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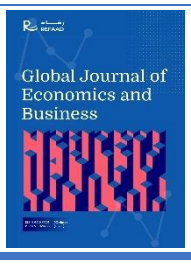

Economic Analysis of the Effect of Social Capital on Food Security Status of Micro-Credit Households in Ekiti State Nigeria

التحليل الاقتصادي لتأثير رأس المال الاجتماعي على حالة الأمن الغذائي للأسر التي تتقدم للقروض الصغيرة في ولاية إيكيتي-نيجيريا

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Abstract:
This study examined the effects of social capital on food security status of microcredit households in Ekiti-state, Nigeria. Multi-stage sampling procedure was used in selecting the sample for the study. The data for the study were collected by using a well-structured questionnaire from three hundred and eighty-six microcredit households in Ekiti-state. The data were analysed using descriptive, Foster, Greer and Thorbecke measure and probit regression model. The result showed that the average age of the sampled heads of households was 47.3years. Average years of formal education and size of households in the study area were about 6.8 years and 7 persons respectively. The results of the social capital dimensions in the study area showed that the average membership density index was 37.25% while decision making participation index was 61.44%. Heterogeneity and meeting attendance indices were 52.89% and 45.02% respectively. Cash and labour indices were 40.42% and 21.18% respectively. The mean social capital value was 12.10%. The results of the probit regression showed that age, age squared, household size, occupation, years of formal education, membership density, decision making participation, meeting attendance and heterogeneity indices of households significantly influenced food security. The use of instrumental variables led to an increase in the value of adjusted R^2 from 0.3760 to 0.3996 relative to the use of the real social capital index. It is recommended that policy that will make households (particularly food insecure ones) participate in associations should be formulated.

Keywords: *Ekiti state; Food security; Instrumental variable; Nigeria; Social capital.*

الملخص:
تفحصت هذه الدراسة آثار رأس المال الاجتماعي على حالة الأمن الغذائي للأسر التي تتقدم للقروض الصغيرة في ولاية إيكيتي، نيجيريا. فتم أخذ العينات متعدد المراحل في اختيار عينة الدراسة. تم جمع البيانات الخاصة بالدراسة باستخدام استبيان جيد التنظيم من ثلاثمائة وستة وثمانين أسرة قروض متناهية الصغر في ولاية إكيتي. وتم تحليل البيانات باستخدام مقياس فوستر وجرير وثوربيك الوصفي ونموذج الانحدار الاحتمالي. وحيث بلغ متوسط سنوات التعليم الرسمي وحجم الأسر في منطقة الدراسة حوالي 6.8 سنة و 7 أفراد على التوالي. فأظهرت نتائج أبعاد رأس المال الاجتماعي بمنطقة الدراسة أن متوسط مؤشر كثافة العضوية بلغ 37.25% بينما بلغ مؤشر المشاركة في صنع القرار 61.44%. فبلغ مؤشرًا عدم التجانس وحضور الاجتماعات 52.89% و 45.02% على التوالي. وبلغت مؤشرات النقد والعمالة 40.42% و 21.18% على التوالي. وبلغ متوسط قيمة رأس المال الاجتماعي 12.10%. فأظهرت نتائج الانحدار التحليلي أن العمر ومربع العمر وحجم الأسرة والمهنة وسنوات التعليم الرسمي وكثافة العضوية والمشاركة في صنع القرار وحضور الاجتماعات ومؤشرات عدم التجانس للأسر أثرت بشكل كبير على الأمن الغذائي. وأدى استخدام المتغيرات الآلية إلى زيادة قيمة $R^{\wedge 2}$ المعدلة من 0.3760 إلى 0.3996 بالنسبة إلى استخدام مؤشر رأس المال الاجتماعي الحقيقي. ويوصى بصياغة السياسة التي ستجعل الأسر (خاصة تلك التي تعاني من انعدام الأمن الغذائي) تشارك في الجمعيات.

الكلمات المفتاحية: *ولاية إكيتي؛ الأمن الغذائي؛ المتغير الآلي؛ نيجيريا؛ رأس المال الاجتماعي.*

Introduction:

Food insecurity ranks high among the challenges of the developing countries including Nigeria. It is an important component of the well-being of any household. The crucial role that food security plays in the well-being of households made it to attract the attention of researchers, government and non-governmental organizations (NGOs). Food insecurity exists when people lack access to sufficient amount of safe and nutritious food for normal growth, development and active and healthy life (Aworh, 2010). Food insecurity according to Amos (2018) is characterised by fear of starvation or hunger. Food insecurity in Nigeria is more of a rural phenomenon Obayelu and Orosile (2015). The food and Agricultural Organization (FAO) (2017) in its Global Hunger Index (GHI) assessment reported that 13 million Nigerians were experiencing severe hunger. According to Amos (2018), out of the 21.6 million under-nourished people in West Africa, 60% are from Nigeria.

