactual framework to evaluate the impact of households' receipt of remittances on their expenditure on the education of children in primary or lower secondary school.

In view of the prevalence of remittance flows, it is not surprising that a large volume of literature has evolved on the subject. Remittance-related topics that have engaged the attention of researchers include the prevalence of remittance flows, the motivation underlying these transfers, specific factors influencing the transfer decision and the amounts of remittances, and the impacts of remittances on various aspects of development, such as poverty, wellbeing, inequality, education, and agricultural productivity (see Rempel and Lobdell, 1978; Lucas and Stark, 1985; Adams and Page, 2005; and Boakye-Yiadom, 2008).

One of the theoretical issues addressed in the remittance literature is the underlying rationale for the sending of remittances. Ordinarily, it would appear that altruism is the obvious reason for the sending of remittances. However, since the 1980s, various studies have highlighted the importance of self-interest or exchange as another plausible motivation for remittance transfers, with Robert Lucas and Oded Stark proposing a fusion of the two main hypotheses, which they describe as tempered altruism or enlightened self-interest (see Lucas and Stark, 1985; and Stark and Lucas, 1988). Studies whose findings lend support to the view that remittance transfers are motivated mainly by altruism include Agarwal and Horowitz (2002), Ravallion and Dearden (1988), and McGarry and Schoeni (1995). The self-interest or exchange hypothesis, on the other hand, has been supported by the findings of Cox and Rank (1992), Hoddinott (1992), and Gubert (2002), among others.

Apart from the empirical investigations into the motivation for remitting, a considerable number of the empirical studies on remittances have examined the impact of remittances on poverty, wellbeing, and other welfare outcomes such as nutritional status and education. Regarding the impact of remittances on education, relatively few studies are available. A number of these studies have analysed the impact of remittances on school attendance or education attainment (see Mansour, Chaaban, and Litchfield, 2011; Amuedo-Dorantes, Georges, and Pozo, 2010; and Lu and Treiman, 2011). Others have highlighted the effect of remittances on education expenditure (see Pickbourn, 2016; and Adams, Cuecuecha, and Page, 2008).

To the best of our knowledge, very few studies on Ghana have examined the impact of remittance receipts on households' investment in education. In a recent study, Gyimah-Brempong and Asiedu (2014) used cross-section and pseudo-panel data to assess the impact of remittances on households' investment in education. The paper's findings show that remittances have a favourable impact on school enrolment. In a more recent study, Pickbourn (2015) uses qualitative and quantitative data on the rural-urban migration of Ghana's women to explore the gender dimension of the impact of remittances on households' education expenditure. A major finding of Pickbourn's (2015) study is worth noting: where the primary remittance recipient is a woman, the household spends twice as much on education, in comparison with a similar household for which the primary remittance recipient is a man. Notably, this finding of Pickbourn is robust to the sex of household head.

This paper employs data from the 2012/2013 Ghana Living Standards Survey (GLSS) to enhance our understanding of remittance receipts and to examine the impact of households' remittance receipts on the investment in basic education. To this end, the paper addresses the following research questions:

i) What is the distribution of remittance receipts?
ii) What is the impact of remittance receipts on households' investment in basic education?
iii) What are the implications of the findings from (i) and (ii) on the distribution of welfare?

2. The Dataset and Methodology

This paper uses data from the most recent round of the 2012/2013 Ghana Living Standards Survey (GLSS 6), which is currently the most recent of the GLSS datasets. The dataset, like those of the previous five waves, is nationally representative, covering all ten regions of Ghana. The GLSS6 data contain the valuable information on various aspects of the living conditions of 16,772 households and over 71,000 individuals in 1200 enumeration areas. Information contained in the dataset include data on the demographic characteristics of households, education, health, household expenditure, income, migration and remittances.

As noted in the preceding section, we address the following research questions:

i) What is the distribution of remittance receipts?
ii) What is the impact of remittance receipts on households' investment in basic education?
iii) What are the implications of the findings from (i) and (ii) on the distribution of welfare?

