Impacto de la membresía cooperativa en la generación de ingresos rurales en el suroeste de Nigeria

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Resumen. Este estudio examina el impacto de la membresía cooperativa en la generación de ingresos rurales. También analiza los factores que influyen en la participación en cooperativas entre los hogares rurales en el suroeste de Nigeria. El estudio fue diseñado para tener en cuenta el sesgo de selección en las organizaciones cooperativas. Se utilizaron datos de encuestas de hogares rurales y las estimaciones se basaron tanto en el modelo Probit como en el método de emparejamiento de puntaje de propensión no paramétrico. Los hallazgos muestran que los ingresos generados a través de la membresía cooperativa son aproximadamente un 10% más altos que los generados por los miembros no cooperativos. Las estimaciones empíricas de los determinantes de la membresía cooperativa indican que los años de educación, la edad y el tamaño de la tierra tienen una influencia significativa en la decisión de unirse a las cooperativas.
Palabras clave: Cooperativas; Pobreza; Evaluación de impacto; Rural; Emparejamiento de puntaje de propensión.
Claves Econlit: P13; O15; O18; D04.

[en] Impact of Cooperative Membership on Rural Income Generation in Southwest, Nigeria

Abstract. This study examines the impact of cooperative membership on rural income generation. It also analyzes the factors influencing participation in cooperatives among rural households in Southwest, Nigeria. The study was designed to account for selection bias into cooperative organizations. Rural household survey data were used and the estimates were based on both the Probit model and non-parametric propensity score matching method. The findings show that income generated through cooperative membership is approximately 10% higher than those generated by non-cooperative members. Empirical estimates of determinants of cooperative membership indicate that years of education, age and land size have significant influences on the decision to join cooperatives.
Keywords: Cooperatives; Poverty; Impact evaluation; Rural; Propensity score matching.

Summary. 1. Introduction. 2. Literature Review. 3. Methodology. 4. Results and discussion. 5. Conclusions. 6. References.

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1. Introduction

The income gap in rural communities is believed to have an adverse negative effect on the productivity and sustenance of the rural populace. Rural settings are generally characterized by a low level of production, poor infrastructure, lack of sufficient public goods, and undesirable livelihoods and living standards. In most developing nations, rural areas are marked by limited income generating activities with attendant effects on the general well-being of the poor. One of the suggested pathways to overcoming these challenges is the encouragement of institutional arrangement in form of cooperatives. These cooperative institutions are considered appropriate for advancing the socio-economic goals of their members (Getnet & Anullo, 2012). Existing studies suggest that cooperatives can help reduce market failures and improve access to financial resources without stringent interest rates or harsh conditions (Ma & Abdulai, 2016; Mojo, Fischer & Tegefa, 2017; Milovanovic & Smutka, 2018).

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Cooperatives are defined as the association of persons rather than capital characterized by the existence of common interests and goals among participants or members (Kryiakopoulos, Meulenberg & Nilsson, 2004). The motives for membership or participation may either be social, economic, or both. In most cases, the economic motive will likely dominate due to the mounting pressure in meeting human basic needs at both the individual and household levels. This motive seeks to enhance members' economic position within the society through the generation of additional income. Several activities could be rationalized for members of cooperatives which are generally limited at the individual level. First, there is a possibility of cost reduction through joint supply activities. Second, it is possible to increase revenues through joint marketing actions by cooperative members. Third, both cost reduction and revenue generating activities could be carried out by cooperatives (Chukwu, 1990; Sofoluwe, 2019). While some of these possibilities could be carried out at the individual level, the imports of such activities at joint levels are expected to be larger (Sofoluwe, 2019). Interests in cooperatives have significantly increased due to the additional benefits it offers like improved market participation by small-holders, as well as in income generation and poverty reduction (Sentime, 2019; Wanyama *et al*., 2015).

The Nigerian society is bedevilled with problems of unemployment, poverty and a widening gap between the rich and the poor. This income inequality is evident in the living standard of these classes of people, whether in the rural or urban communities (Dauda, 2016). The poor live below $1.25 per day with fettered access to life basic needs and lack access to important amenities like potable water, improved sanitation, qualitative health care and education. The possibility of reaching the Sustainable Development Goals (SDGs) has undoubtedly remained a myth. To overcome these challenges and lead a meaningful life, many Nigerians, both in the rural and urban centres have engaged in cooperative societies over the years. A study carried out by a development organization (EFInA) (2012) indicated that there were 82,460 cooperative societies, with 1.4 million members in 605 local government areas in Nigeria as of 2010.

