Effect of Youth Migration and Remittances on Rural Households' Livelihoods in South Eastern Nigeria

by Esther Alleluyanatha, Bola Amoke Awotide, Paul Martin Dontsop Nguezet, Lateef Olalekan Bello, Amadou Youssouf Coulibaly, Tahirou Abdoulaye, Victor Manyong, and Zoumana Bamba

EFFECT OF YOUTH MIGRATION AND REMITTANCES ON RURAL HOUSEHOLDS' LIVELIHOODS IN SOUTH EASTERN NIGERIA

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Abstract

Using Endogenous treatment effect model and wealth index score, this study evaluate the effect of migration and remittances on crop productivity and welfare among a sample of 714 households from South Eastern Nigeria. The results show that household size, sex of household head and availability of electricity and household toilet type were key factors influencing migration among youths, while employment status, household size, and age of migrant were the major factors that influenced youths sending remittances to the originating households in the study area. The average treatment effect of migration on household welfare and remittances on crop productivity was significant at 10%. The wealth index scores -0.238, -0.271 and -0.63 for the pooled data, Anambra and Imo states, respectively implies that non-migrant households were better off in improve household welfare, particularly in the pooled data and Imo state. The average treatment effect of remittances on crop productivity was 0.08 tons of cassava in the pooled data, but not significant when the states were considered separately. Therefore, youths should be encouraged to embrace agriculture as a source of livelihood in the rural areas to discourage them from migrating to urban areas.

Keywords: Migration, Endogenous treatment effect, Wealth index, Nigeria, Welfare, productivity

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1.0 INTRODUCTION

All over the world, migration has become an integral part of the current economy. An estimated 740 million people live outside their region of birth (Bell and Muhidin 2009). UNDESA (2019) estimated that youth migrants rose from 22.1 million in 2020 and they accounted for 11.3% of the total migrant population. Migration occur mainly intra region with over 21 million Africans living in another African country in 2019. It stated also that net migration rate in Nigeria was -2.1 in 2018 as against -3.5 in 2015. Also, remittance inflow from international migrants to Nigeria increased from14.64 in 2005 to 24.31 in 2018 (Natali and Isaacs, 2020). It was noted that regional economic performance differences induce people to leave more impoverished areas and move to others to have more and better opportunities. Particularly in developing countries, unequal developmental processes have led to increased migration flows from less or non-urbanized to more urbanized areas searching for greener pastures. The high rate of unemployment, security issues, and political instability, among other factors, contributes to the movement of Nigerian youths from one place of origin to another. Youths comprised a larger population of migrant globally (Ikuteyijo, 2020), and this is associated with their choices and the way they decide to actualize them; which have an impact on their own lives and that of their families, societies, and communities, both in the short, medium and long term (UNCF, 2014). However, the propensity for a successful accomplishment of these choices is a determinant of improving the originating households through agricultural productivity and remittances. Hence, the rural households where livelihood sustainability depends mainly on agriculture see migration as a survival strategy.

Empirical information on the impact of migration is still very scanty. Some studies such as Chen, 2020, Cuong and Linh, 2018, Awumbila et al., 2015, Ayinde et al., 2014, Davis and Lopez-Carr, 2014 that attempted to looked at the effect of migration on migrants' households did that without creating a counterfactual group to ascertain what would the situation of migrant households would have been if there was no migrant(s). In addition, the outcome of interest also varied. Some studies such as Kangmennaang *et al*. (2018), Akanle and Adesina (2017), Andersson (2014), Raihan *et al*. (2009) used food security, household's food, and housing-related expenditures, education and health expenditures, and poverty index, intangible welfare like credits and social welfare as proxies for household welfare and these variations showed different levels of the positive effect of remittance on agricultural productivity and household welfare. Furthermore, there is also no consensus on the relationship between migration, remittances, agricultural productivity, and households' welfare. For instance, Wadood and Hossain (2016) and Cuong and Linh (2018) emphasized that the effects of migration on household welfare happens mainly through remittances, and if migrants do not send remittances to their originating households, there would be no effects of migration on the welfare of households. However, Muyambo and Ranga (2020), Ghimire and Kapri (2020), Adeagbo and Ayandibu (2017), Ofuoku (2015), and Akpan et al. (2014) argued that remittances sent by migrant were limited to taking care of the originating households, and there was no significant effect of remittance on arable crop production and household welfare. Moreover, the income from rural farm households was

far higher than the remittances from rural-urban migrants.

Against this background, this study intends to contribute to the literature on the impact of migration. The study evaluated the impact of migration and receiving remittances on crop productivity and households' welfare by controlling for the observable and unobservable characteristics of the migrant households that can introduce biases into the analyses. Understanding the determinants of migration and how it impacts agricultural productivity is important for agricultural development related policies. Additionally, understanding how much impact remittances have on rural households' welfare would be an important tool in the formulation of welfare improved policies.

2.0 METHODOLOGY

2.1 Study Area, Data and sampling techniques

The study was carried out in Southeastern Nigeria. Anambra and Imo states were purposively selected. This is because the two states were the most youth migrating states in the region with percentage youth migration of 47.8% and 26.7%, respectively (NBS, 2012). The multistage sampling technique was used in selecting nine local government areas (LGAs) from Anambra State and 11 LGAs in Imo State. Using the Nigerian postcodes, two rural areas and three villages were randomly selected from each LGA. Again, six households were randomly selected from each village, bringing the sample size to 720 households.

We collected quantitative data from rural households with youths aged 15-35years (based African Union definition of youths) using a well-structured questionnaire, which was administered face-to-face. Out of the 720 households interviewed, 714 households were used for the study as households with youths not within the age bracket were dropped. Therefore, the data used for the final analyses comprise of 342 non-migrant households and 372 migrant households. When we looked at the in terms of remittances, the data also contains 467 non-remittance households, and 247 remittance-receiving households

2.2 Analytical Framework and Estimation Techniques

2.2.1 Endogenous Treatment Effect Model

Crop productivity and household welfare are affected by youth migration and remittance including other factors such as household components and community characteristics, among others. So using OLS as a point of reference to estimate the effect of youth migration and remittance on crop productivity as well as the effect of youth migration and remittance on household welfare, the model specification is as follows:

$$\ln y_i = \alpha T_i + X_i'\beta + u_i$$

where the subscript i denotes the ith household. y_i means crop productivity and household welfare of the ith household; T_i denotes dummy variables indicating whether a household has

migrant(s) or received remittances; X_i denotes a vector of covariates; α and β are the coefficients to be estimated; and $u_i$is the random error term.

However, the coefficients of this regression will be biased and inconsistent because of the observed and unobservable factors associated with self-selectivity variables such as youth migration and remittances used as treatment variables in this study. Hence to ensure that the effect of youth migration on crop productivity and the effect of remittance on household welfare are not over-estimated or underestimated, as the case might be, endogenous treatment effect model (ETE) was used. Other methods used by previous studies (Peng and Huang, 2017) were propensity score matching, inverse probability of treatment weighting, and endogenous switching regression model among others. However, propensity score matching and inverse probability of treatment weighting models can only account for self selectivity occurring from observable factors while endogenous switching regression model accounts for both observable and unobservable factors including the average treatment effect (Maddala, 1983), but cannot estimate the direct effect of endogenous dummy variables; whereas, the ETE accounts for observable and unobservable factors as well as ATE of endogenous dummy variables (Cong and Drukker, 2001).