In exploring the distribution of remittance receipts, we examine how remittances are distributed, by gender of household head and rural-urban locale. We also compute the mean sizes of these remittances for various categories of households. Regarding households' investment in basic education, this is represented by households' expenditures on the schooling of household members who are in primary or Junior High School (JHS).

The impact evaluation component of the study is carried out within a counterfactual framework, drawing on the treatment effects literature, with the unit of analysis being the household. One of the main variables in the analysis is average (mean) household expenditure on basic education. The natural log of this variable is used in the econometric estimations. We also disaggregate households' remittance receipt status into four, namely those who received domestic remittances only, those who received international remittances only, those received both domestic and international remittances, and those who did not receive any remittance.

We carried out the following three sets of impact evaluations:

a) The impact of the receipt of domestic remittances only on households' investment in basic education;
b) The impact of the receipt of international remittances only on households' investment in basic education;
c) The impact of the receipt of both domestic and international remittances on households' investment in basic education.

For each of the above analysis, we had two sub-samples of households; those who received the relevant kind of remittances and those who did not receive any remittance at all. These sub-samples of households were then used to estimate remittance-recipient and remittance non-recipient education expenditure equations. These two equations then became the basis for generating appropriate counterfactual education expenditures for all the households in the sample. Consequently, we are able to estimate, for households who actually receive remittances, the average impact of remittance receipts on investment in basic education. This

estimate is known in the treatment effects literature as the average treatment effect on the treated (ATET). We also examine the overall impact of remittance receipt on investment in basic education, taking into account all households, irrespective of remittance-receipt status.

Empirical Model Specification

The migration-remittance literature documents the methodological problems associated with evaluating the impact of remittances on economic outcomes. These issues have broadly been categorized into at least four main categories by Adams (2011). These are simultaneity, reverse causality, and selection bias and omitted variable bias.

In this study, we argue that the there is some level of selectivity bias with respect to migration and remittances. As such, households that receive remittances may not be random. Therefore, merely comparing the education expenditure of households that receive remittances versus households that do not receive remittances will produce biased results. For instance, households that spend more on education are likely to produce highly educated household members who are more likely to migrate and send remittances back home. Also, there is the possibility of unobserved characteristics of the household heads that make a particular household more likely to receive remittances compared to other household heads. For example, household heads that are trustworthy and conscientious are more likely to receive remittances. The combination of selectivity bias and omitted variable bias may lead to biased estimates.

To obtain more consistent and unbiased estimates, the study estimates two models. The first model estimates the propensity score matching model, which attempts to solve the problem of selectivity bias by calculating propensity scores for the full sample. The full sample is then grouped into treatment and control based on similar propensity scores. Here, the treatment group refers to the households that received remittances and the control group refers to households that did not receive remittances.

The second model considered is the treatment effect model which is estimated in the context of a counterfactual framework. This technique as described by Cattaneo (2010) has been used to obtain more unbiased estimates of program effects using observational data. Given that in observational data, an individual cannot be observed under the treatment and control arms simultaneously, the researcher is unable to directly compare the differences in the averages of the outcomes. The treatment effect specification, therefore, allows for the estimation of potential means which allows for a comparison between the potential mean and the mean outcomes. This study makes use of the inverse probability weight with regression adjustment (ipwra) estimator. The *IPWRA* has been described in the treatment effect literature to have a double-robust property. In accounting for non-randomness in treatment assignment, this estimator models both the treatment and the outcome. The *IPWRA* pose the question "how would the outcome (education expenditure) have changed if the households that received remittances did not" or "how would the outcome have changed if the households that did not receive remittances did receive remittances?" The difference in these two counterfactual outcomes, also called potential outcomes precisely gives the actual effect of remittances on education expenditure

In this study, whether or not the household receives remittances is regarded as the 'treatment'. The *treatment effect* of receiving remittances, represented by *TREAT* for the household heads is written as :

$$Treat_i = Y_i(1) - Y_i(0) \qquad (1)$$

In this context, $Y_i(1)$ represents the household's expenditure on education if the household received remittances and $Y_i(0)$ represents household's expenditure on education if household did not receive any remittances. This difference yields the average treatment effect when the full sample (both receiving and non-receiving households) is considered. The average treatment effect on the treated (ATET) is obtained when the sample is restricted only for households that received remittances.