Food insecurity by rural households can be traced to their major engagement in agriculture which is characterized by risks and poor access to resources. Their exposure to risks and poor access to resources in turn would affect their access to food either through own-produced or market purchases. In order to reduce the risks (production and market) and poor access to resources faced by households. Food insecurity reduction is a goal being pursued globally. To this end, millennium development goal (MDG) number 2 which aimed at halving number of hungry people by year 2015 was launched at the world leaders' summit in 1996.

As part of the efforts to achieve the No 2 MDG, Amos (2018) noted that Nigeria keyed into some interventions such as coalition for African Rice Development (CARD), African Region Nutritional Strategy (ARNS), multi-national NERICA Rice Dissemination Project (MNRDP), ECOWAS Zero hunger initiative (EZHI), among others. Nonetheless, food insecurity still persists even at the turn of the year 2015. The persistence of food insecurity led to the launch of the Sustainable Development Goals (SDGs) which is a renewed effort to continue the war against food insecurity. The SDGs like the MDGs has its second mandate geared towards mopping up the MDGs left-over hunger tolls by the year 2030. Some important components of the SDGs that relate to food insecurity include eliminating multiple deprivations, vulnerability reduction in terms of experience of shocks and sustainable social protection (Azeem, 2016).

To achieve the foregoing components of the SDGs, governments need to emphasize institutional development that facilitates social organization at the local level which serves as a channel for the delivery of support to the hungry. In line with the foregoing, Tabi (2009) viewed that the absence of social capital suggests one of the critical challenges to economic development such as food insecurity. Thus, a policy that aims at tackling an economic development challenge such as food insecurity should be all-inclusive or participatory. Making a policy participatory allows the people to pool resources in their groups, take part in decision making process as well as having benefits and cost that arise therefrom. Thus, as a radical departure from business as usual, Adepoju and Oni (2013) suggest the use of social network whose effects increased availability of information at lower cost, facilitation of collective decision/actions and reduced opportunistic behaviour by group members.

Conceptual Framework & Literature Review:

Previous studies on social capital (Ajani & Tijani 2009; Kangogo, Lagat & Ithinji 2013; Balogun & Yusuf 2011) have adopted the dimensional approach to measure social capital by using six dimensions of social capital. These six dimensions of social capital (membership density, decision making, heterogeneity, meeting, cash and labour dimension indices) co-exist in an association and complement each other, but their levels may be different leading to different outcomes as a result (Njuki *et al*., 2008).

Practically, social capital facilitates coordination and cooperation for the mutual benefit of the members of the association, physical availability, access and utilization of food by households and communities can be enhanced by collectively sharing information and resources (Balogun & Yusuf, 2011). Also, during times of stress or shock, social capital manifested by kinship ties, community solidarity and access to external works play roles in facilitating access to food for the households that possess it (Haroon, 2009). Dzanja, Christie, Fazey & Hyde (2015) posit that social capital reduces social exclusion which is a feature of poverty that is intractably woven to food insecurity. Despite the claim that social capital can reduce food insecurity, yet studies that had examined this claim are scarce. Ideally, policy that aims at tackling an economic development challenge such as food insecurity should be all-inclusive or participatory. Making a policy participatory allows the people to pool resources in their groups, take part in decision making process as well as bearing benefits and cost that arise therefrom. It has been acknowledged that involving the stakeholders in the planning of the food insecurity reduction programmes has the merits of reducing some cultural, social, political and economic barriers that weaken their social connectedness.

Again, previous studies that concluded that social capital is associated with positive welfare outcomes had been criticized on the grounds of self-selection of samples and simultaneity. For instance, Ted (2006) raised suspicion that many existing empirical estimates of the effect of social capital are biased unless they are corrected for endogeneity. The results showed that bonding social capital had a positive and significant impact on commercialization of maize. Ajani and Tijani (2009) examined the role of social capital on access to micro credit in Ekiti-state, Nigeria. The study concluded that social capital index, membership in associations, cash and labour

contributions significantly influenced the probability of obtaining microcredit. Therefore, this study examined the influence of social capital on food security status of rural microcredit households in Ekiti state, Nigeria.