This study examines the factors determining participation in cooperative groups and the direct contribution of such membership to income generation. A major thrust of government policies has been to raise the peoples' income levels especially those within poverty margins in the rural sector of the economy. Hence, by utilizing cross-section survey from rural communities in the Southwest geographical region of Nigeria, this study adopts a non-parametric approach of "propensity score matching" (PSM) to underscore the effect exerted by the membership of cooperative societies, given the increasing number of such organizations in Nigeria. The study contributes to the ongoing debates on the potential of cooperatives, as an economic and social institution, for increasing the wealth of rural dwellers through income accumulation. The study also aims at highlighting the scope for incorporating cooperative societies into income generating policies and priority settings of policy makers. Since income generation is an integral part of the poverty reduction strategy, adequate understanding of the effect of cooperative membership on income generation remains crucial.

The rest of the paper is organized into sections: Section 2 presents the review of literature on the relevance of cooperative society to development policy as well as cooperative and income-related outcomes. Section 3 presents the methods, including data sources and the study area. Section 4 shows the results and discussion, while section 5 reports the conclusion of the work.

2. Literature Review

2.1. Cooperatives in Nigeria

The cooperative movement in Nigeria has grown in size over the years. As of 2002, there were more than thirty-six thousand cooperatives (FMA&RD, 2002) which grew to about 82, 460 cooperatives in 2010 (EFInA, 2012). With more than half (50.48%) of the Nigerian populace being classified as a rural population up till 2017 (The World Bank, 2019), the development of rural centres through cooperation is of significant interest to Nigerian policy. The government of Nigeria through its Department of Cooperatives (DRC) have placed great emphasis on promoting the welfare of rural dwellers through cooperative organizations. Cooperatives have since become popular across geographical entities in Nigeria. The dual form of cooperative as both the social and economic organizations increases its potential as a great source of help to the poor (Othman *et al*., 2012). Despite the proliferation of cooperatives in Nigeria, it is not clear whether or not cooperative membership contributes to the income generation of the rural poor. A disproportionately large number of the Nigerian population still live in abject poverty, with the poverty index rising from 46.3% in 1985 to 69.3% in 2010. The majority of Nigerians still live on less than one dollar a day despite the nations' estimated GDP at $86 billion in 2010 and $521.8 billion in 2013 respectively (The World Bank, 2015). Also, income inequality and unemployment in Nigeria are sources of concern for the well-being of the majority of the people in the country. The inequality level increased from 44.7 per cent in 1985 to 50.3

per cent in 1990. Although, it reduces insignificantly to 44.8 per cent and 40 per cent in the year 2000 and 2011 respectively (World Inequality Database, 2014), the level of unemployment in Nigeria revolves around 21% to 24% between 2010 and 2014 (NBS, 2014).

Cooperative organizations in Nigeria owed their existence to the colonial era. The prospect of cooperative establishment in the country was first accepted in 1935 following the submission of Mr C.F. Strickland report. Consequently, a pioneer cooperative federation of Nigeria (CFN) was formed in 1945, and duly registered in 1967 (Kareem *et al.*, 2012). The subsequent success of a cooperative organization in Nigeria thrived on a traditional savings and loans system that provides an easy and accessible platform for financial access in rural areas. The pattern of cooperative operations in Nigeria was similar and comparable to most African countries. In most developing countries within the African continent, cooperative models of development were introduced by the colonialists to facilitate the growth and export of agricultural products. Subsequently, local authorities sustained the cooperative model to implement developmental agenda, especially, for input distributions and marketing of agricultural commodities. Following these periods, the outcome of globalization and liberation policies resulted in the evolution of cooperation organizations in several rural communities in Africa. However, government interventions, weak management, mistrust as well as poor regulations led to the failures of many rural cooperatives (Hannan, 2014).

At independence, most African nations formed cooperative policies and legal frameworks that enable direct management of cooperatives affairs. Ministries and departments were set up to manage cooperative affairs. Cooperatives became the sole agents of Government marketing boards responsible for processing, marketing and export of agricultural produce (Develtere, 2008). Poverty alleviating policies including credit administration were subsequently administered through cooperative societies. Through this, cooperatives enjoyed the monopolistic advantage of trade which made it compulsory for producers and traders (especially farmers and produce marketers) to join. However, the emerging market liberalization of the time brought an end to the monopoly status already enjoyed by the cooperatives (Wanyama, Develtere & Pollet, 2008).

Currently, cooperatives in the Nigerian rural settings are of greater interests to women. Rural cooperatives in the country could be categorized into two: agricultural and non-agricultural cooperatives. The agricultural cooperatives exist in various forms such as farmers' multi-purpose cooperatives, producers' cooperatives, marketing and processing cooperatives, agricultural credit and rural banking cooperatives. The existing forms in the non-agricultural groups include thrift and credit cooperatives, investment and credit cooperatives, consumers' cooperatives, artisans and handicraft cooperatives (Nnadozie et al., 2015).