The estimated model is represented by the equation below:

$$LnExpenditure = \alpha Remittance + \beta\, LnHHIncome + \delta PupilsAge + \rho Scholarship + \mu Loc + \varepsilon \qquad (2)$$

The main dependent variable is the natural log of household expenditure on basic education. Where *Remittance,* the main explanatory variable of interest is also captured in two different forms. First, as a binary variable which indicates whether or not the household received cash remittances in the past twelve months prior to the survey, and secondly, as another binary variable indicating whether or not the household received foreign cash remittances. These are run as separate analysis. *LnHHIncome* indicates the household income. This income excludes all remittances received by the household. *PupilsAge* captures the mean age of household's basic education school pupils. *Scholarship* shows whether or not the basic school pupils within the household receive any form of scholarship. of the household head that are likely to influence the household's propensity to save. *LOC* is a vector of variables that captures the location characteristics of the household including whether the household is located in the urban or rural area. It also includes the region of residence.

3. Results of the Empirical Analysis

From the estimation sample, the average household expenditure on basic education is about 357 Ghana cedis (GH¢). However, this expenditure varies significantly across location of residence, household remittance-recipient status, and gender of household head (see Tables 2 and 3). As expected, households that reside in the urban areas appear to spend more on basic education than households that reside in rural areas. Particularly, urban households on average spend about GH¢540, while households in the rural areas spend slightly below GH¢180 on basic education per pupil. Further disaggregating basic education expenditure by remittance status, the sample statistics show an interesting finding. The summary statistics suggest that households that receive only domestic remittances appear to spend the least on children's basic education while households that receive only foreign remittances appear to spend the most on basic education. It is, however, interesting to note that households that receive both foreign and

domestic remittances rather appear to spend less than households that do not receive remittances. Empirical estimates of our impact evaluation analysis are shown in Tables 4 – 17.

Table 1: Descriptive statistics of relevant variables

Variable	Variable description	N	Mean	SD	Min	Max
mbedexp	Mean expenditure on basic education	7487	270.03	429.27	0.25	11990
Hierr	Household income, exluding remittance receipts	7487	9564.19	25259.15	0.2	788632.8
mabsp	Mean age of household's basic school pupils	7487	11.57	3.04	3	28
hrems1	hrems==Received remittance(s)	7487	0.3	0.46	0	1
urbrur1	loc2==Urban	7487	0.38	0.49	0	1
hss1	hss==Household has a scholarship	7487	0.01	0.1	0	1
region1	region==Western	7487	0.1	0.29	0	1
region2	region==Central	7487	0.09	0.29	0	1
region3	region==Greater Accra	7487	0.09	0.28	0	1
region4	region==Volta	7487	0.09	0.29	0	1
region5	region==Eastern	7487	0.11	0.31	0	1
region6	region==Ashanti	7487	0.11	0.31	0	1
region7	region==Brong Ahafo	7487	0.1	0.3	0	1
region8	region==Northern	7487	0.11	0.32	0	1
region9	region==Upper East	7487	0.1	0.3	0	1

Table 2: Mean of households' average expenditure on basic education

Household's remittance status	***Urban-Rural Status***		
	Urban	Rural	Total
Received remittances	459.81	163.89	296.04
Did not receive remittance	569.53	184.65	382.63
Total	539.97	177.88	356.82

Table 3: Mean of households' average expenditure on basic education, by location and gender of household head