Materials and Methods:

The study was carried out in Ekiti State, Nigeria. The state is situated in the South-West of Nigeria. It is located between longitudes 7°45′ and 5°45′E and latitudes 7°45′ and 8°05′N. It lays South of Kwara and Kogi States as well as East of Osun State. It is bounded in the East by Edo State and in the South by Ondo State. Ekiti State has sixteen Local Government Areas. The total population of the local government areas where the sample selected for the study, which is 1,625,483. The population of the selected local government represented about 1.2% of Nigeria population based on the last census of 2009. Nigeria conducted her last census exercise in 2006 but released an official gazette with respect to her population in 2009. The study area is mainly an upland zone rising to about 250 metres above sea level. It lies within the area under lain by metamorphic rocks of the basement complex. It enjoys tropical climate with two distinct seasons: the rainy season (April – October) and dry season (November – March). The temperature ranges between 21°C and 28°C with high humidity. Tropical forest exists in the South and guinea savannah in the North. The state is endowed with water resources like Ero, Osun, Ose and Ogbese rivers. Ekitis are culturally homogenous and they speak a dialect of Yoruba language known as Ekiti. The selection of the Ekiti state is justified by its high incidence of poverty within the southwestern states (Balogun and Yusuf, 2011). The people of the state are to a large extent, rural dwellers whose poverty is a result of inability to generate enough income from their agricultural and non-agricultural activities to increase production (Centre for Enterprise Development and Action Research, 2003). Ekiti state has an agriculture-based economy with the production of food crops providing employment and income for more than 75.0% of the population. The people are predominantly farmers while women engage in food processing, trading, in addition to farming activities. The climate favours the state in the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew etc.

Sources of data and sampling procedure:

A multi-stage sampling procedure was used to select the sample for the study. The first stage involved a random sampling of three (3) local government areas (LGAs) from each of the senatorial districts in Ekiti state namely: Ekiti North, Ekiti South and Ekiti central. This was done to ensure equal representation of the respondents. The second stage involved a simple random sampling of microcredit groups in each of the selected LGAs depending on the number in each LGA using a proportionality factor given below as done by Balogun & Yusuf, (2011).

$$Xi=n/N*30 \quad \text{(i)}$$

Where:
Xi=number of microcredit groups to be sampled from a local government
n= number of microcredit groups in the particular LGA
N=total number of micro credit groups in all the local government areas
The desired total number of microcredit groups was 30

In the last stage of the sampling, fourteen members in each of these microcredit groups were selected. This led to four hundred and twenty (420) microcredit members being randomly sampled for this study. However, out of the four hundred and twenty questionnaires distributed, (386) had meaningful information for analysis because the other questionnaires contained incomplete information which rendered it unusable for the study.

Analytical technique:

The analytical tools employed for the study include descriptive statistics, FGT poverty measure and Probit regression model.

Descriptive statistics:

Descriptive statistics such as tables, frequencies, mean and percentages were used to profile the socio-economic characteristic and social capital variables of microcredit households in the study area.

Foster-Greer-Thorbecke (FGT) Index:

The study adopted Foster, Greer and Thorbecke (1984) approach to estimate the incidence, depth and severity of food insecurity in the study area. The FGT measure is calculated by taking the proportional shortfall in expenditure for each food insecure household and normalizing the sum by the population size. The reason for using FGT is due to its decomposability of the overall population into sub groups, which allows for comparison.
It is expressed as:

$$P_{\propto} = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z-y}{z}\right]^{\propto} \quad \text{(ii)}$$

Where:
y = per capita household expenditure
Z = food insecurity line
n= total population
q = population of the food secure
∝= degree of food insecurity aversion

Measurement of Social Capital:

The starting point of obtaining value for social capital variables is by measuring the level possessed by households through their activities in their local level groups or associations which is reflected by social capital (dimension) index following Narayan and Prichett, 1997; Grootaert, 1999; Okunmadewa et al., 2005; Okunmadewa et al., 2007; Yusuf, 2008; Balogun & Yusuf, 2011. Thus, social capital dimension indices used in the regression analysis in this study were obtained as follows:

- Density of membership: this is measured by the number of active household membership in existing associations. A complete inventory of all associations was made at local level institutions; each household was then given that inventory and asked which associations they are members in. In other words, the proportion of membership of associations by individuals is found and rescaled to 100.
- Heterogeneity index: the questionnaire identifies the three most important associations for each household. For those associations, a number of supplementary questions were asked including about the internal homogeneity of the group. This was rated according to twelve criteria: neighborhood, kin group, same occupation, same economic status, same religion, same political, gender, same age, same level of education, cultural practices, belief and trust. Hence, for each of the factors a yes response was coded 0 while no was coded 1 (Lawal *et al.,* 2009). A maximum score of 12 for each association represents the highest level of heterogeneity. The score of the three associations were averaged for each household by dividing by maximum score 36 to obtain the index. The resulting index was then multiplied 100 (whereby a zero value represents complete homogeneity and 100 correspond to the highest heterogeneity).
- Decision making index: it has been argued that associations, which follow a democratic pattern of decision-making, are more effective than others. The questionnaire asked association members to evaluate subjectively whether they were "very active" "active" or "not very active" "passive" "very passive" or not participating in the group's decision making. This response was scaled from 4 to 0, respectively and averaged across the three most important groups in each household. The summation was calculated from subjective responses from the households' members on their rating in participation in decision making in three important associations to them. The responses were averaged across the three associations and multiplied by 100 for each household.
- Cash contribution index: this was achieved by taking records of payment of membership dues and other contributions. The summation of the total cash contributed to the various associations, which the household belong was calculated. The actual contribution for each household was rescaled by dividing the amount by the maximum fee in the data and multiplying the resultant fraction by 100.
- Labour Contribution index: this is the number of days that individual members belonging to institution claimed to have worked for their institutions. This represents total numbers of man- hour's days worked by household members. This is also rescaled to 100 using the same method of cash contribution.
- Meeting attendance index: this index was measured by finding the number of times members of association actually met as a group over a period of time. This is obtained by summing up of attendance of the household members at meeting and relating it to the number of scheduled meetings of the associations. The value is multiplied by 100. . Generally, we have computed social capital as the average of households' component social capital levels, which rules out any scale effects. However, it would be interesting to investigate the absolute amount of household's social capital as deterrent to food insecurity. This aspect is provided in this analysis.
- Aggregate Social Capital Index: this is the multiplicative social capital index. The index was calculated using the products of density of membership, heterogeneity index and decision making index of household in their various social groups.

Probit Regression Model:

The probit model is a suitable tool of analysis when the dependent variable is dichotomous as is the case in this study. It has been used by Ojo (2014) to model household economic behavior under constrained utility maximization and was used in this study following Ojo (2014) to relate the level of household food security directly to the exogenous variable describing socio-economic environment in which a household makes decision. The micro credit household food security is hypothesized to be influenced by the independent variables as represented in the equation below:

$$Y^* = X^1\beta + \varepsilon \quad \text{(iii)}$$

Y =Vector of dependent variable (1 for food secure households; 0, otherwise).

The independent variable specified for the probit regression model of social capital and food security status included the following:
$\beta_{0=}$Constant
X_1= Age of household head in years
X_2= Age Squared in years
X_3= Gender of Household head (Male 1, female 0)
X_4= Marital status of household heads (Married 1, single 0)
X_5= Occupation of household heads (farming 1, non-farming 0)
X_6= Household size (number of people eating in a pot)
X_7= Years of Formal education of household head in years
X_8= income of household head in Naira (1USD = ₦460)
X_9=Social Capital Aggregate index (%)
X_{10}=Membership Density index (%)
X_{11}=Decision making index (%)
X_{12}= Cash Contribution index (%)
X_{13}=Labour Contribution index (%)
X_{14}= Meeting Attendance index (%)
X_{15}=Heterogeneity index (%)
ε_1=Random error

Results and Discussions:

Table 1 presents some of the socio-economic characteristics of the respondents. Their age distribution shows that about 90% of them are not sixty years old yet. Specifically, the average age of the respondents is about 47 years. This implies that they are in their active age. Invariably, they would be willing to join associations that can facilitate their access to production resources. Being in active age means that they would want to engage in productive/ income generating activities. This result agrees with Korir, Lagat Mutai & Ali (2015) who found that the average age of the respondents in their study as 45 years and regarded them as young and economically active people.

The distribution shows further that about 69% of the respondents have formal education of varying levels. The average years of formal education of the respondents is about 7 years. This implies that average years of formal education acquired by the respondents is less than the 9 years universal basic education prescribed by the federal government of Nigeria. This may limit respondents' ability to take advantage of full scale production and marketing opportunities that may be available for them for enhanced access to food. This result agrees with Ojo (2014) who found average years of formal education acquired by respondents in his study was about 7 years.