2.2. Role of cooperatives in rural poverty reduction

A considerable body of literature has shown interest in the role of cooperative in rural poverty reduction across different geographical entities. More importantly, membership in cooperatives has been linked to various dimensions of assets and capital measurement (Verhofstadt & Maertens, 2015; Hellin, Lundy & Meijer, 2009). Specifically, on the importance of cooperatives, several studies indicate a positive effect of cooperatives on income and total revenues as well as poverty of rural people (Tilahun *et al.*, 2016; Getnet & Anullo, 2012; Ghosh & Maharjan, 2011; Allahdadi, 2011). The gain in livelihood assets especially, in household capital and income gain has been reported by Gandhi and Marsh (2003) as part of the positive effects of cooperative membership. Their study affirms the relevance of institutional tools such as cooperative in helping the poor. This finding suggests a number of possibilities. Most important of these possibilities are that participation in cooperatives could lead to (1) asset acquisition (2) capital build-up (3) improved livelihood (4) income generation (5) increase in revenue and (6) reduced poverty. But, these shreds of evidence could not be generalized especially, within rural areas (FAO, 2014).

Ito, Bao and Su (2012) contend that cooperative benefits are skewed to favour wealthy individuals. These studies indicate that while acknowledging the perceived impact of cooperative organizations on individual economic life, the real impact of cooperative could be relative. Hence, further studies are needed to provide an adequate measure of the impact of such organizations on rural dwellers. In some studies, expected benefits from cooperative were found to be exclusive to the rich leaving aside the vulnerable in the societies. Yet, others found that the poor and the wealthy are excluded; only the middle-class benefits from cooperatives (Fischer & Qaim, 2012). By implication, earlier findings that poor people may not benefit are not true in all cases. Thus, the impact of cooperative could then be considered as being social class-specific. Other studies found that cooperative societies have little relations to small holder support despite being able to obtain higher prices for rural producers (Bernard, Taffesse & Gabre-Madhin, 2008). Results from endogenous switching regression obtained by Ma and Abdullai (2016) however, suggest a positive effect of cooperation on net returns and yields of Chinese farmers.

Farmers in rural areas are found to gain extensively from cooperative impact especially in the areas of input provision, transportation and marketing of agricultural commodities. From the rural farmers' perspective, cooperative membership has been significantly linked to the adoption of improved technology, seeds, fertilizer and pesticides in countries like Ethiopia and Rwanda (Abebaw & Haile, 2013). Since most

developing countries have a significant portion of their population in the rural areas where agriculture usually predominates, the provision of productivity enhancing inputs is crucial. Cooperatives have also been linked to cost-saving through labour substitution (Milovanovic & Smutka, 2018). Labour exchanges are found to be common among rural people whereby specific tasks of individuals are accomplished through the support provided by neighbours at no monetary cost.

Various studies have identified some factors associated with cooperative inclusion by members across cultural settings and boundaries. Some of these factors include social and human capital (Bhukuth, Roumane & Terrany, 2018; Agusalim, Karim & Yaddarabullah, 2019; Hellin *et al*., 2009), cultural factors (Gijselinckx & Bussels, 2014), age and occupation (Othman *et al*., 2012), education, family size, land size and access (Mojo, Fischer & Degefa, 2017). Nonetheless, the relevance of the studies conducted outside Nigeria and their relations to the Nigerian situation may be difficult largely due to several social, economic and institutional constraints affecting development in the country.

3. Methodology

This study used primary data collected from the rural communities in collaboration with the Rural Development Agency (RuDeP) in two clusters (groups) of seven Nigerian villages. Multi-stage sampling was employed to select 735 respondents. However, information relevant to the study was obtained from 589 respondents. Out of these, 397 respondents belong to at least a cooperative group while 192 respondents are not members of any cooperative organization. Some of the villages studied (Afon, Idi-Odan, Asaobi, Ayetoro, Ifewara, Oke-Ila, Ifewara and Abalota) are situated in Osun State, South-western region of Nigeria, while the remaining villages studied (Afao, Igemo, Ijero, Ifelodun, Erio, and Ikoro) are located in Ekiti State, Nigeria. The study areas were purposively selected using developmental intervention criteria. All the sampled regions relied on agricultural economies involving different aspects of agricultural commodities and activities. We sought information about the existing cooperative organizations in the study area from which the contacts of the cooperative members were obtained. With the aid of the cooperative officers in the selected communities, consent of most of the members was obtained for the study. Consequently, non-cooperative members in each of the sampled communities were randomly sampled.