The ETE model is estimated in two stages. The first stage is a treatment equation in which the youth migration and remittances were regressed on the instrumental variable(s) and other covariates while the second stage is an outcome equation, in which the crop productivity and household welfare were regressed on the endogenous dummy variable and other covariates. Instrumental variable used were household size and household toilet type for migration and age of migrant and employment status of migrant for remittances. The model was estimated as follows:

$$T_i^* = \gamma z_i + X_i'\delta + v_i$$

$$T_i = \begin{Bmatrix} 1, T_i^* > 0 \\ 0, T_i^* \leq 0 \end{Bmatrix}$$

where T_i^* refers to the latent variable of youth migration and remittances. For this study, it measures the likelihood that the ith household has youth migrant(s) or received remittances. T_i is equal to 1 when the household has youth migrant or receive remittances, and 0 otherwise. z_i denotes the instrumental variable(s). γ and δ are the coefficients to be estimated while v_i is the random error term.

The random error terms of Equations (1) and (2) were assumed to be normally distributed with zero means for the ETE model. They have a bivariate normal distribution with covariance matrix as

$$cov(v_i, u_i) = \begin{pmatrix} \sigma_u^2 & \rho\sigma_u \\ \rho\sigma_u & 1 \end{pmatrix} \quad (4)$$

where the variance of v_i(σ_v^2) is normalized to one. σ_u^2 , σ_u and ρ denote the variance of u_i ,

standard deviation of u_i, and correlation coefficient between u_i and v_i, respectively. When the estimated ρ is not equal to zero, it suggests the presence of self-selectivity of household with youth migrant or received remittances.

The conditional expectation of crop productivity and household welfare with youth migration and remittances were calculate as:

$$E(lny_i|T_i = 1) = \alpha + X_i'\beta + E(, u_i|T_i = 1) \quad (5)$$
$$E(lny_i|T_i = 0) = X_i'\beta + E(, u_i|T_i = 0)$$

Based on Equation (2), Equations (5) and (6) were further specified as:

$$E(lny_i|T_i = 1) = \alpha + X_i'\beta + \rho\sigma_u\pi(-\gamma z_i - X_i'\delta) \quad (7)$$
$$E(u_i|T_i = 0) = \rho\sigma_u\pi(\gamma z_i + X_i'\delta)$$

In Equations (7) and (8), $\pi(.) = \varphi(.)/[1 - \Phi(.)]$ stands for the inverse Mills ratio. $\varphi(.)$ and $\Phi(.)$ denote the standard normal density function and cumulative distribution function, respectively. Then, the difference in the conditional expectation between youth migrant(s) and non-migrant(s) households as well as remittance and non remittance households were calculated as follows:

$$E(lny_i|T_i = 1) - E(lny_i|T_i = 0) = \alpha + \rho\sigma_u[\pi(-\gamma z_i - X_i'\delta) + \pi(\gamma z_i + X_i'\delta)] \quad (9)$$

Hence, the effect of youth migration and remittances on crop productivity and household welfare respectively, contains two parts. The first part is captured by the coefficient α, and the second part is captured by $\rho\sigma_u[\pi(-\gamma z_i - X_i'\delta) + \pi(\gamma z_i + X_i'\delta)]$. Rearranging the inverse Mills ratio for ith household would be:

$$\pi_i = \begin{Bmatrix} \pi(-\gamma z_i - X_i'\delta), & T_i = 1 \\ -\pi(\gamma z_i + X_i'\delta), & T_i = 0 \end{Bmatrix}$$

Using Equations (7) and (8), Equation (1) can be written as:

$$E(lny_i) = \alpha T_i + X_i'\delta + \rho\sigma_u\pi_i$$

The ETE models called by the function *eteffects* in stata employ a so-called "control function approach" that estimates simultaneous equations, in contrast to most instrumental variable methods that use two-stage estimation (Wooldridge, 2010).

3.2.2 Wealth Index Score (WIS)

Wealth Index Score[2] was used to obtain household welfare instead of using household income or consumption as suggested by Shaukat et al. (2020) and Poirier et al. (2020). This was to eliminate the endogeneity that could be present in the source of food as most of the rural

[2] The method used for generating wealth index as a proxy for household welfare was adopted from Hjelm et al (2017), https://docs.wfp.org/api/documents/WFP-0000022418/download/

populace source food from their farms and do not really spend money on buying food items. Food consumed and the associated prices were based on market prices assuming that the household bought from the market. This, however, was not the case with using the WIS as responses on productive and non productive assets, household amenities, land and livestock owned were easily identified.

Estimating of the Wealth Index Score (WIS)

Indicator Variables: the productive and non-productive assets, household amenities and land and livestock owned were used to determine indicator variables to have a better distribution of households with fewer households being concentrated on certain index scores. These variables were then categorized into binary variables, 1 and 0; 1 if variable is not = 0. Next was to check the frequency of occurrence of each incorporated variable and percentages less than 5% or more than 95% were eliminated to differentiate between households.

Calculating Indicator Weights and Index Value: Principle Component Analysis **(**PCA) was used to calculate indicator weights and index value. The indicator variables were first standardizes, then the factor coefficient score (factor loadings) were calculated and finally, for each household, the indicator values were multiplied by the loadings and summed up to produce the household's index value. At this point, the first of the factors produced was used to represent the wealth index. This was because the first principal component variable across households had a mean ($\hat{\mu_i}$) of zero and a variance of σ. The principal component yields a wealth index that assigns a larger weight to asset that varies the most across households. The first principal component or wealth index can take positive as well as negative values. Therefore, the wealth index follows this general form:

$WI_i = w_1 a_{1i} + w_2 a_{2i} + \ldots + w_n a_{ni}$

Where: WI_i is the index calculated for household i, a_{1i} is the indicator for ownership of asset k for household i, and w_i is the weight assigned to asset k based on the first principal component. Thus, the wealth index $y_i$for household i is the linear combination of:

$$WI_i = \sum_{k=1}^{p} \propto_k \left(\frac{x_{ki} - \bar{x}_k}{s_k}\right), i = 1,2,\ldots,n$$

Where x_{ki} is asset k for ith household, $\bar{x}_k = \frac{1}{n}\sum_{k=1}^{p} x_{ki}$ is the mean of asset k, s_k is the standard deviation of asset, k, $\propto_k$ = is the weight for the k^{th} asset with respect to the first principle component

Calculation of the Wealth Quintiles: Quintiles were used as a compromise between limiting the number of categories to be tabulated and adequately representing the relationship between wealth and the phenomenon of interest (Karigi, 2014). The cut points in the wealth index at which to form the quintiles were calculated by obtaining a weighted frequency distribution of households, the weight being the product of the number of permanent members of the household and the sampling weight of the household (ibid). Thus, the distribution represented the household

population in each state, where each member is given the wealth index score of his or her household. To calculate the asset score for each household, PCA sums the standardized value of each variable multiplied by its eigenvalue, such that $\bar{X}_k = 0$ and s_k =1 (the mean and standard deviation of s = 0, 1) and s_k is multiplied by the eigenvalue ε_k of the first principal component for that asset:

$$\Lambda_{i1} = \sum_{1}^{v} \varepsilon_v \times \hat{V}_i$$

After calculating the asset scores, the resulting asset scores for each household were ranked from lowest to highest, which was divided into quintiles based on household asset score, with approximately 20% of the population in each quintile. Then the household score was recoded into the quintile variable, range 1-5, so that each member of a household also received that household's quintile category.