In terms of respondents' size of household, the distribution shows that household comprising of 5-8 members is the commonest among the respondents. There are about 58% of such households. The average size of household according to the distribution is about 7 members. This means that the size of household in the study area is fairly large. Large-size household may be beneficial in terms of labour supply or harmful as it reduces per capita resources accompanied by worsening welfare. This result is consistent with Balogun & Yusuf (2011) who found that average household size of the respondents in their study was about 7 members. Furthermore, the distribution reveals that respondents earn varying levels of income and that their average monthly income is about ₦50,000. This implies that the average monthly income of the respondents is higher than the new minimum wage (₦30,000) in Nigeria. Nonetheless, considering the rising prices of both food and non-food items in Nigeria, an income of ₦50,000 may not guarantee household food security. This may propel respondents to be passionately committed to the activities of their association targeted at improved welfare outcomes.

Table (1): Socio-economic characteristics of micro-credit households

Age	F	%	Mean
21-30	30	7.77	
31-40	59	15.29	
41-50	138	35.75	
51-60	121	31.35	
>60	38	9.85	
Total	386	100	47.28
Education			
0	121	31.35	
1-6	106	27.46	
7-12	81	44.75	
>12	78	20.21	
Total	386	100	6.78
Household Size			
1-4	61	15.80	
5-8	222	57.51	
9-12	82	21.24	
>12	21	5.44	
Total	386	100	7.22
Income			
≤ 13500	54	13.99	
13501 – 40500	131	33.94	
40501 -67500	87	22.54	
67501 – 94500	78	20.21	
> 94500	36	9.33	
Total	**386**	**100**	**50.328**

The various sources of credit patronized by the respondents are presented in Table 2. The result shows that 89.12% of the respondents patronized one credit source or the other. It further revealed that while many (46.89%) of the respondents patronized cooperative societies for their credit needs, 15.03%, 8.03%, 9.07% and 10.10% patronized bank, government agencies, local money lenders and family and friends respectively. However, 10.88% of the respondents did not patronize any of the credit sources but relied on personal savings. Access to credit enhances consumption smoothening and taking advantage of high-yielding technology. This distribution implies that formal and informal credit markets co-exist in the study area. The co-existence of the formal and informal credit market increased access of the respondents to credit. This result agrees with Mpuga (2008) and Balogun (2011) who found that credit markets are dualistic in nature.

Table (2): Distribution of micro credit households by credit sources

Source	**Frequency**	**Percentage (%)**
Bank	58	15.03
Cooperatives	181	46.89
Government agencies	31	8.03
Local money lender	35	9.07
Family/friends	39	10.10
Personal Savings	42	10.88
Total	**386**	**100**

Table 3 presents the social capital dimensions and the food security status of the respondents. The result shows that the highest households (30.8%) of the respondents had 41-60 membership density. The implication is that they belong to three out of five associations. However, most of the respondents (46.0%) in this group were food secure and the remaining were not. Nonetheless, almost half of the respondents that were food insecure had membership density greater than 80. This implies that household heads are mindful of belonging to too many associations perhaps as too much commitment associated with belonging to too many associations may compromise productivity (Ojo, 2014). With respondents mean heterogeneity index of 54.87%, associations in the study area were considered diverse. Heterogeneity index of respondent in associations shows that in 41-60% subgroup, food insecure respondents had higher heterogeneity index (54.9%) than food secure category (53.2%) index.

This moderate background diversity of members of association may limit the extent of productive information knowledge and experience available for sharing among members. This result is consistent with Balogun & Yusuf (2011) who found that increase in heterogeneity index of a group is associated with an increase in welfare. In terms of meeting attendance and because of the importance attached to regular meetings, respondents that were food insecure (61.2%) attended meeting more frequently than other sub-group (59.1%). However, average meeting attendance of respondents in the study area is approximately two out of five meetings for both sub-groups. Attendance at meetings is loaded with benefits (training & skill acquisition, credit, disbursement, receipt of input packages).

This result is consistent with Ajani & Tijani (2009) who found that their respondents attended scheduled meetings of their group fairly moderately. Decision Making Index (DMI) is moderate in two sub-groups (food secure and insecure) with an average of 59.0%. Members participate in three out of five of decisions affecting their

associations. Decision making process is slightly higher among the respondents that were food insecure. Cash contribution index (CCI) values are generally moderate among the food secure respondents whereas they are high among food insecure respondents. The highest percentage of respondents (80.8%) with CCI of 41-60% was found among the respondents that were food secure. On the other hand, it was only from respondents with CCI greater than 80% of their contribution to their associations that the number of food insecure individual could reach 80.92%. However, households that have commercial banks funding their businesses made the highest contribution to their associations whereas those with friends and family contributed the least to their association. The average labour contribution index (LCI) of the respondent was 39.2%.