The total sample size comprised both cooperative and non-cooperative members. The outcome variable- rural income- is measured as the total net income of the respondents, representing all monetary income (agricultural and off farm), and other incomes received in kind by the respondents at household levels. Data were also collected on factors influencing participation in addition to the socio-economic attributes of the sample. Data collection was conducted between July and September, 2018 with the use of structured questionnaire, personal interview and Focus Group Discussion (FGD). Socio economic characteristics were analysed with descriptive statistics (frequency and percentages); while the factors influencing cooperative membership and impact analysis were carried out through the probit model (with marginal effect), and propensity score matching method, respectively. The empirical model of the study and strategy employed in the estimation are presented in the next section.

3.1. The propensity score matching method

The propensity score method was chosen to overcome participation bias often associated with group related activities. Any of the bias may confound the observed effect of participation on social or economic related outcomes that are related to individuals', communities' or groups' livelihood. For instance, clear differences are usually observed between members and non-members of cooperative societies, in terms of individual and/or household observable characteristics. These differences may exert a significant influence on income accumulation. Consequently, an observed difference between participants and non-participants in cooperative may originally be due to this participation advantage, rather than what the cooperative itself is capable of doing. On the other hand, there is a possibility of bias from unobservable characteristics or peculiarities of the individual or community. The existence of cooperative in a vibrant community or local setting may be driven by dynamic rural leaders with sufficient linkage to external structural opportunities. This may impact the observed success of cooperative participation. For a member of such a cooperative in an influential community, perceived advantages may be due to external advantages that are exclusive to the cooperative itself. This kind of bias is not usually resolved by an instrumental variable method.

To understand the impact of cooperative on members' income by avoiding the identified biases, the researchers employed propensity score matching (PSM). The method is widely used in the literature on cooperative evaluation and income-related studies in rural areas (Verhofstadt and Maertens, 2015; Bernard et al., 2008). The PSM model helps to construct a statistical comparison group that is based on

the probability of participation in a cooperative society. Consequently, members of cooperative groups are matched with non-members based on individual and socio-economic characteristics.

The impact exerted by cooperative is then estimated as the difference of mean income and poverty across the comparison groups.

Explicitly, the researchers estimated the propensity score in terms of probability of membership in a cooperative (E) using a probit model that includes several conditioning variables (X) that are likely to explain membership behaviour and non-random distribution of participation among the sampled population. The main parameter of interest in PSM is the average treatment effect on the treated (ATT) for the treated (members/participants) population. Hence, the non-parametric model of PSM is presented as:

$$Y = P(D = 1|X) \tag{1}$$
$$= E(Y_1 - Y_0|D = 1) = E(Y_1|D = 1) - E(Y_0|D = 1) \tag{2}$$

Y_1 represents the value of the outcome when an individual becomes a member of a cooperative society (1); Y_0 denotes the value of the same outcome when an individual is not a member of a cooperative society (0). The bias of non-observation is because $E(Y_1|D = 1)$ can be estimated, while $E(Y_0|D = 1)$ cannot. Since PSM could be sensitive to specification and methods of matching, different types of matching method exist. These include nearest neighbour, radius caliper and kernel matching (Dehejia & Wahba, 2002; Imbens 2004; Caliendo & Kopeinig, 2008). In nearest neighbour matching, a case in the control group is matched to a treated case based on the closest propensity score. Kernel matching uses a weighted average of all cases in the control group to estimate counterfactual outcomes. The weight is calculated by the propensity score distance between a treatment case and all control cases. The closest control cases are given the greatest weight. The radius caliper uses a tolerance level on the maximum propensity score distance (caliper) to avoid bad matches (Dehejia & Wahba, 2002). Estimation of the PSM parameter of interest (ATT) relies on key assumptions of conditional independence assumption (CIA) and the assumption of common support. The former is based on the assumption that selection into the treatment group is based on observable characteristics. The common support is the area where the balancing score has positive density for both the treatment and control units (Sofoluwe, Tijani & Ogundari, 2012). In this study, nearest neighbour and caliper matching are found to be more appropriate.