3.0 RESULTS AND DISCUSSION

This study focused on finding the ATE of migration on crop productivity and household welfare as well as the ATE of remittance on crop productivity and household welfare in Southeastern Nigeria.

3.1 Effect of migration on crop productivity and household welfare

Tables 1a and 1b depict the means of the variables used in the analysis for migration.

Table 1a: Variable definition and their descriptive statistics – Pooled data

		Migrant household		Non-migrant household	
Variables	**Description**	**Mean**	**Std.Err.**	**Mean**	**S.E.**
yield_TONNE_HA*	Cassava yield / hectare (Tons)	10.87	0.83	9.82	0.80
Fathers_AGE	Father's age (years)	43.17	1.53	39.88	1.37
Fathers_EDUC	Father's educational level (years)	6.12	0.29	6.56	0.30
Mothers_AGE	Mother's age (years)	37.05	1.42	32.28	1.20
coop_HHH	Household head belongs to a cooperative (Yes=1, No=0)	0.04	0.01	0.05	0.01
dist_home_BANK	Distance from home to bank (km)	9.66	0.58	12.11	0.81
dist_home_Majoroad	Distance from home to the major road (km)	4.42	0.39	5.08	0.43
electricity	Availability of electricity(Yes=1, No=0)	0.81	0.02	0.68	0.03
farmsize_Cass_HA	Cassava farm size (Ha)	0.42	0.02	0.40	0.02
Hhsize	Household size (number)	7.35	0.12	6.09	0.13
HHTiolet	Toilet type (Modern=1, Latrine=0)	0.60	0.03	0.51	0.03
Highest_income	Highest source of household income (remittance=1 otherwise 0)	0.23	0.02	0.09	0.02
income_agricwage2	Income from agricultural wages (number)	0.82	0.04	0.75	0.05
MATRLwalls	Wall material (Concrete =1 other 0)	1.42	0.07	1.37	0.07
Revenue	Revenue from cassava sales (N)	200034.70	9249.93	177887.10	9444.83
SexHhH	Sex of household head (Yes=1, No=0)	0.77	0.02	0.82	0.02
Total_expenditure	Per capita expenditure (N)	89198.74	1506.34	90968.43	1793.33
use_fertilizer	Fertilizer use (Yes=1, No=0)	0.30	0.02	0.31	0.03
use_herbicide	Herbicide use (Yes=1, No=0)	0.33	0.03	0.27	0.03
non_food_expendture	Per capita non-food expenditure (₦)				
Unitprice_CASS (₦)	Unit price of cassava (₦)				
Labourcost_HA	Labour cost per HA (₦)				

Source: Field survey, 2020 *Dependent variable

Table 1b: Variable definition and their descriptive statistics for Migration – Anambra and Imo states

	ANAMBRA				IMO			
Variables	**Migrant**		**Non-migrant**		**Migrant**		**Non-migrant**	
	Mean	**S.E.**	**Mean**	**S.E.**	**Mean**	**S.E.**	**Mean**	**S.E.**
Cassava yield per hectare*	8.34	0.24	7.53	0.25	12.59	1.37	12.06	1.54
Fathers_AGE	39.52	2.36	34.86	44.18	45.67	2.00	47.13	1.87
Fathers_EDUC	5.28	0.45	4.40	6.17	6.69	0.38	8.09	0.43
Mothers_AGE	32.58	2.25	28.14	37.01	40.10	1.80	35.01	1.77
coop_HHH	4.89	0.46	3.99	5.79	1.69	0.08	1.36	0.07
dist_home_BANK	14.19	1.20	11.82	16.55	2.60	0.20	2.95	0.26
dist_home_Majoroad	7.09	0.87	5.37	8.80	0.33	0.02	0.33	0.03
Electricity	0.64	0.04	0.56	0.71	0.94	0.02	0.98	0.01
farmsize_Cass_HA	0.56	0.04	0.49	0.64	7.75	0.16	6.68	0.18
Hhsize	6.77	0.18	6.40	7.13	0.65	0.03	0.59	0.04
HHTiolet	0.54	0.04	0.46	0.62	2.19	0.08	2.20	0.11
Highest_income	0.23	0.03	0.07	0.02	11.70	0.06	11.58	0.07
income_agricwage2	0.54	0.07	0.41	0.68	11.39	0.02	11.41	0.02
Revenue	237577.80	14922.59	208092.20	267063.40	18006.31	615.99	18118.24	1630.57
SexHhH	0.75	0.04	0.68	0.82	0.52	0.07	0.40	0.06
Total_expenditure	85504.77	2852.40	79868.69	91140.85	174383.00	11478.91	163494.20	14253.79
use_fertilizer	0.28	0.04	0.21	0.36	0.32	0.03	0.29	0.03
MATRLwalls	1.79	0.15	1.50	2.09				
use_herbicide	0.80	0.07	0.66	0.94				
Labourcost_HA	585949.50	42074.23	502814.80	669084.10				
Non_food_expenditure	14262.15	984.63	12316.61	16207.68				
Unitprice_CASS					3890.95	114.84	3783.24	129.22

Source: Field survey, 2020 ***Dependent variable**

3.1.1 Average Treatment Effect (ATE) of migration on crop productivity

The effect of migration on crop productivity is presented in Table 2. The Potential Outcome Means (POMs) on crop productivity for non-migrant household and migrant household were 2.049 and 2.176 points, respectively and significant at 1%, which results to an insignificant ATE of 0.128 tons for migrant household in the states. In Anambra state, the POMs on crop productivity for non-migrant household and migrant household were 1.854 and 2.002 points respectively at 1% significant level with ATE of 0.148 tons of cassava for migrant household though it is not significant. While Imo state, non-migrant household and migrant household had 2.350 and 2.513 significant points respectively resulting to an insignificant ATE of 0.308 for migrant household. Test of endogeneity were not significant implying that we reject the null hypothesis of presence of endogeneity in the treatment and outcome models. The results showed an insignificant ATE of youth migration on crop productivity in Southeastern Nigeria, implying that there was no significant effect of migration on crop productivity. This could be resulting from the fact that cassava production is not a labour-intensive crop (Imran et al., 2006). Therefore the loss of labour within the households due to migration had little or no effect on crop productivity. This result is consistent with Chen (2020) report of insignificant but positive effect of rural–urban migration experience on arable land use, though not in agreement with Ayinde *et al.* (2014) and Shi (2018).

The outcome model parameter estimates for crop productivity is also depicted in Table 2. The size of cassava farm was the major factor that influenced cassava productivity in all the states, although, with a negative relationship. Other factors were household head belonging to a cooperative and mother's age have a negative relationship with cassava yield per hectare in the pooled data for non-migrant households; but use of herbicides and revenue from cassava sales increased cassava yield per hectare in the pooled data set. In Anambra state, cost of labour, revenue from cassava sales and per capita expenditure on non-food items were significantly increasing cassava yield in the state for both youth migrant and non-migrant households. However, use of herbicide was significant for migrant households alone.