The result shows that respondents that contributed more man-days of labour to association were food insecure compared to those that contributed less. Members' collective commitment to the course of the association that is not strong enough will definitely yield a little or no dividend (access to productive inputs). This result agrees with Okunmadewa (2005) who found that respondents whose level of labour commitment to their group was low tend to be poor. Excessive commitment to the course of the group may compromise the resources (time and money) that the group members could have channeled towards their personal work with a view to guaranteeing their access to food. So, being committed to group activities has an opportunity cost which group members should take cognizance of in order not to defeat the objective of joining a social network.

Table (3): Social Capital Dimensions and the food security status of the respondents

Social capital dimensions	Food secure		Food insecure		All	
	Frequency	(%) Percentage	Frequency	(%) Percentage	Frequency	(%) Percentage
Membership density						
1-20	23	10.80	14	10.69	37	10.76
21-40	65	30.52	08	6.11	73	21.22
41-60	98	46.01	08	6.11	106	30.81
61-80	14	6.57	40	30.53	54	15.70
>80	13	6.10	61	46.56	74	21.51
Total	213	100	131	100	344	100
Mean	58.55		80.4		59.25,	
SD	0.12		1.5		6.4	
Heterogeneity						
1-20	-	-	-	-	-	-
21-40	53	27.75	33	25.19	86	25.00
41-60	80	37.56	18	13.74	98	28.48
61-80	50	23.47	316	23.66	81	23.55
>80	30	14.08	49	37.41	79	22.97
Total	213	100	131	100	344	100
Mean	53.22		62.12		54.87	
SD	4.0		2.4		8.5	
Meeting attendance						
1-20	-	-	-	-	-	-
21-40	88	41.31	12	9.16	100	29.07
41-60	101	47.42	03	2.29	104	30.23
61-80	20	9.39	54	41.22	74	21.51
>80	04	1.88	62	47.33	66	19.19
Total	213	100	131	100	344	100
Mean	59.14		61.23		55.02	
SD	7.1		1.1		15.2	
Decision making						
1-20	35	16.43	23	17.56	58	16.86
21-40	37	17.37	22	16.79	59	17.15
41-60	140	65.73	1	0.76	141	40.99
61-80	01	0.47	85	64.89	86	25.00
>80	-	-	-	-	-	-
Total	213	100	131	100	344	100
Mean	59.50		63.91		61.44	
SD	3.2		5.5		2.1	
Cash contribution						
1-20	08	3.76	04	3.05	12	3.49
21-40	22	10.33	04	3.05	26	7.56
41-60	172	80.75	03	2.29	175	50.87
61-80	07	3.28	14	10.69	21	6.10
>80	04	1.88	106	80.92	110	31.98
Total	213	100	131	100	344	100
Mean	54.01		80.12		58.42	
SD	2.1		3.5		, 12.4	
Labour contribution						
1-20	38	17.84	48	36.64	86	25.00
21-40	78	36.62	24	18.32	102	29.65
41-60	89	41.78	05	3.82	94	27.33
61-80	08	3.76	54	41.22	62	18.02

>80	-	-	-	-	-	-
Total	213	100	131	100	344	100
Mean	23.45		40.1		39.18,	
SD	2.3		1.1		9.6	

Table 4 shows effects of social capital on food security status of respondents. The result of the basic reduced form model of the household food security status which excludes social capital variable revealed that 44.14% of variation in the respondents' food security status was explained by the model. The result indicates that age is significant at 1% level and positively affected food security status of the respondents. This may be due to the fact that young people tend to be active, productive and participate in associations with pay-offs. Also, levels of productivity of young people tend to be higher than older people. This result is consistent with Ojo (2020) who found that young people tend to be more food secure than old people. Income is significant at 1% and positively affected food security. This might be due to the fact that higher income households tend to have better access to food because they have higher purchasing power. This result was in line with Omonona and Agoi (2007).

Age squared variable was included in the model to capture the non-linearity between age squared and food security status of respondents. Age squared is included as one of the independent variables to capture life-cycle hypothesis. In other words, as someone advances in age, he or she tends to be less productive and ultimately less food secure. This happens up to a certain point in one's life before it starts to decline. Age squared is significant at 1% and negatively affected food security status of respondents. The implication of this is that as the household head advances in age, there is tendency for him to receive dwindling income due to retirement, reduced strength or decline in productivity as the case may be. This result agrees with Ojo (2020) who found that old people tend to be less food secure. Occupation is significant at 5% and negatively affected food security status. This implies that non-farming households are more food secured than farming households. This might be because rural non-farming households usually engage in farming (diversify) in addition to their primary occupation which might make them earn more income and gain better access to food. This corroborates Obayelu (2013) who found that non-farming households were more food secured than farming households. Household size is significant at 1% and negatively affected food security status. This might be due to decline in the per capita food associated with large family size. The result agrees with Omonona and Agoi (2007) who found that large-size households tend to experience poor welfare.