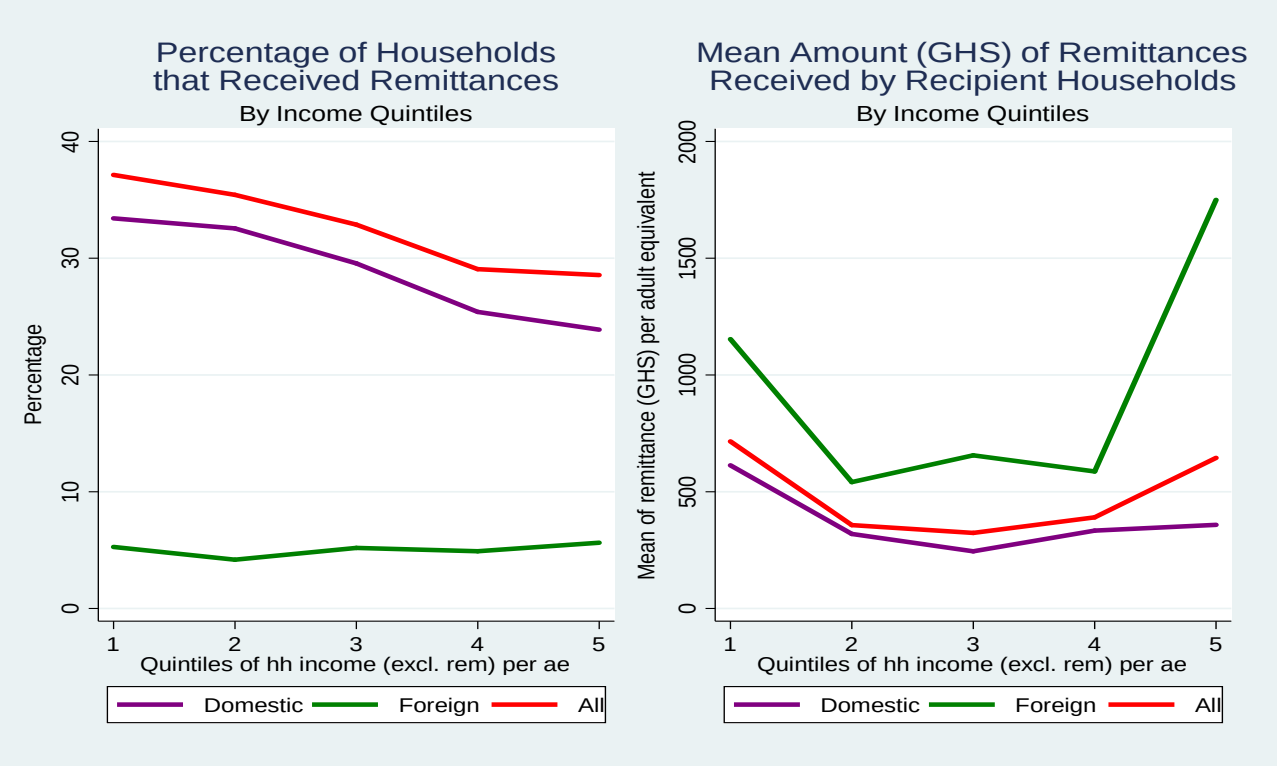
	URBAN/RURAL and Household head's sex								
	Urban			Rural			Total		
Household remittance receipt status	Male	Female	Total	Male	Female	Total	Male	Female	Total
Received domestic remittances only	418.21	380.19	401.72	153.93	171.26	159.27	250.12	274.85	259.02
Received foreign remittances only	645.39	931.36	745.63	261.19	151.09	221.26	544.69	718.78	606.28
Received domestic & foreign remittances	429.81	323.77	383.59	229.19	134.23	208.10	306.22	253.21	289.21
Did not receive any remittance	575.42	550.75	569.53	183.98	187.93	184.65	376.84	404.98	382.63
Total	550.52	513.83	539.97	177.52	179.19	177.88	352.82	368.73	356.82