3.2. The probit method

The probit model is used to explain the behaviour of the dependent variable that is dichotomous. Based on normality assumption, the probability estimate in the probit model is based on cumulative distribution function (CDF) (Gujarati & Sangeetha, 2007), and is computed as:

$$P_i = P\left(Y = \frac{1}{X}\right) \tag{3}$$
$$= p(I^*_i < \overset{A}{=} I_i) \tag{4}$$
$$= p(G_i < B_1 + B_2 X_i) \tag{5}$$
$$= p(B_1 + B_2 X_i) \tag{6}$$

where I^* denotes the threshold level of the probability index; if I_i is greater than I^*, an individual is a member of a cooperative society and vice versa. P is the probability that an individual becomes a member of a cooperative society. Given the values of X, such that G_i is the normal study variable and B is the parameter to be estimated, the study's probit model could then be defined as:

$$= P_r\left(Y = \frac{1}{X}\right) = \varphi(xb) \tag{7}$$

φ denotes the standard cumulative distribution under normal probability assumption while xb is the probit index. Implicitly, the model of cooperative membership is stated as:

$$P_i = f(X_1 \ldots X_n) \tag{8}$$

In explicit term, the model is specified as:

$$P_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \beta_8 X_{8i} + \beta_9 X_{9i} + \beta_{10} X_{10i} + \epsilon_i$$
$$\tag{9}$$

P represents the status of respondents concerning cooperative membership and is a dependent variable of the probit model. Other variables are as described in Table 1. A priori expectation of the study variables follows extant literature. Age is expected to exert either a positive or negative effect on the dependent variable. Studies including Tilahun *et al.* (2016) found a positive effect of age on the decision to participate in cooperatives, indicating that older people are more likely to participate. However, Ma and Abdulai (2016) reported negative effect suggesting that younger people are more likely to participate. Hence, the influence of age is mixed. Generally, the age of individuals could affect their attitude to new ideas, risks and unfamiliar income-generating activities. Sofoluwe (2011) found older people to be more experienced with trying new possibilities. But, younger people may be more willing to adopt new ideas that are likely to generate better income. Thus, the variation in the mental attitude of the young and the old individuals may have resulted in mixed findings in the literature.

In rural settings, differences in gender role affect their decision-making process. Although systematic gender differences are observed in most rural areas, women have been found to take more socially oriented decisions (Sofoluwe, 2015). Hence, the effect of gender is mixed. Marital status was hypothesized to have either positive or negative sign. Abebaw and Haile (2013) reported positive sign, while Mojo *et al.* (2015) found its effect to be negative. Household size could also exert either positive or negative signs following the studies carried out by Bernard and Spielman (2009). Education and land size are hypothesized to have a positive sign. The data for the descriptive statistics, probit and propensity score matching (PSM) analysis were analysed using STATA 13.

Table. 1. Description and measurement with a priori expectation of the variables

Variable	Description	Measurement	A *priori*
Dependent variable			
P_i = Coop member	Status of membership	Dummy (1= member; 0 = non member)	
Independent variables			
X_1 = Age	Age of respondents	Years	+/-
X_2 = Gender	Sex of respondents	Dichotomous (male =1; female = 0)	+/-
Marital status	Current status of marriage	Continuous	+/-
Household size	Household size	Number of people residing under the same roof	+/-
Education	Years of education	Years	+
Land size	Size of land used for rural occupation	Hectares (ha)	+
Experience	Occupational experience	Years	+
Credit	Access to credit	Dichotomous (1= Yes; No = 2)	

Source: Authors' computation, 2020

4. Results and discussion

4.1. Socio-economic characteristics of respondents

Socio economic characteristics of respondents across cooperative and non-cooperative members are shown in Table 2 below. Across groups, most respondents were above 40 years of age, suggesting that cooperative membership is more appealing to adults. The results show that none of the cooperative sample (0%) is less than or equal to 30 years of age. The percentage age distribution between 31 and 40 years is approximately 5% for cooperative groups. Respondents within the age bracket of 41 and 50 years are 19.2%. However, a substantial increase in percentage age distribution is observed after 50 years of age. For example, there are 31.4% between the age bracket of 51 and 60 years; while 34.5% are within the age bracket 61 and 70 years. Lower percentage (10.2%) is observed for respondents above 70 years. This result indicates that younger people are less interested in cooperative organizations. However, the percentage age distribution of cooperative members is higher from 50 years and above. This result suggests that cooperatives are not popular among younger people. Most participants in FGD gave different reasons why cooperative organizations are not dominated by younger people in rural

areas. The participants discussed youth attitude to living in rural communities. They highlighted rural-urban migration, youth orientation, occupational shift and awareness as reasons for age disparity in cooperative composition. Participants within the age group 51-60 years noted that youth migration from rural communities to urban areas affected composition of cooperative groups.

> "Our youths and younger people consider rural life as boring. Some of them move to cities looking for modern life. Those of us here do not have the energy to do much work on the farm, so we come together to pool our meagre resources together for survival in our occupation" (Male, 51-60 years).