Column two shows the result of the introduction of a multiplicative social capital variable. This variable led to an improvement in the value of the explanatory power of the model (44.14% to 56.09%). Along with the demographic variables, multiplicative social capital index has a positive coefficient of 0.0486 and significantly affected food security status. This implies that multiplicative social capital increases the probability of being food secure. This finding could be associated with the possibility that the building of social networks and trust among members and external linkages with both government and non-governmental agencies spills over into access to resources which in turn results in improved welfare outcome (food security). This result agrees with Tabi (2009) & Oni *et al.* (2011) who found that the more the social capital possessed, the more the probability of being more food secure.

Also in Table 4. the six social capital dimensions were included. This led to an increase in the ability of the model (56.09% to 62.17%) to explain the variance of food security status relative to the use of multiplicative social capital. The six dimensions included are: membership density, decision making, cash contribution, labour contribution, meeting attendance and heterogeneity indices. Membership density is significant at 1% level and positively affected food security of respondents. The results also showed that a unit increase in membership of respondent in associations increases the probability of being food secure by 0.11%. This result may be due to the possibility that local level associations are loaded with economic benefits/ food security-enhancing resources such that respondents' gains are as much as the number of associations to which they are members. This finding agrees with Ajani and Tijani (2009) that access to credit improves with increase in the number of groups to which a respondent belongs.

Meeting attendance is significant at 1% and positively affected food security of respondents. The results also indicated that a unit increase in meeting attendance of the respondents at their association meeting increases the probability of being food secure by 0.71%. This may be ascribed to the fact that trainings on matters such as acquisition of production and marketing knowledge aimed at improving human capital stock of members that are usually scheduled for meeting days. Grootaert (1999) attests to the ability of human capital development to bring about economic outcome. Also, welfare packages are usually distributed to members at meetings, so if such welfare packages are in short supply, it follows that only members that attend the meeting will receive such packages. This result agrees with Ojo (2014) who found that the more the number of meetings attended by the respondents, the higher the probability of being food secure.

Also, decision making is significant at 1% level and positively affected households' food security. The results showed further that a unit increase in participation in decision making of the group by the respondents tends to increase food security by 0.38%.This could be attributed to the possibility that members who participated actively during meetings through suggestions of far-reaching points/ideas during discussions at association meetings tend to bring up production/marketing issues/ideas/challenge affecting their welfare and when such issues are duly

addressed, "windows and doors" of food security may be open to them. This finding means that additional contribution to decision made at meetings by members increases the probability of food security. This may be reinforced by the fact that members of association can make important submissions that can lead them out of their economic doldrums. This result supports Tabi (2009) but contrasts Yusuf (2008); Olawuyi and Oladele (2012).

Cash contribution is significant at 1% and positively affected food security of households. The results also indicated that a unit cash contribution by respondents increases the probability of food security by 0.37%. This could be explained from the viewpoint that group members who are committed to the course of the group contribute money to the group. Also, the result could be linked to the possibility that members' cash contribution to the association is supposedly an indication of a higher level of interest in the association which can equally serve as collateral security in the event of borrowing. This result is consistent with Ajani and Tijani (2009) that found that cash contribution by respondents increased their chance of accessing credit.

Heterogeneity is significant at 10% and positively affected respondents' food security. The results showed further that a unit increase in the heterogeneity of the association would increase the probability of food security by 0.29%. This finding could be traced to the fact that benefits accruable to group members are as much as the diversity of the group members in terms of education, skill, experience, knowledge, production and marketing information, etc. The more diverse members of a group are in terms of socio-economic attributes, the more the food security- enhancing beneficial resources they tend to share with one another. This result is consistent with Grootaert (1999).