In the case of households from Imo State, expenditure on non-food items and unit price of cassava increased cassava yield for migrant and non-migrant household, while use of herbicide increased cassava yield for migrant households alone. Size of cassava farm was significant but negatively associated with cassava yield in both youth migrant and non-migrant households, implying that as farm size increases, cassava yield decreases. This corresponds with Osundare and Sunday (2018) and Ikuemonisan *et al.* (2020) findings that improper agronomic management was associated with large cassava farm size leading to reduction in yield. Fertilizer use was negatively significant in Imo state suggesting that majority of the households does not or adequately use fertilizer. Furthermore, use of herbicide in Anambra state among migrant households was significant and increases the yield of cassava.

Table 2: ATE of migration on crop productivity – Pooled data

LOG of cassava yield per hectare				
Variables	**Coefficient**	**Robust Std. Err.**	**Coef.**	**R.S.E.**
Parameter estimates for migration				
Mothers_AGE	-0.001	0.002		
Fathers_EDUC	-0.021*	0.011		
Fathers_AGE	0.014***	0.003		
Hhsize	0.135***	0.024		
SexHhH	-0.856***	0.232		
HHLandowned	0.109***	0.044		
MATRLwalls	0.042	0.040		
Electricity	0.503***	0.138		
HHTiolet	0.289***	0.104		
States	-0.109	0.115		
Constant	-1.113***	0.268		
Non-migrant household			**Migrant household**	
Fathers_AGE	0.000	0.001	-0.001	0.001
Mothers_AGE	-0.003**	0.001	0.000	0.001
coop_HHH	-0.422**	0.203	0.130	0.161
Hhsize	-0.009	0.016	0.002	0.015
Revenue	0.000***	0.000	0.000***	0.000
farmsize_Cass_HA	-0.780***	0.107	-0.829***	0.320
use_herbicide	0.039	0.044	0.087**	0.039
use_fertilizer	-0.011	0.057	-0.077	0.049
States	0.315***	0.059	0.302***	0.051
Constant	1.662***	0.101	1.652***	0.244
Treatment effect on outcome means (TEOM)	-0.126	0.218	-0.040	0.232
POMs on migration	2.049***	0.116	2.176***	0.107
ATE	0.128	0.168		
Test of endogeneity				
chi2(2)	0.34			
Prob > chi2	0.8428			

Source: Field survey, 2020 ***1%, **5, *10%

Table 2: ATE of migration on crop productivity – Anambra and Imo state

LOG of cassava yield per hectare								
	ANAMBRA				**IMO**			
Variables	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**
Parameter estimates for migration								
Mothers_AGE	-0.006	0.004			0.006**	0.003		
Fathers_EDUC	-0.001	0.018			-0.035**	0.015		
Fathers_AGE	0.023***	0.006			0.004	0.003		
Hhsize	0.174***	0.038			0.117***	0.032		
HHTiolet	0.360**	0.159			0.286**	0.138		
SexHhH	-1.374***	0.351						
HHLandowned	0.133**	0.055						
MATRLwalls	0.104**	0.048						
Electricity	0.661***	0.164						
Constant	-1.592***	0.343			-1.231***	0.374		
	Non-migrant household		**Migrant household**		**Non-migrant household**		**Migrant household**	
Fathers_AGE	-0.002*	0.001	0.000	0.001	0.002	0.001	0.000	0.001
Mothers_AGE	-0.001	0.001	0.002	0.001	-0.001	0.001	-0.003*	0.002
farmsize_Cass_HA	-1.556***	0.161	-0.512	0.354	-0.400**	0.166	-0.278***	0.092
Non_food_expenditure	0.000***	0.000	0.000	0.000	0.000***	0.000	0.000*	0.000
use_fertilizer	0.008	0.071	0.007	0.049	-0.042	0.104	-0.384***	0.147
Unit price_cassava					0.000***	0.000	0.000*	0.000
Labour cost per HA	0.000***	0.000	0.000***	0.000				
Revenue	0.000***	0.000	0.000***	0.000				
use_herbicide	-0.012	0.040	0.105***	0.037				
Constant	1.385***	0.122	1.578***	0.336	2.153***	0.180	2.568***	0.384
TEOM	-0.105	0.232	-0.055	0.273	0.120	0.359	-0.493	0.499

POMs on migration	1.854***	0.114	2.002***	0.141	2.350***	0.206	2.513***	0.207
ATE	0.148	0.192			0.163	0.308		
Test of endogeneity								
chi2(2)	0.23				1.18			
Prob > chi2	0.8933				0.5556			

Source: Field survey, 2020. ***1%, **5, *10%

An increased income from cassava sales led to increase in the yield of cassava, indicating that income realized from sales of cassava from the previous season were used in the purchase of farming input such as fertilizer and herbicide and hiring of labour in Anambra state. The unit price of cassava is a determinant of increased income from sales of cassava as higher prices of cassava results to higher income among the households in Imo state. This finding corresponds with Omotayo and Oladejo (2016) that price per cassava truck increased the net revenue of cassava famers and Adeyemo *et al.* (2019) found that increased income from cassava activities was a leverage to invest in agricultural activities with prospects of higher returns. Non-food expenditure and labour cost had a significant positive effect on cassava production, which entails that as household expenditure on nonfood items and labour cost increases, crop productivity increases as well. Likewise, labour cost increasing with yield could be traced to the additional cost incurred for increasing cassava farm size in Anambra state. This related to Anyikwa *et al.* (2019) study in Anambra state but in contrast with Oginni and Abdoulaye (2019).

Table 2 also shows the parameter estimates for migration on crop productivity in Anambra and Imo state. Household size and toilet type were significant factors that encouraged youth's decision to migrate in both states implying that households with greater number of people within a household and modern toilet tends to migrate more and vice versa. de Brawn (2019) however found a negative relationship between youth migration and household size. Other factors were father's age, total land owned, wall material and availability of electricity were significant factors that increased youth's migration, while sex of household head decreased youth's migration in Anambra state. Whereas, mothers age, and father's educational level increases and reduces youth's migration respectively in Imo state. This implies that households with older father, total land owned of less than 0.5Ha, using concrete for wall material and electricity induced youths migration whereas households with female headed households decreased youth migration in Anambra state; older mother induced and father's low literacy level discouraged migration among the youths in Imo state. The above findings are in line with de Brawn (2019) that increased age and educational level of household instills migration decision among youths.