The average household income (excluding remittance income), according to the data, is slightly above GH¢ 9,500. With respect to age, the average age of household's basic school pupils is about 12 years. Overall, the data indicates that almost a quarter (24%) of the sample received cash remittances, while a relatively small fraction (3%) of the sample indicated that they received foreign cash remittances. Disaggregating households that received remittances by residence type, the data show that more than half (58%) of those who reported receiving domestic remittances only reside in the rural areas while almost three-quarters (73%) of those who reported receiving foreign remittances reside in the urban areas. These statistics seem plausible as one would expect household members who reside in the urban areas to send domestic remittances to their family members in the rural areas. Also, given that most foreign remittance service operators are likely to be located in the urban areas, households that reside in the urban areas may be more likely to receive foreign remittances due to proximity of these services compared to other households that reside in the rural areas. However, a significantly higher proportion of households that reported receiving both domestic and foreign remittances appear to reside in the rural areas.

With respect to gender of the household head, the data show that female headed households significantly appear to spend more on basic education compared to male headed households. Particularly, on average, for households that receive domestic remittances only, female headed households appear to spend more on basic education compared to male headed households. However, when we consider location of households, male headed households in the urban areas appear to spend more on basic education. With respect to those who receive foreign cash remittances, female headed household appear to spend significantly higher on basic education in general. Also, this holds true for female headed households in the urban areas where expenditure on basic education is significantly higher. The reverse is however true for households in the rural areas. In addition, for all households that receive both domestic and foreign cash remittances, male headed households appear to spend more on basic education than female headed households. The trend is similar for households in both urban and rural areas.

Figure 1 below shows the distribution of households that receive remittances by household income quintiles and their corresponding average amounts. The figure suggests that across the wealth quintiles, a higher percentage of households receive domestic remittances compared to foreign remittances. Focusing on the highest wealth quintile in particular, the figure suggest that a slightly higher percentage of households in the highest wealth quintile receive foreign remittances while a slightly lower percentage of these same households receive domestic remittances. The second panel of the figure 1also suggest that although a smaller proportion of households across the quintiles receive foreign remittances compared to domestic remittances, the average amount of foreign remittances received is higher than domestic remittance received

Figure 1: Distribution of remittance receiving households and amounts by household wealth quintiles



Note: "ae" is adult equivalent.

Results of empirical analysis

Table 4: ATET, using ipwra, for the effect of remittance receipts on households' investment in basic education

Treatment-effects estimation Number of obs = 7,487
Estimator : IPW regression adjustment
Outcome model: linear
Treatment model: probit

		Robust				
	ln_mbedexp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
ATET						
	hrems1 (1 vs 0)	.0103674	.0304319	0.34	0.733	-.049278 .0700128
POmean						
	hrems1 0	4.615454	.0275454	167.56	0.000	4.561466 4.669442

Table 5: ATET, using psm, for the effect of remittance receipts on investment in basic education

Treatment-effects estimation Number of obs = 7,487
Estimator : propensity-score matching Matches: requested = 1
Outcome model : matching min = 1
Treatment model: probit max =1

		AI Robust				
	ln_mbedexp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
ATET						
	hrems1 (1 vs 0)	.0067485	.0484691	0.14	0.889	-.0882492 .1017463

Table 6: ATE, using ipwra, for the effect of remittance receipts on investment in basic education

```
Treatment-effects estimation                   Number of obs     =      7,487
Estimator      : IPW regression adjustment
Outcome model  : linear
Treatment model: probit
------------------------------------------------------------------------------------------
                                    |               Robust
                         ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------------------------------+-----------------------------------------------------------------
ATE                                 |
                            hrems1  |
                         (1 vs 0)   |  -.0075351     .02958    -0.25   0.799    -.0655109    .0504407
------------------------------------+-----------------------------------------------------------------
POmean                              |
                            hrems1  |
                                0   |   4.686655   .0194711   240.70   0.000     4.648492    4.724817
------------------------------------------------------------------------------------------
```