Table (4): Effect of Social Capital on Food Security Status of the Respondents

Variable	Basic Model			Social Capital	Multiplicative		Social Capital Additive Variables		
	Coefficient	z-stat	Marginal effect	Coefficient	z-stat	Marginal effect	Coefficient	z-stat	Marginal effect
Constant	-7.0630	-4.18		-8.8202	-4.47		-13.8552	-5.87	
Age	0.2915	3.97***	0.0969	0.3225	3.82***	0.1050	0.3189	3.47***	0.1033
Age squared	-0.0032	-3.99***	-0.0011	-0.0035	-3.80***	-0.0011	-0.0033	-3.37***	-0.0011
Sex	0.2228	1.25	0.0742	0.2737	1.37	0.0893	0.1498	0.70	0.0486
Marital status	0.0033	0.01	0.0011	0.004	0.01	0.0012	0.2444	0.77	0.0759
Occupation	-0.5041	-2.32**	-0.1652	-0.4453	-1.83*	-0.1432	-0.2742	-1.06	-0.0883
Household size	-0.2755	-7.36***	-0.0916	-0.3157	-7.26***	-0.1028	-0.3162	-6.82***	-0.1025
Years of formal education	0.0198	1.28	0.0066	0.0236	1.34	0.0077	0.0271	1.41	0.0088
Income	4.47e-05	7.68***	1.49e-05	4.973e-05	7.34***	1.61e-05	4.57e-05	6.66***	1.48e-05
Social capital index	-	-		0.0486	6.76***	0.0158	-	-	
Membership density index	-	-		-	-		0.0340	6.37***	0.1101
Decision making index	-	-		-	-		0.0117	3.65***	0.0038
Cash index	-	-		-	-		0.0113	3.17***	0.0037
Labour index	-	-		-	-		0.0046	0.88	0.0014
Meeting index	-	-		-	-		0.2195	4.03***	0.0071
Heterogeneity index	-	-		-	-		0.0090	1.74*	0.0029
No of observation	386	-		386	-		386		
Log likelihood	-143.55***	-		-112.83***	-		-97.20***		
Chi-squared	226.83***	-		288.27***	-		319.52***		
Pseudo R^2	0.4414	-		0.5609	-		0.6217		

*significant at 10% level; ** significant at 5% level; *** significant at 1% level
Field survey, 2012

Table 5 presents the result of endogeneity test. The result showed that when the original social capital variable was replaced by the instrumental variable, that is, the length of time of residing in the community, adjusted R^2 increased from 0.3760 to 0.3996. Furthermore, the coefficient of the instrumental variable is higher than the coefficient of the original variable. Consequently, this result implies that there is no case of endogeneity. This result agrees with Adepoju & Oni (2013) that states that the absence of significant reverse causality infers the exogeneity of social capital.

Table (5): Result of Endogeneity Test of Social Capital (Instrumental Variable Estimation)

Variable	Without instrumental variable (OLS)		With instrument variable (2SLS)	
	Coefficient	2-statistics	Coefficient	2-statistics
Constant	4.9637 (1.52)	3.28***	1.4706 (0.32)	4.59***
Age	-0.1228 (0.07)	-1.83*	-0.0223 (0.02)	-1.48
Age squared	0.0014(0.00)	1.97**	0.0003(0.00)	1.75*
Sex	0.1228 (0.26)	0.50	0.0310(0.06)	0.49
Marital status	0.4263(0.20)	2.15**	0.1174(0.05)	2.41**
Occupation	-0.0572 (0.23)	-0.25	-0.0018 (0.06)	-0.03
Household size	-0.4957 (0.05)	-10.54***	-0.1395 (0.01)	-13.94***
Years of formal education	0.0384(0.02)	2.48**	0.0078(0.00)	2.12**
Social capital index	-0.0338(0.01)	-3.79***	-0.0215(0.06)	-3.80***
No of observation	386		386	
Chi-squared	200.65		256.86	

The inclusion of instrumental variable is to probe the existence of reverse causality, and this is indicated by improvement in the adjusted R^2.

Conclusion and Recommendations:

This paper explored the food security promotion effect of social capital among microcredit households by addressing whether participation in social networks reveals insights into the myth surrounding promotion of food security. The empirical model entails four different approaches of introducing the explanatory variables: Basic model, social capital multiplicative, social capital additive and social capital additive without cash distribution. The findings reveal that level of participation of respondents in social network as indicated by their social capital dimension indices promoted food security up to a level where food insecurity incidence began to rise except for heterogeneity of group that presented a consistent increasing trend of food insecurity incidence. These suggest that while over-commitment to the course of the group should be discouraged by members due to diseconomy of scale, potential group members should be encouraged to join group that is highly heterogeneous to maximize pay-off.

From the basic model, non-farming occupation and education promoted food security whereas large household size worsened it. These point to the need for an improvement in policies for promoting off-farm employment, non-formal education and intensified family planning campaign in order to tackle the food insecurity incidence. Furthermore, the results of the social capital additive models with and without cash contribution index both pointed towards a negative relationship between social capital and food insecurity. This may call for such interventions as public sensitization as to the welfare benefits inherent in the participation in social network.

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