3.1.2 ATE of migration on household welfare

The ATE of migration on household welfare was -0.238, -0.271 and -0.63 scores for the pooled data, Anambra, and Imo states, respectively, for migrant households signifying that non-migrant households were better off when it comes to improvement in households' welfare particularly in the pooled data and Imo state which was significant (Table 3). Migration had a significant positive effect on households' welfare in Anambra state, suggesting that youth migration households increased household welfare by 0.508 scores. POMs were significant in both youth migrant and non-migrant households across the states. The ATE results suggest that migrant households were less likely to increase wealth by 0.24 and 0.34 scores in the pooled data and Imo state, respectively, implying that non-migrant household accumulates wealth more than the migrant households. In other words, migration does not have instantaneous effects on the welfare

of originating households. This conforms to Awumbila *et al.* (2016) that on average, households with migrants were worse off than they might have been had their members stayed at home in Ghana. Likewise, Serbeh *et al.* (2015) argued that internal migration may produce some benefits, but it may not be a conventional means for poverty reduction because the benefits were more likely to be offset by conditions which further expose migrants to endless deprivation and gloom. This could be associated with place of migration as Teye *et al.* (2019) observed in Ghana that internal migration may not improve welfare of the originating households in a short-term period, though; there is the potential for a long-term impact of migration on originating households. This is consistent with Ajaero *et al.* (2018), Cuong and Linh (2018) and Etowa *et al.* (2015). Furthermore, the non-significant values on the endogeneity test validate the absence of endogeneity in the model.

Table 3: ATE of migration on household welfare – Pooled data

	Log wealth Index Score			
Variable	**Coef.**	**R.S.E.**	**Coef.**	**R.S.E.**
	Parameter estimates for migration			
Fathers_AGE	0.011***	0.003		
Hhsize	0.138***	0.024		
SexHhH	-0.864***	0.205		
HHLandowned	0.108***	0.040		
HHTiolet	0.277***	0.103		
Electricity	0.499***	0.126		
States	-0.137	0.113		
Constant	-0.841***	0.279		
Variable	**Non-migration household**		**Migration household**	
Fathers_EDUC	0.005	0.006	0.018***	0.005
Mothers_EDUC	-0.001	0.001	0.000	0.001
coop_HHH	0.344***	0.091	0.003	0.136
Highest_income	0.025	0.031	-0.077***	0.025
Total_expenditure	0.000**	0.000	0.000***	0.000
dist_home_BANK	-0.004**	0.002	0.000	0.003
yield_TONNE_HA	0.002***	0.001	-0.001	0.002
States	-0.127*	0.076	-0.014	0.067
Constant	0.992***	0.169	0.554***	0.193
TEOM	0.185	0.188	0.304	0.224
POMs on migration	3.163***	0.257	2.640***	0.235
ATE	-0.238*	0.135		
Test of endogeneity				
chi2(2)	2.77			
Prob > chi2	0.250			

Source: Field survey, 2020 . ***1%, **5, *10%

Table 3: ATE of migration on household welfare in Anambra and Imo state

	Log wealth Index Score							
	ANAMBRA				IMO			
Variables	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**
	Parameter estimates for migration							
Fathers_AGE	0.023***	0.005			0.006	0.004		
Hhsize	0.179***	0.039			0.121***	0.034		
SexHhH	-1.368***	0.343			-0.616**	0.302		
HHTiolet	0.336**	0.160			0.277**	0.143		
Electricity	0.630***	0.167			0.369*	0.225		
HHLandowned	0.142***	0.055						
Highest_income					0.525***	0.187		
Constant	-1.238***	0.457			-2.211**	1.042		
Variable	**Non-migration household**		**Migration**	**Non-migration household**	**Non-migration household**		**Migration**	**Non-migration household**
Fathers_EDUC	0.006	0.009	0.012	0.008	0.002	0.008	0.018*	0.006
Mothers_ EDUC	-0.003	0.002	0.003*	0.002	0.001	0.002	-0.002***	0.001
coop_HHH	0.512***	0.133	0.181	0.306	0.246**	0.111	-0.090	0.138
Hhsize	0.020	0.023	-0.059**	0.027	0.046*	0.026	0.029*	0.020
dist_home_BANK	-0.016***	0.005	-0.003	0.009	-0.013**	0.006	-0.004	0.005
Expenditure_non_food	0.000**	0.000	0.000**	0.000				
dist_home_Majoroad	0.021**	0.010	0.014	0.013				
Log non_food_expenditure					0.277***	0.091	0.374***	0.073
yield_TONNE_HA					0.003***	0.001	-0.001	0.001
Constant	1.079***	0.133	0.917***	0.279	-1.633*	0.886	-2.981***	0.796
TEOM	0.508*	0.273	0.010	0.312	0.788	0.519	0.401	0.427
POMs on migration	1.066***	0.092	0.828***	0.100	3.475***	0.252	2.513***	0.346
ATE	-0.271	0.181			-0.630*	0.339		
Test of endogeneity								

chi2(2)	2.85	3.50
Prob > chi2	0.240	0.174

Source: Field survey, 2020 ***1%, **5, *10%

Table 3 shows the parameter estimates for migration with regards to household welfare. It illustrates that household size, sex of household head, availability of electricity and toilet type were the key factors influencing migration among youths in the study area, implying that with large household, availability of electricity and modern toilet facility, youth migration increased. Large households are characterized to be poor in the rural areas (Yigzaw, 2016). This corresponds with Mgbakor *et al.* (2014). Sex of household head had an inverse relationship with youth migration, implying that female headed household encouraged youth migration and vise versa. This could be attributed to the poverty level associated with female headed household when compared to their male counterparts (Pam, 2014 and Adaku, 2013) These findings are in line with Milasi (2020), Alarima (2018) and Pickbourn (2018).

Table 3 also contains the household welfare parameters as related with migration. Household head belonging to a cooperative and distance from home to the bank were key factors that influenced wealth accretion in the study area but particularly within the non-migrant households, implying that household welfare increases with household head being a member of cooperative. This is consistent with Wossen *et al.* (2017). Distance from home to the bank had a negative relationship with wealth indicating that the farther the bank from the household, the less of wealth accrued among the non-migrant households. This corresponds with Munyegera and Matsumoto (2014) that households choose to go for mobile money services that were nearest to their house. Father's and Mother's educational level were positively and negatively associated with household welfare in the pooled data and Imo state respectively, indicating that a higher educational level of household head, results to increased wealth accumulation in the pool data whereas, higher educational level of mother reduces wealth accretion in Imo state. This is in line with Nguyen and Nguyen (2019) but contradicts Imo state result.

Similarly, the per capita expenditure and cassava yield per hectare had positive influence on wealth accretion, suggesting that household welfare increases with household expenditure and cassava yield per hectare. These results were consistent with Priyadi *et al.* (2020). Household source of highest income showed a negative relationship with wealth in the pooled data showing that remittance being the highest source of income reduced rate of wealth accumulation within the migrant household, indicating that remittances were not adequate to increase wealth. Andersson (2014) found that remittances had no effect on productive assets in Ethiopia's rural areas. Similarly, Cuong and Linh (2018) observed that migration affects household welfare mainly through remittances without which migration has no effect on household welfare. But this contradicts most studies as Raihan *et al*. (2009), Kangmennaang *et al*. (2017) and Akanle and Adesina (2017). Household size was negatively associated with household welfare among the migrant households in Anambra state but positively associated in Imo state, specifying that large household in Anambra decreased wealth accumulation among migrant household, whereas the reverse was the case in Imo state. It could be that resources that should be used to acquire more

wealth was used to the fending the large households, thus making it difficult for the household to accrue wealth. This is line with Wang *et al.* (2017).