Table 7: ATE, using psm, for the effect of remittance receipts on educ investment

```
Treatment-effects estimation                   Number of obs      =      7,487
Estimator      : propensity-score matching     Matches: requested =          1
Outcome model  : matching                                  min =          1
Treatment model: probit                                    max =          1
------------------------------------------------------------------------------
             |               AI Robust
  ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ATE          |
      hrems1 |
   (1 vs 0)  |    .002075   .0411287     0.05   0.960    -.0785358    .0826858
------------------------------------------------------------------------------
```

Table 8: ATET, using ipwra, for the effect of "domestic remittance receipts only" on investment in basic education

```
Treatment-effects estimation                    Number of obs     =      7,225
Estimator      : IPW regression adjustment
Outcome model  : linear
Treatment model: probit
------------------------------------------------------------------------------------------------
                                    |               Robust
                         ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------------------------------+-----------------------------------------------------------
ATET                                |
                               dum1 |
                        (1 vs 0)    |  -.0316268   .0320154    -0.99   0.323    -.0943759    .0311223
------------------------------------+-----------------------------------------------------------
POmean                              |
                               dum1 |
                                  0 |   4.531889   .0285307   158.84   0.000      4.47597    4.587808
------------------------------------------------------------------------------------------------
```

Table 9: ATET, using psm, for the effect of "domestic remittance receipts only" on educ investment*/

```
Treatment-effects estimation                    Number of obs      =      7,225
Estimator      : propensity-score matching      Matches: requested =          1
Outcome model  : matching                                      min =          1
Treatment model: probit                                        max =          1
------------------------------------------------------------------------------
             |              AI Robust
  ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ATET         |
        dum1 |
   (1 vs 0)  |   .0279085   .0495898     0.56   0.574    -.0692856    .1251027
------------------------------------------------------------------------------
```

Table 10: ATE, using ipwra, for the effect of "domestic remittance receipts only"on investment in basic education

```
Treatment-effects estimation                    Number of obs     =      7,225
Estimator      : IPW regression adjustment
Outcome model  : linear
Treatment model: probit
------------------------------------------------------------------------------
                             |               Robust
                  ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------------------------+------------------------------------------------------------------
ATE                          |
                        dum1 |
                 (1 vs 0)    |  -.0516575   .0309865    -1.67   0.095      -.11239    .0090751
-----------------------------+------------------------------------------------------------------
POmean                       |
                        dum1 |
                           0 |   4.666594   .0196113   237.95   0.000     4.628156    4.705031
------------------------------------------------------------------------------
```

Table 11: ATE, using psm, for the effect of "domestic remittance receipts only" on investment in basic education

```
Treatment-effects estimation                   Number of obs      =      7,225
Estimator      : propensity-score matching     Matches: requested =          1
Outcome model  : matching                                   min =          1
Treatment model: probit                                     max =          1
------------------------------------------------------------------------------
             |               AI Robust
  ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ATE          |
        dum1 |
   (1 vs 0)  |  -.0532876   .0417538    -1.28   0.202    -.1351235    .0285483
------------------------------------------------------------------------------
```

Table 12: ATET, using ipwra, for the effect of "international remittance receipts only" on investment in basic education

```
Treatment-effects estimation                   Number of obs     =      5,466
Estimator      : IPW regression adjustment
Outcome model  : linear
Treatment model: probit
------------------------------------------------------------------------------------------------
                                |               Robust
                     ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------------------------+---------------------------------------------------------------
ATET                            |
                           dum2 |
                    (1 vs 0)    |   .3068521   .0788994     3.89   0.000     .1522121     .461492
--------------------------------+---------------------------------------------------------------
POmean                          |
                           dum2 |
                              0 |   5.378523   .0597199    90.06   0.000     5.261474    5.495572
------------------------------------------------------------------------------------------------
```

Table 13: ATET, using psm, for the effect of "international remittance receipts only" on investment in basic education

```
Treatment-effects estimation                   Number of obs      =      5,466
Estimator      : propensity-score matching     Matches: requested =          1
Outcome model  : matching                                  min =          1
Treatment model: probit                                    max =          1
------------------------------------------------------------------------------
             |               AI Robust
  ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ATET         |
        dum2 |
   (1 vs 0)  |   .1904646   .1147774     1.66   0.097    -.0344949    .4154241
------------------------------------------------------------------------------
```

