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**Pareto Superior dimension of Rotating  
Savings and Credit Associations  
(ROSCAs) in Ghana: Evidence from  
Asunafo North Municipality of Ghana**

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## **Abstract**

This study investigates characteristics of Rotating savings and credit associations (ROSCAs) participants who join the association due to its Pareto superior allocation in Ghana. Some scholars like Dejene and Van den Brink have hypothesized that people join ROSCAs because of its Pareto superior allocation. The study employed primary data analysis in achieving its main objective. Out of the 400 ROSCA participants sampled for the study from Asunafo North Municipality of Ghana, 71.75% joined the association because of its Pareto superior allocation. A Probit model was used to predict the probability of joining the association due to its superior allocation. The dependent variable took the value of one when respondents join the association due to its superior allocation and zero if otherwise. Married participants, participants with no or low level of education, participants who are unemployed and participants who save more of their income are more likely to join ROSCA due to its Pareto superior allocation. It was recommended that that ROSCA participants who have access (participants living in urban sectors) to formal financial institutions, participants who have accounts at formal financial institutions, participants who are rich and aged participants should be educated on how ROSCA constitutes its Pareto superior allocation

## **Keywords:**

Pareto Superiority, Rotating Savings and Credit Association

## **1. Introduction**

Informal financial sectors dominate in developing countries than formal financial sectors (Aryeetey & Hyuha, 1990). Formal financial sectors consist of categories of stocks containing firms that offer financial services to commercial and retail customers. Examples include banks, investment fund, insurance companies and real estate. Informal financial sectors, on the other hand, consist of those, often unrecorded, activities that take place outside official financial institutions. It must be noted that these sectors are legal but unregulated. Among money-lending, Susu collection, Accumulated savings and credit associations (ASCRA) etc., rotating savings and credit associations (ROSCAs) are one of the major informal financial sectors one can think of. A more general definition of ROSCA was given by Shirley Ardener as "an association formed upon a core of participants who agree to make regular contributions to a fund which is given, in whole or in part, to each contributor in a rotation" (Ardener, 1964).

## **2. Background of the study**

The root of Rotating savings and credit association (ROSCA) was traced by Geertz (1962) from the regions of West Africa countries that were economically developed during the slave trade era into the Caribbean and the southern part of the United States. According to Ardener, ROSCA operated in Japan as far back as the thirteenth century (1275 AD). Handa and Kirton (1999) on the other hand reported that ROSCAs in Jamaica also called 'Jamaica partner' rooted from the slaves from Africa who used it as a device to purchase their freedom. Poole and Grant (2006) indicated that, during the slave trade era, slaves from West Africa were found using a type of financial savings mechanism called Susu, which is a form of Rotating savings and credit association (ROSCA).

The term rotating savings and credit association was coined by Geertz (Geertz, 1962). According to him, earlier scholars have used many terms to describe the association. Among which include, contribution clubs, slates, mutual lending societies, pooling clubs, thrift groups, and friendly societies. ROSCA is the most dominant form of informal financial institution in most developing economies (Besley et al., 1993). It is called Susu in Ghana, esusu in Liberia and Nigeria, osusu in Gambia, asusu in Sierra Leone, and ndjonu in Benin, arisan in Indonesia, yao hui in China, tontine in Cameroon and Senegal, equbs in Ethiopia, huis in Vietnam, and finally, keh in Korea (Bouman, 1995).

There is a slight distinction between the general term Susu and ROSCA as used in Ghana. Susu is a term used for informal financial activities such as Susu collection scheme, ROSCAs, ASCRAs etc. Susu is one of the oldest traditional way of banking in Ghana. The term Susu in the Akan language means “small small”. This indicates savings made on daily, weekly or monthly basis by those economically active poor people. Particularly Susu collection scheme is a form of “small small” saving up whereby a person decides to contribute on daily basis to another person (the Susu collector) for an agreed period of time usually a month. Here the collector is remunerated with a fee. ROSCA, on the other hand, is a form or a subset of the general term “Susu” used in Ghana.

ROSCAs are found almost in every part of the world, but research shows that they are highly dominated in the rural areas of developing economies where citizens do not have enough access to formal financial institutions such as Banks (Besley et al., 1990). Besley et al. (1990) proposed that the main aim of these institutions is to save up for the purpose of buying durable indivisible goods such as bicycles or to provide financial support to major events such as weddings.