3.2 Effect of remittances on crop productivity and household welfare

Tables 4a and 4b shows the means of the variables used in the analysis for remittances.

Table 4a: Variable definition and their descriptive statistics for Remittances - Pooled Data

		Remittance		Non-remittance	
Variables	**Description**	**Mean**	**S.E.**	**Mean**	**S.E.**
Wealth Index Score*		2.93	0.70	3.06	0.80
Aage_migrant	Age of migrant (years)	30.45	0.25	25.16	0.63
EDUC_migrant	Educational level of migrant (years)	12.91	0.17	3.25	0.26
MemployST ATUS	Migrant employment status (employed =1 otherwise 0)	0.96	0.01	0.21	0.02
Fathers_AGE	Father's age	43.38	1.94	40.66	1.20
Fathers_EDUC	Father's educational level	6.17	0.37	6.42	0.26
Mothers_AGE	Mother's age	38.20	1.75	32.95	1.09
Mothers_EDUC	Mother's educational level (years)	6.26	0.36	6.21	0.26
remitUSE_Agric_implements	Remit used for buying Agricultural implements (Yes=1, No=0)	0.35	0.03	0.01	0.00
remitUSE_Schoolfeesforchildren	Remit used for paying children's School fees (Yes=1, No=0)	0.42	0.04	0.01	0.01
dist_home_BANK	Distance from home to bank	8.48	0.59	12.08	0.68
dist_home_Majoroad	Distance from home to the major road	3.39	0.39	5.45	0.39
farmsize_Cass_HA	Cassava farm size	0.41	0.02	0.41	0.02
HHLandowned	Total land owned (>0.5=1, ≤0.5=0)	0.31	0.03	0.29	0.02
Hhsize	Household size	7.29	0.15	6.46	0.11
income_agricwage2	Income agricultural wages	0.82	0.05	0.77	0.04
QTYherbicide_used	Quantity of herbicide used (litres)	0.47	0.12	0.66	0.16
Revenue	Revenue from cassava sales	202473.30	10811.31	182525.50	8338.86
Total_expenditure	Per capita expenditure	89428.50	1793.07	90373.22	1505.54
use_fertilizer	Fertilizer use	0.29	0.03	0.32	0.02
DUM_destination	Migrant destination (Abroad= 1 otherwise=0)	0.18	0.02	0.03	0.01
QTYfert_used	Quantity of fertilizer used (Kg)	0.45	0.06	0.48	0.09
No_migrants	Average Number of migrants in a household (Number)	1.74	0.07	0.40	0.04
SEX_migrant	Sex of migrant (M=1, F=0)	0.77	0.02	0.19	0.02

Source: Field survey, 2020 ***Dependent variable**

Table 4b: Variable definition and their descriptive statistics for Remittances – Anambra and Imo state

	ANAMBRA				IMO			
	Remittance		Non-remittance		Remittance		Non-remittance	
Variables	**Mean**	**S.E.**	**Mean**	**S.E.**	**Mean**	**S.E.**	**Mean**	**S.E.**
Wealth Index Score*	2.88	0.11	3.09	0.11	2.97	0.10	3.03	0.11
Aage_migrant	30.62	0.38	29.86	31.37	30.31	0.33	26.14	0.77
EDUC_migrant	12.51	0.31	11.89	13.14	13.16	0.19	12.82	0.30
MemployST ATUS	0.90	0.03	0.85	0.96	1.00	0.00	0.28	0.03
AFathers_AGE	41.63	3.03	35.62	47.63	44.49	2.53	47.44	1.61
AMothers_AGE	34.50	2.83	28.88	40.12	40.56	2.21	36.19	1.55
AMothers_EDUC	5.27	0.58	4.12	6.42	6.89	0.46	6.90	0.37
remitUSE_Agric_implements	0.11	0.03	0.05	0.18	0.50	0.04	0.01	0.01
dist_home_BANK	11.50	1.23	9.06	13.94	6.55	0.53	7.23	0.48
farmsize_Cass_HA	0.54	0.05	0.44	0.64	0.33	0.02	0.33	0.02
Hhsize	6.60	0.23	6.15	7.06	7.73	0.19	7.00	0.16
Revenue	240249.50	18453.82	203614.00	276884.90	178456.60	12905.31	164099.60	12143.64
use_fertilizer	0.25	0.04	0.16	0.34	0.32	0.04	0.30	0.03
SEX_migrant	0.94	0.02	0.90	0.98	0.65	0.04	0.19	0.02
non_food_expendture	14458.94	1196.88	12082.83	16835.06	18698.58	749.03	17655.82	1200.53
SexHhH	0.76	0.04	0.67	0.85	0.75	0.04	0.86	0.02
Highest_income	0.32	0.05	0.23	0.42	0.28	0.04	0.12	0.02
No_migrants	1.42	0.08	1.25	1.58	1.95	0.10	0.53	0.07
QTYfert_used					0.54	0.08	0.42	0.05
Unitprice_CASS					4006.95	142.94	3742.18	106.73
AFathers_EDUC					6.77	0.48	7.64	0.36
dist_home_Majoroad	5.23	0.92	3.40	7.06				
income_agricwage2	0.46	0.08	0.29	0.62				
use_herbicide	0.81	0.09	0.63	0.99				
coop_HHH	0.02	0.01	-0.01	0.05				
DUM_destination	0.17	0.04	0.09	0.24				

Source: Field survey, 2020 ***Dependent variable**

3.2.1 ATE of remittances on crop productivity

Table 5 depicts the results of remittance effect on crop productivity in Southeastern Nigeria. Remittance effect on crop productivity was negatively significant in the pooled data and positively significant in Imo state, indicating a 0.20 tons decrease in cassava productivity assuming non-remittance households were to receive remittance in the pooled data and 0.29 tons increase for remittance households in Imo state. In the pooled data, ATE of remittances on crop productivity was 0.08 tons and significant for remittance households, meaning that remittance households were better off by 0.8 tons. However, Anambra and Imo state had an insignificant ATE of 0.126 and -0.09 tons respectively implying that there was no significant difference in crop productivity for remittance and non-remittance receiving households. This findings correspond with Ofuoku (2015) and Ghimire and Kapri (2020) that remittances from rural-urban migrants did not make any meaningful contribution to arable crop production as remittances from rural farm households were far higher than the remittances from rural-urban migrants and the little remittances from the rural-urban migrants were used to funding of rural farm household, farm labour and inputs. Again, Ghimire *et al.* (2020) reported that unearned[2] remittances were more useful in improving agricultural productivity than earned[3] remittances. Muyambo and Ranga (2020) affirmed that remittance sent by migrant was well limited to take care of the originating households and there was no significant relationship between remittance sending and crop productivity. Furthermore, Adebayo *et al.* (2021) discovered that remittances were more beneficial to urban household than to the rural households in Southwestern Nigeria. The chi-square probability is not significant, implying that there is no endogeneity in the model specification.