Table 14: ATE, using ipwra, for the effect of "international remittance receipts only" on investment in basic education

```
Treatment-effects estimation                    Number of obs     =      5,466
Estimator      : IPW regression adjustment
Outcome model  : linear
Treatment model: probit
------------------------------------------------------------------------------------------
                                   |               Robust
                        ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------------------------------+------------------------------------------------------------
ATE                                |
                              dum2 |
                       (1 vs 0)    |   .1520247   .1359613     1.12   0.264    -.1144546     .418504
-----------------------------------+------------------------------------------------------------
POmean                             |
                              dum2 |
                                0  |   4.740751   .0206284   229.82   0.000      4.70032    4.781182
------------------------------------------------------------------------------------------
```

```
Table 15: ATE, using psm, for the effect of "international remittance receipts only"
>  on educ investment*/
. teffects psmatch (ln_mbedexp) (dum2 ln_hierr i.hhsex ib6.hag nelderly ib2.fosthh ///
> i.hss ib2.loc2 ib10.region, probit)

Treatment-effects estimation                   Number of obs      =      5,466
Estimator      : propensity-score matching     Matches: requested =          1
Outcome model  : matching                                   min =          1
Treatment model: probit                                     max =          1
------------------------------------------------------------------------------
             |               AI Robust
  ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ATE          |
        dum2 |
   (1 vs 0)  |   .4149789   .1739683     2.39   0.017     .0740072    .7559505
------------------------------------------------------------------------------
```

```
Table 16: ATET, using ipwra, for the effect of "the receipt of both domestic and
>  international remittances" on educ investment*/
. teffects ipwra (ln_mbedexp ln_hierr mabsp i.hss ib2.loc2 ib10.region) ///
> (dum3 ln_hierr i.hhsex ib6.hag nelderly ib2.fosthh i.hss ///
> ib2.loc2 ib10.region, probit), atet

Iteration 0:   EE criterion =  .00001746
Iteration 1:   EE criterion =  7.232e-07
Iteration 2:   EE criterion =  2.310e-08
Iteration 3:   EE criterion =  1.897e-09

Treatment-effects estimation                    Number of obs     =      5,336
Estimator      : IPW regression adjustment
Outcome model  : linear
Treatment model: probit
------------------------------------------------------------------------------------------
                                    |               Robust
                       ln_mbedexp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------------------------------+------------------------------------------------------------
ATET                               |
                              dum3 |
                       (1 vs 0)    |   .3635501   .0995651     3.65   0.000      .168406    .5586942
-----------------------------------+------------------------------------------------------------
POmean                             |
                              dum3 |
                                 0 |   4.834922   .0931254    51.92   0.000     4.652399    5.017444
------------------------------------------------------------------------------------------
```

```
Table 17: ATE, using ipwra, for the effect of "the receipt of both domestic and
>  international remittances" on educ investment*/
. teffects ipwra (ln_mbedexp ln_hierr mabsp i.hss ib2.loc2 ib10.region) ///
> (dum3 ln_hierr i.hhsex ib6.hag nelderly ib2.fosthh i.hss ///
> ib2.loc2 ib10.region, probit)

Iteration 0:   EE criterion =  .00001197
Iteration 1:   EE criterion =  5.589e-07
Iteration 2:   EE criterion =  3.837e-08
Iteration 3:   EE criterion =  2.426e-09

Treatment-effects estimation                    Number of obs     =      5,336
Estimator      : IPW regression adjustment
Outcome model  : linear
Treatment model: probit
```

ln_mbedexp	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
dum3						
(1 vs 0)	.5451512	.0593438	9.19	0.000	.4288394	.661463
POmean						
dum3						
0	4.71848	.0207428	227.48	0.000	4.677825	4.759135

4. *Conclusion*

Our findings show that while the receipts of cash or monetary remittances have little effect on households' expenditure on basic education, the receipts of international monetary remittances have a considerable favourable impact on households' investment in basic education. These results are robust to different impact evaluation methods, notably the *inverse-probability-weighted regression adjustment* (ipwra) method and the *propensity score matching* (psm) technique. In view of the tendency for the recipients of international remittances to be relatively better-off households, these findings suggest that the effects of remittance receipts on households' expenditure on basic education could have an adverse effect on Ghana's welfare distribution. Additionally, internationally remittances offer an opportunity for enhancing Ghana's human capital.