Youth orientation was cited as one of the reasons for the observed age composition of cooperative organizations in rural communities. Some participants mentioned the quest for quick wealth as part of the reasons for age disparity in cooperative composition in rural areas. Hence, the participants underscored impatience among most rural youths.

> "Nowadays, our young ones want quick money that can meet all their needs at once. Youths want cars, big houses, enjoyment and a special lifestyle we do not consider too important. But, cooperative funds are primarily for empowerment which can help build a strong financial base for desirable lifestyle" (female, 51-60 years).

For both groups, the gender distribution is skewed in favour of female. There are more female (72.2%) than male (27.8%). Rural–urban migration of male youths to cities, as expressed in the FGD, could be one of the reasons for the gender imbalance in cooperative composition. Majority of respondents (above 70%) from both comparison groups had household sizes ranging between 3 and 7 respectively. Education appears to be the greatest constraint of cooperative members as a larger percentage (61.2%) had no formal education. Land size ownership also varied among the studied respondents. A higher percentage of non-cooperative members (78.5%) had land size below five (5) hectares of land. However, the percentage of cooperative members with land size in the range of 5 and 10 was higher (30.6%) than non-cooperative members (20.0%). Also, more cooperative members had land size above ten (10) hectares compared to non-cooperative members. The income distribution of respondents across groups showed differences in income levels between cooperative members and non-cooperative members. Results show that at a higher level of income, cooperative members earn better than non-cooperative members.

Table. 2. Socio-economic characteristics of respondents

	Cooperative members (%)	Non cooperative members (%)
Age (years)		
<=30	-	5
31-40	4.7	10
41-50	19.2	27
51-60	31.4	26
61-70	34.5	24
Above 70	10.2	8
Gender		
Female	72.2	78.0
Male	27.8	22.0
Household size (number)		
<= 2	0.8	-
3-7	71.0	74
8-12	25.9	15
Above 13	2.4	11
Years of education (years)		
No formal education	61.2	50
6	24.7	29
11	7.8	16
15	6.3	5
Land size (ha)		
<= 5.00	47.5	78.5
5.01-10.00	30.6	20.0
10.01-15.00	17.3	1.5
15.01 and above	4.7	-

Income (₦)*

<=500000	35.3	69.0
500000-1m*	34.9	28.5
1m-1.5m	20.4	2.5
1.5m-2m	7.1	0.0
>2m	2.4	0.0

*₦360 = 1$; m= million; .5m = 500000

Source: Field Survey, 2018

   Table 3 below presents a correlation analysis of the study variables. The results show that none of the variables is highly correlated, suggesting the possible absence of multi-collinearity of the study variables. Socio-economic variables of age, education, and land size are positively correlated with cooperative membership. The correlation coefficient between cooperative membership and age is positive, suggesting the older an individual becomes, the higher the possibility of participating in cooperative membership. A similar trend is observed for education and land size, indicating a positive relationship with cooperative membership.
   Meanwhile, household size and credit access revealed a negative correlation. The correlation coefficient between household size and cooperative membership is negative 0.09, suggesting the higher the household size, the lower the possibility of cooperative membership and household size. But, the value of the correlation coefficient between household size and cooperative membership is low. The correlation between credit access and cooperative membership follows a similar pattern. However, the relationship of variables in correlation analysis is generally symmetrical, hence, inferential deductions cannot be made.

Table. 3. Correlation of the study variables*

	Coop member	Age	Gender	Marital	Household size	Education	Land size	Experience	Credit
Coop member	1								
Age	0.23*	1							
Gender	-0.06	0.01	1						
Marital	0.09	0.29*	0.03	1					
Household size	-0.09*	0.65*	-0.21*	0.145*	1				
Education	0.09*	0.01	0.38*	0.00	0.11*	1			
Land size	0.37*	0.69*	-0.28*	0.16*	0.530*	-0.26*	1		
Experience	0.04	0.85*	-0.09	0.211*	0.717*	-0.07	0.73*	1	
Credit	-0.18*	0.05	-0.050	0.048	0.108*	-0.05	0.09*	0.09*	1