The parameter estimates for remittances on crop productivity is also shown in Table 5. Employment status and age of migrant were the major factors that influenced youths sending remittances to the originating households with regards to cassava productivity, implying that being employed influenced migrants to remit the originating households and the older a migrant, the more remittance was sent to the originating households in the study area. These findings matched with Ajaero *et al.* (2018). Other factors included: use of remittance for agricultural implements and paying of children's school fees in the pooled state, migrant's destination in Anambra state and sex of household head in Imo state. The purpose of sending remittances such as buying of agricultural implements and paying of school fees positively influenced the sending of remittances to the originating households by the migrants in the pooled state. This corresponds with Kassa (2017) and Bacchi *et al.* (2017). Again, being an international migrant increased remittance flow to the originating households in Anambra state. This result corresponds with Ajaero *et al.* (2018) and Adaawen and Owusu (2013).

[2] Unearned remittances are income received by household on irregular bases by distant relatives.
[3] Earned remittances are income received by household on regular bases.

The outcome model parameter estimates for non-remittance and remittance households as shown in Table 5 illustrates that land owned by remittance and non-remittance households and Father's age, mother's age, farm size of cassava and use of fertilizer in non-remittance households were factors that negatively influenced crop productivity while quantity of herbicide used and revenue from cassava sales were positively related to crop productivity in both remittance and non-remittance households. This suggests that as land owned is greater than 0.5, cassava yield decreases and vise versa in both remittance and non-remittance households, implying that even with household receiving remittances, improper agronomic practices persist with increased land

Table 5: ATE of remittances on crop productivity – Pooled data

	LOG of cassava yield per hectare			
Variables	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**
	Parameter estimates for remittance			
SEX_migrant	-0.259	0.216		
Aage_migrant	0.101***	0.014		
EDUC_migrant	-0.010	0.026		
MemploySTATUS	1.134***	0.290		
remitUSE_Agric_implements	0.796***	0.275		
remitUSE_Schoolfeesforchildren	0.655***	0.230		
States	-0.445**	0.191		
Constant	-2.730***	0.428		
	Non-remittance household		**Remittance household**	
Fathers_AGE	-0.002*	0.001	0.000	0.001
Mothers_AGE	-0.002**	0.001	0.000	0.001
Hhsize	0.000	0.009	0.001	0.010
HHLandowned	-0.380***	0.065	-0.305***	0.077
QTYherbicide_used	0.022**	0.009	0.030**	0.014
Revenue	0.000***	0.000	0.000***	0.000
farmsize_Cass_HA	-0.865***	0.141	-0.401	0.299
use_fertilizer	-0.058	0.050	-0.011	0.042
States	0.328	0.050	0.292***	0.034
Constant	1.708***	0.093	1.638***	0.108
TEOM	-0.202*	0.114	0.014	0.098
POMs on migration	2.099***	0.027	2.179***	0.038
ATE	0.080*	0.044		
Test of endogeneity				
chi2(2)	3.20			
Prob > chi2	0.2016			

Source: Field survey, 2020 ***1%, **5, *10%

Table 5: ATE of remittances on crop productivity in Anambra and Imo states

	LOG of cassava yield per hectare							
	ANAMBRA				IMO			
Variables	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**
	Parameter estimates for remittance							
SEX_migrant	0.664	0.521			-0.192	0.216		
Aage_migrant	0.126***	0.031			0.102***	0.020		
EDUC_migrant	0.021	0.036			-0.009	0.043		
MemployST ATUS	0.970***	0.297			1.061*	0.601		
DUM_destination	0.902**	0.374						
SexHhH					-0.517**	0.257		
Constant	-3.713***	0.089			-2.845***	0.304		
	Non-remittance household		**Remittance household**		**Non-remittance household**		**Remittance household**	
Fathers_AGE	-0.003	0.002	0.004*	0.002	0.001	0.001	-0.001	0.001
Mothers_AGE	0.000	0.002	-0.002	0.002	-0.002	0.001	-0.002*	0.001
use_fertilizer	0.107	0.078	0.055	0.059	-0.182*	0.109	-0.337**	0.171
Mothers_EDUC	-0.005	0.007	0.013**	0.006				
HHLandowned	-0.713***	0.090	-0.369***	0.129				
use_herbicide	0.040	0.040	0.059**	0.028				
Revenue	0.000***	0.000	0.000***	0.000				
farmsize_Cass_HA					-0.408***	0.142	-0.197***	0.075
QTYfert_used					0.114	0.075	0.161**	0.073
Non_food_Expenditure					0.000**	0.000	0.000**	0.000
Unit price of cassava					0.000**	0.000	0.000**	0.000
Constant	1.470***	0.130	1.781***	0.161	2.242***	0.143	2.022***	0.150
TEOM	-0.098	0.276	-0.193	0.192	-0.051	0.130	0.293*	0.171
POMs on migration	1.894***	0.073	2.020***	0.056	2.298***	0.035	2.205***	0.058
ATE	0.126	0.091			-0.092	0.066		
Test of endogeneity								
chi2(2)	1.17				3.09			
Prob > chi2	0.5571				0.2134			

size in the study area especially in Anambra state (Osundare and Sunday, 2018 and Ikuemonisan et al, 2020). This finding, however, is against Okeke and Emaziye (2017) that more units of land were required for increased cassava output in Anambra.

Similarly, cassava farm size was negatively associated with crop productivity for non-remittances households in the pooled data but in Imo state, it was both remittance and non-remittance households. Likewise, in Imo state, there exists a negative relationship between the use of fertilizers and crop productivity but quantity of fertilizer use was significant and positively associated with crop productivity; implying increased cassava yield with increased quantity of fertilizer in the remittance households. This confirms Onu and Echebiri (2019) that more units of fertilizer were required for increased yield of cassava in the Imo state. Father's age and mother's age was negatively associated with crop productivity in the pooled data, indicating a decrease in cassava yield as age increases. This is certain because productivity reduces with age of farmers and this corresponds with Opondo and Owuor (2018). Furthermore, non-food per capita expenditure and unit price of cassava were significant and had a positive relationship with crop productivity in Imo state, pointing out that both variables lead to increase in cassava yield and vice versa. This is consistent with Anyanwu and Iyagba (2010).

3.2.2 ATE of remittances on household welfare

Table 6 shows that ATE of remittances on household welfare was insignificant in the study area. Though, there was a significant positive relationship between remittance and household welfare keeping other variables constant in remittance receiving households, Imo state; this did not influence the ATE to be significant. This could be attributed to the findings of Adaawen and Owusu (2013) that the decision to send money to originating households was dependent on the kind of motivation a migrant may have. Migrant influenced by 'economic and financial self-interest motives' may want to amass wealth at the place of destination thereby discouraging remittance sending to originating households. However, migrant that wants to enhance intangible welfare credits like community respect for remittances receiving households (Akanle and Adesina, 2017) and social status for the migrant (Ikuteyijo, 2020) would remit the household. Also, table 6 shows that the endogeneity test was not significant implying that we reject the evidence of endogeneity in the treatment and outcome model.