Basically, there are two forms of ROSCAs. These are the random ROSCAs and the bidding ROSCAs. Besley et al. (1990), defined random ROSCAs by saying that "In a random ROSCA, members commit to putting a fixed sum of money into a 'pot' for each period of the life of the ROSCA. Lots are being drawn and the pot is randomly allocated to one member in the group. In the next period, the process repeats itself, except the previous winner is excluded from the draw for the pot. The process continues, with every past winner excluded, until each member of the ROSCA has received the pot once. At this point, the ROSCA is either disbanded or begins again Besley et al. (1990)". They went ahead and defined bidding ROSCA as one that allocates the pot by using bidding procedures. Thus the participant who obtains the pot in the current period does so by bidding higher. For instance, pledging higher future contributions to the ROSCA or one-time payment to the other members.

The most common form of ROSCA in Ghana is the random ROSCA. ROSCAs are the source of fund and capital formation for most of the small-scale enterprises and especially market women and petty traders in Ghana. It can play an active role in the development of the Ghanaian economy if the government gives the necessary avenue for the operation of the sector (Owusu et al, 2013). 'This is because the Ghanaian economy is highly dominated by small and medium scale enterprises and therefore can develop the economy through import substitution industrialization strategies' (Owusu et al. 2013). According to Aryeetey and Steel (1995), rotating savings and credit associations are mostly practiced by petty traders. "Many traders and market women in Ghana use ROSCAs to expand their businesses" (Aryeetey & Gockel, 1991). Also, some office workers in the urban areas of Ghana have developed an interest in ROSCA participation.

SMEs ability to access funding within the formal sectors in Ghana has become a challenge. The challenge affects the smooth running of businesses in the SMEs. The challenge stems from the fact that access to services of formal financial institutions requires documented rules such

as valid collateral security, residential documents etc. For instance, many formal financial institutions require that any of its clients who come for a loan must have a collateral security, which ensures excludability of these petty traders from the operations of formal financial services.

Although there has been an introduction of savings and loans companies and microfinance companies, these companies fail to deliver effectively in an attempt of helping these petty traders. Some of the factors that cause their breakdown in their attempt of delivery, especially microfinance institutions include the high rate of interest on their investment packages which eventually collapse the institutions. Owners are being forced to escape with the available fund in their coffers and also overtrading by the microfinance institutions collapse the microfinance institutions (Antwi, 2015). As an alternative, rotating savings and credit associations has become an instrument for these SMEs in raising funds to support their operations.

According to the round six of the Ghana living standards survey (GLSS6) main report, the proportion of urban households which save through Susu (which is a form of ROSCA, Poole and Grant (2006)) in Ghana are 54.91% with Accra having only 9.1% and 45.8% goes to the other urban centres in Ghana. 45.1% of those in the rural areas save through Susu. Those in the rural coastal constitute 4.2%, whereas 30.9% of people in rural forest saves through Susu and finally, 10.0% of people in rural Savannah save through Susu. This gives clear evidence that people in urban areas are more likely to save through Susu (ROSCA included) in Ghana. In Accra, 3.8% had their loans from Susu and 23.4% in other urban centres had their loans from Susu. In rural coastal, 23.4% had their loans from Susu whereas 10.4% of the rural forest had their loan from Susu and finally, 14.7% of the rural savannah had their loan from Susu. With regards to sex, 4.5% of males obtain their loans from Susu and 11.3% of females obtain their loan from Susu.

Let's take for instance a group of five school teachers who have agreed to enter into a ROSCA, with the aim of buying bicycles to help them reduce their lateness to school. The cost of their choices of the bicycle is Five Hundred Ghana Cedis. Let's assume further that, the monthly salary of each teacher is one hundred Ghana cedis. So, it means for a teacher to own a bicycle, it will take him/her five months of saving his/her salary(saving alone), deposit his/her monthly income at a bank against an interest and going for an interest-bearing loan from a bank. But if they enter into a ROSCA, all the teachers except the last person on the rank would receive their bicycle before the end of the fifth month. At least four of these teachers will prefer ROSCA to the other forms of financial intermediation except the last person who will be indifferent between saving alone and joining the ROSCA. Also with reference to the formal intermediation, they will prefer ROSCA since it does not come with any interest on credit.