References

Adams, Jr., R.H. and Page, J. (2005). "Do International Migration and Remittances Reduce Poverty in Developing Countries?", *World Development*, Vol. 33, No. 10, pp. 1645-1669.

Agarwal, R. and A.W. Horowitz (2002). "Are International Remittances Altruism or Insurance? Evidence from Guyana Using Multiple-Migrant Households", *World Development*, Vol. 30, Issue 11, pp. 2033-2044.

Amuedo-Dorantes, C., Georges, A., and Pozo, S. (2010). "Migration, Remittances, and Children in Haiti", The Annals of the American Academy of Political and Social Science, Vol. 630, pp. 224-244.

Boakye-Yiadom, L. (2008). "Rural-Urban Linkages and Welfare: The Case of Ghana's Migration and Remittance Flows", PhD Thesis, Department of Economics and International Development, University of Bath, UK.

Cattaneo, M. D. 2010. Efficient semiparametric estimation of multi-valued treatment effects under ignorability. Journal of Econometrics 155: 138–154.

Cox, D. and M.R. Rank (1992). "Inter-Vivos Transfers and Intergenerational Exchange", *The Review of Economics and Statistics*, Vol. 74, Issue 2, pp. 305-314.

Gubert, F. (2002). "Do Migrants Insure Those who Stay Behind? Evidence from the Kayes Area (Western Mali), *Oxford Development Studies*, Vol. 30, No. 3, pp. 267-287.

Gyimah-Brempong, K. and Asiedu, E. (2014). "Remittances and Investment in Education: Evidence from Ghana", *Journal of International Trade & Economic Development*, Vol. 24, No. 2, pp. 173-200.

Hoddinott, J. (1992). "Modelling Remittance Flows in Kenya", *Journal of African Economies*, Vol. 1, No. 2, pp. 206-232.

Lu, Y. and Treiman, D. J. (2011). "Migration, Remittances, and Educational Stratification among Blacks in Apartheid and Post-Apartheid South Africa", *Social Forces*, Vol. 89, No. 4, pp. 1119-1143.

Lucas, R.E.B. and Stark, O. (1985). "Motivations to Remit: Evidence from Botswana", *Journal of Political Economy, Vol. 93, No. 5*, pp. 901-918.

Mansour, W., Chaaban, J. and Litchfield, J. (2011). "The Impact of Migrant Remittances on School Attendance and Education Attainment: Evidence from Jordan", *International Migration Review*, Vol. 45, No. 4, pp. 812-851.

McGarry, K. and Schoeni, R. F. (1995). "Transfer Behavior in the Health and Retirement Study: Measurement and the Redistribution of Resources within the Family", *Journal of Human Resources*, Vol. 30, Special Issue, pp. S184-S226.

Pickbourn, L. (2015). "Remittances and Household Expenditures on Education in Ghana's Northern Region: Why Gender Matters", *Feminist Economics*, Vol. 22, Issue 3.

Ravallion, M. and L. Dearden (1988). 'Social Security a "Moral Economy": An Empirical Analysis for Java', *the Review of Economics and Statistics*, Vol. 70, No. 1, pp. 36-44.

Rempel, H. and Lobdell, R. A. (1978). "The Role of Urban-to-Rural Remittances in Rural Development", *Journal of Development Studies, Vol. 14, No.3*, pp.324-41.

Stark, O., and Lucas, R. E. B. (1988). "Migration, Remittances and the Family", *Economic Development and Cultural Change, Vol.36, No.3*, pp. 465-81.