Parameters estimate of remittance are displayed in Table 6. Employment status of migrant was an outstanding factor that influenced sending remittance to the originating households. Other factors were age and sex of migrant, buying of agricultural implements, paying of children's school fees, number of migrants in a household and migrant destination. Getting a well-paid job in the migrant's new destination had a higher influence on sending remittances back home. This corresponds to Adaawen and Owusu (2013) and Nwosu *et al.* (2012) that the level of migrants' income and type of migrants' employments positively influenced migrants sending remittances

to originating households. Sex of migrants in Anambra state was positive compared to Imo state, which was negative, implying that being a male migrant in Anambra state increased sending

Table 6: ATE of remittance on household welfare – Pooled data

	Log wealth Index Score			
Variables	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**
Parameter estimates for remittances				
SEX_migrant	-0.122	0.205		
Aage_migrant	0.102***	0.014		
EDUC_migrant	-0.005	0.027		
MemployST ATUS	1.246***	0.291		
AremitUSE_Agriculturalimplements	0.727**	0.298		
AremitUSE_Schoolfeesforchildre	0.584**	0.244		
States	-0.232	0.195		
Constant	-2.630***	0.326		
	Non-remittance household		**Remittance household**	
AFathers_EDUC	0.010*	0.005	0.021***	0.006
AMothers_EDUC	-0.004	0.005	-0.001	0.007
EDUC_migrant	0.013	0.020	-0.109**	0.055
income_agricwage2	0.084***	0.033	-0.001	0.048
dist_home_BANK	-0.004**	0.002	0.001	0.003
States	-0.120**	0.060	-0.024	0.085
Constant	0.926***	0.135	1.199***	0.346
TEOM	0.219	0.205	0.216	0.183
POMs on migration	1.021***	0.053	1.246***	0.152
ATE	0.225	0.160		
Test of endogeneity				
chi2(2)	2.58			
Prob > chi2	0.2757			

Source: Field survey, 2020 ***1%, **5, *10%

Table 6: ATE of remittance on household welfare in Anambra and Imo states

	Log wealth Index Score							
	ANAMBRA				IMO			
Variables	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**	**Coef.**	**R.S.E**
	Parameter estimates for remittances							
SEX_migrant	1.251***	0.376			-0.483*	0.256		
EDUC_migrant	0.042	0.033			-0.047	0.047		
MemployST ATUS	1.155***	0.293			1.913***	0.368		
Aage_migrant					0.096***	0.020		
remitUSE_Agriculturalimplements					1.312*	0.714		
remitUSE_Schoolfeesforchildre					-3.037***	0.228		
DUM_destination	1.074**	0.483						
No_migrants	0.792***	0.242						
Constant	3.341***	0.445			-3.037***	0.228		
	Non-remittance household		**Remittance household**		**Non-remittance household**		**Remittance household**	
Hhsize	-0.020	0.017	-0.100***	0.024	0.012	0.013	0.031**	0.014
Expenditure_ non_food	0.000***	0.000	0.000***	0.000	0.000	0.000	0.000***	0.000
dist_home_BANK	-0.012*	0.007	0.002	0.009	-0.009**	0.005	0.004	0.005
coop_HHH	0.371***	0.118	-0.112	0.765				
income_agricwage2	0.108**	0.054	0.137*	0.084				
dist_home_HOME	0.018	0.014	0.024***	0.010				
farmsize_Cass_HA	-0.012	0.106	-0.474***	0.108				
Fathers_EDUC					0.010	0.009	0.014**	0.007
No_migrants					0.007	0.058	-0.099***	0.036
Highest_income					-0.037	0.111	-0.307***	0.100
Constant	1.035***	0.164	1.284***	0.281	0.949***	0.150	0.425**	0.191
TEOM	0.052	0.157	-0.071	0.364	0.092	0.253	0.337*	0.187

POMs on migration	0.978***	0.045	1.024***	0.138	0.987***	0.073	0.956***	0.068
ATE	0.046	0.145			-0.031	0.098		
Test of endogeneity								
chi2(2)	0.16				3.43			
Prob > chi2	0.9234				0.1801			

Source: Field survey, 2020 ***1%, **5, *10%

remittance, unlike in Imo state, where sending remittances depends on being a female migrant. This corresponds with Adaawen and Owusu (2013) that sex determined the amount of money sent by migrant. However, Nwosu et al. (2012) observed that being male was a positive factor to remittance sending in Nigeria. Age of migrant was positively associated with remittance sending, meaning that youth advancing in age influenced remitting of the originating households. This matches with Eshetu and Beshir (2020). While sending remittance for school fees was negatively significant in Imo state, it was positive in the pooled data, indicating that in Imo state, sending remittance for paying of school fees discouraged migrants from sending remittance to the originating households. This finding corresponds with Pickbourn (2011). Again, number of migrants in a household and migrant destination influenced sending of remittances to the originating household by migrants in Anambra state, confirming that an additional number of migrants within household increased remittances sent to the originating households. Contrarily, Egger and Litchfield (2019) found no effect of sending a new migrant on the household welfare implying that there was no economic gain or loss for the household and at the same time, these migrants remit less or not at all compared to earlier waves of migrants. But Ackah and Medvedev (2010) observed the positive relationship between number of migrant and household welfare but under the condition that households has at least one migrant in urban areas. Also, migrant's destination being international increases remittance sending to the originating households in Anambra. This matches with Ajaero *et al.* (2018) that international migrant and receiving of remittances significantly increased household welfare in Nigeria.

Outcome parameters in Table 6 also shows that educational level of migrant was negatively correlated with wealth indicating that household welfare reduced as migrant educational level increased and vise versa. This finding contradicts other studies (Wadood and Hossain, 2016; Kangmennaang *et al*., 2017; Akanle and Adesina, 2017). Income from agricultural wages was significant and positive in both remittance and non-remittance household in Anambra state and non-remittance households in the pooled states, implying that as income from agricultural wages increases, household welfare increases as well. This matches with Inder *et al.* (2017). Distance from home to the major road was positive in the remittance household in Anambra state, implying that as distance from the major road increases, household welfare increases as well. Household welfare decreases along side with farm size of cassava in the remittance households of Anambra state, meaning that as farm size decreases, value of cassava harvested that could have been used to increase household welfare decreases as well. This is in line with Inder *et al.* (2017).

4.0 CONCLUSION AND RECOMMENDATION

This study focused on the effect of migration on crop productivity and household welfare as well as the effect of remittances on crop productivity and household welfare. Keeping other variables constant, remittance receiving households were better off when compared with non-remittance households with regards to improving crop productivity and household welfare in Imo state. But pooling the two states together, non-remittances households were better off in improving crop productivity while non-migrant households were better off in improving crop productivity in Anambra state. Notwithstanding, the ATE of remittances on crop productivity and migration on household welfare were significant, while ATE of migration on crop productivity and remittances on household welfare were insignificant in the study area. Explicitly, there was no difference between non-migrant and migrant households with respects to crop productivity, in other words; migration had no effect on cassava productivity. Furthermore, non-migrant households were better off compared to migrant households in improving household welfare in the pooled data. Thus, migration retards accumulation of wealth among migrant households in the study area. Furthermore, there was no significant difference between non-remittance receiving and remittance receiving households with regards to household welfare, meaning that remittances had no effect on accretion of wealth in Southeastern, Nigeria.

Since this is the case, it was recommended that youths be encouraged to stay in their originating households and be involved in agricultural production instead of migrating. Youths should be encouraged to form or belong to cooperatives and opportunities for training on proper agronomic practices to improve the overall efficiencies in agriculture should be provided. Again, access to agricultural inputs such as land, improved planting materials, fertilizer and herbicides should be improved.

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