*significant

Source: Data Analysis, 2019

4.2. Determinants of participation in cooperative organization

The parameter estimate of the probit model is presented in Table 4 below. The diagnostic parameters including Log-likelihood, LR chi-squared and Pseudo R^2 suggest the overall fit of the specification. This indicates that the included variables in the model are good predictors of the probability of participation in the cooperative organization by individuals. Age is found to be significantly (5%) related to the probability of being a member of a cooperative organization. The positive sign of the parameter indicates that older individuals are more likely to participate in cooperative than younger ones. The marginal effect estimate suggests that as individuals grow older, the probability of participating in cooperative would increase by 1%. Membership in the cooperative society is significantly influenced by household size inversely. The negative sign suggests that members with smaller household size are more likely to participate in cooperative within the rural areas. Education proves to be a highly significant factor in deciding to be a member of a cooperative society. As a tool of enlightenment, information and awareness, an increase in years of schooling is related (5%) to the likelihood of being a member of cooperative societies. The Size of land holdings shows a positive and significant effect on the likelihood of cooperative membership, suggesting that an increase in access to land for agricultural activities is likely to increase the possibility of participation in cooperative organizations.
   The coefficient of experience exerts a positive and significant ($P < 0.05$) effect on the likelihood of cooperative membership. The results suggest that the higher the level of experience of individuals in

rural settings, the higher the likelihood of participation in cooperative organizations. Also, access to credit is positively and significantly (5%) related to the probability of joining cooperative organizations in rural areas. Thus, as people gain increasing access to credit through cooperatives, the likelihood of participation in cooperative increases.

Table. 4. Determinants of participation in cooperative organization

Variable	Coefficient	t-value	Marginal effect
Age	0.027	2.42*	0.01
Gender	-0.402	-1.91	-0.151
Marital	0.354	1.18	0.134
Household size	-0.394	-8.30*	-0.149
School years	0.131	7.01*	0.049
Land size	0.451	8.02*	0.170
Experience	0.253	3.61*	0.151
Credit	0.348	2.63*	0.149
Constant	-1.92	-2.93*	

Log-likelihood = -199.522; LR Chi-squared = 225.06; prob>chi2 = 0.000; Pseudo R2 = 0.3606
*significant at 5%

Source: Data Analysis, 2019

4.3. Estimated impact of cooperative membership

Estimates of impact through the matching approach are presented in Table 5 below. The effect of cooperative membership on rural income is estimated using two different methods: Nearest neighbour and Caliper matching. To ensure the elimination of potential bias in the estimate, the researchers impose common support and set balancing property (See Fig. 1 below). Both the common support and the balancing property were satisfied at a 5% level of significance. The inclusion of common support in the 'nearest neighbour' matching led to a loss of 36 non-participants and 91 participants in the cooperative. Following this, the characteristics between the two groups of comparison were balanced. Consequently, the estimation was carried out in the region of common support between members and non-members of cooperative organizations. The estimated income generated by participants in cooperative was ₦519, 756.098 ($1443.77) while that of non-cooperative members was ₦470, 317.07 ($1306.44).

The results based on nearest neighbour matching, show that the causal effect of membership of cooperative organization on income is statistically significant (5%) and approximately equal to ₦49439.03 ($137.33). The value represents the mean difference between the total incomes of similar pairs of individuals with different cooperative membership status. This implies that income generated through cooperative membership is approximately 10% higher than income generated by non-cooperative members using the nearest neighbour matching approach. The estimated result from Caliper returns a positive difference of 4.4% between participants and non-participants in the cooperative. The difference between the two methods is due to matching with replacement involved in Caliper approach. Though both results are positive, the nearest neighbour approach was adopted for interpretation because of its lower value of standard error. The positive difference between the two groups suggests that the vulnerable in rural areas may be better off by joining a cooperative organization. An expanded income level by any margin could offset any unit of household expenditure thereby improving the economic status.

Table. 5. Estimated effect of cooperative membership on rural income

Outcome		Nearest neighbour	Caliper
Income (₦) (₦360 = 1$)	ATT	49,439.024**	24,151.899*
	Standard error	21,406.784	19,565.371
	Treated	519,756.098	555,189.873
	Control	470,317.073	531,037.975

**significant at 5%

Source: Data Analysis, 2019
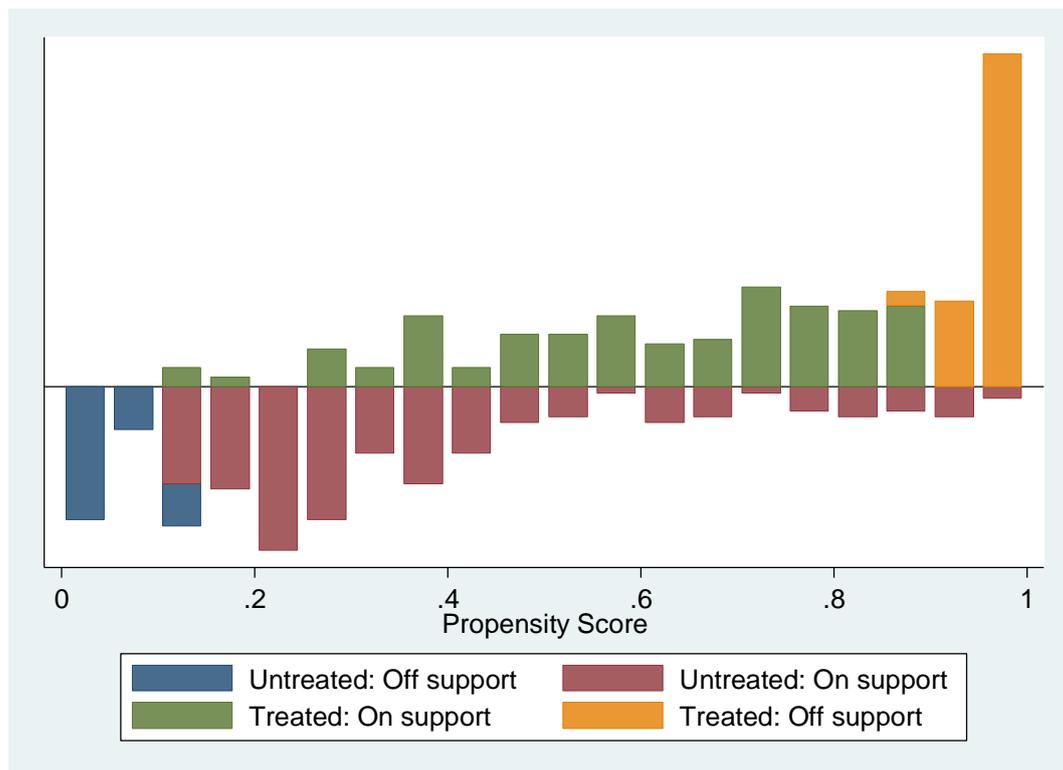
Figure. 1. Effect of cooperative membership

5. Conclusions

Most of the poor people in rural communities thrive on mutual assistance and self-help from rural-based organizations to improve their economic status. The most prevalent self-help group in these settings is cooperative organizations of different classes. An important strategy of cooperatives is the pooling together of members' resources and distributing the benefits widely among members. Despite the expected benefits from being a member of cooperatives, several rural dwellers survive on self-initiatives devoid of cooperative support. As income is critical to reducing the poverty margin among rural dwellers in addition to food support from subsistence farming activities, understanding the impact of cooperative membership on the income of poor rural dwellers is of significant consideration. The study focused on the pathways to poverty reduction through the benefits inherent in cooperative organizations. The impact evaluation process is complex and any observed benefit could be due to several confounding factors. Thus, the study adopted a non-parametric impact evaluation model- propensity score matching- to isolate the effect of cooperative membership on the income of the rural poor. Before this, factors influencing rural dwellers in seeking cooperative membership were evaluated using the probit model.

Age, family size (number of people in a household), years of schooling, and size of landholding (a critical asset in rural areas) have a significant influence on rural dwellers' decision to be cooperative members. As individuals grow older, the energy level will reduce but the desire to seek supporting sources of income grows, hence, the relevance of age to cooperative membership decision. Education which allows for information, awareness and opportunities, also plays a significant role in deciding to join cooperatives.

Based on the results from the propensity score matching method, participation in cooperatives has significant potential to address poverty concerns among rural people. While the margin of income support is found to be marginal, the positive outlook offers significant encouragement. Hence, cooperatives can be considered as one of the means of supporting the rural community by enhancing improved access to social capital. The findings indicate that accumulation of wealth (income) through cooperatives, can simplify future actions toward reduction of rural poverty. The policy implication is that the growth of cooperatives in rural communities requires adequate support, to broaden the observed benefit on the people. Since the nature of poverty is multidimensional, it is important to grow institutions that provide support to poor people while harnessing other support services to alleviate poverty.

Furthermore, the findings of the study suggest that policymakers in the field of rural development and social change should consider rural development plans using rural-based self-help organizations.

This will enable them to channel limited resources towards optimal use particularly, among the vulnerable groups in the rural communities. The utilization of funds by development support organizations can also be made effective through cooperative pathways.

Overall, the study indicates the possibility of broadening the scope of cooperative organization in driving anti-poverty strategies within rural areas. Important and effective poverty alleviation policies should focus not only on the demographic characteristics of the rural dwellers, but also, on their income generating activities. Since cooperatives appeal more to older people within rural communities than younger ones, there is a need for increased awareness on cooperative processes to boost participation and improve cooperative benefits. The benefits that are provided through cooperatives are capable of improving the livelihood of poor people in the rural areas. However, the findings suggest the need for further efforts toward enhancing the positive performance of cooperatives operating in rural communities.

Declaration of interest
There is no conflict of interest in this study.

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