In the above example, it can be seen clearly that ROSCA enables each of its members to acquire his/her indivisible good (bicycle) within the shortest possible time. Besley et al., (1990) postulated that ROSCA sequentially gives solutions to the lumpy problems of each individual in the association. It also shortens the time period each individual would wait in case they were to save alone, except the last person on the rotation. Since all the ROSCA participants with the exception of the last person on the rank are liable in receiving the pot sooner, the average cost of ROSCA fund may be competitive even for people who have access to credit from formal financial institutions (Brink & Chavas, 1991). Hence all these participants will be strictly better off for being a member of the association with the exception of the last person, who will be indifferent between joining the association and saving alone. Hence ROSCA constitutes a Pareto superior allocation (Besley et al., 1990).

If we take a critical look at the ROSCA carefully, we realize that all the ROSCA participants (with the exception of the last one on the rotation) obtain advance money that they will repay through their contributions during the circle. The first person to receive the contributions (rank

one in the order of rotation) receives the maximum credit that he/she pays back in the subsequent contributions. The last person in the other of rotation receives no credit and saves throughout the circle.

The basic principle of ROSCA is the same on every continent. “It exists in at least three continents (Africa, Asia, and Latin America) and within very different communities” ( Bouman, 1977). Despite the manifest importance of ROSCA, there has been little literature on ROSCA in the economics field. Reason being that the importance of such institution is not well understood. Microeconomist sees ROSCA as an informal credit market that is not competitive. On the other hand, among macroeconomists, they are sometimes assumed to be perfectly competitive. Also since the entire institution is governed by mutual trust, in a situation where a member is not so credit-worthy, his/her participation is discouraged. Again, “arrangement used by associations that have bearing on defaults is a provision by which members can contribute less to the fund of members they consider to be relatively poor risks”(Miracle et al., 1980).

There is a hypothesis that ROSCA as an institution gives Pareto superior allocation in a society where there exist fragmentation in the capital market (Dejene, 1993). The superiority comes in as the waiting time to buy durable indivisible good reduces. So many people will join the association because of its Pareto superior allocation. This thesis develops a new argument on the characteristics of ROSCAs participants who join the association due to its Pareto superior allocation.

### **3. Theoretical underpinnings on ROSCAs**

#### **Contending Hypothesis about the Motives for joining ROSCA.**

Dejene (1993) hypothesized that ROSCA as an institution gives Pareto superior allocation in a society where there is fragmentation in the capital market. The superiority comes in as the



waiting time to buy an indivisible good reduces. Anderson et al., (2009) used the term 'early pot motive' as the motive for joining ROSCA for the early purchase of indivisible goods. Theoretically, models that explain the great abundance of rotating savings and credit associations were developed by Besley, Coate, and Lounsbury (1992, 1993). These economists demonstrated that participation in ROSCA was not efficient as compared to saving alone and a random ROSCA gives the individual a higher ex-ante expected utility than formal financial sectors. What this means is that the association gives each of its participants except the last person on the rotation, the pot for the purpose of their participation sooner than they would save alone. However, some participants enjoy their purpose periods after, before others. And almost all the participants with the exception of the last one on the random rotation enjoy it earlier than they would have saved. These participants would be strictly better off with the association and hence the association becomes inefficient.

Besley et al. (1993) presented an economic framework for the analysis of ROSCA, which has become the required recommendation for economic analysis of ROSCA. This model developed by Besley et al. (1993) explains individuals' decision to participate in the ROSCA and provides guidelines for choosing the duration and type of ROSCA. In the model developed by Besley et al., a series of assumptions were made which include ROSCA members being risk averse, having identical preferences, perfect and complete information about the type of the other bidders. In addition, the size of the pool is assumed constant throughout the ROSCA and members are excluded from obtaining credit from other sources. In the setup of Besley et al., the pool of the ROSCA is equal to the price of an unspecified durable good and nondurables are assumed to be complementary.

While arguing against the early pot motive, Gugerty (2007) argued that if the main motive for joining the ROSCA is due to its superior, then the last person on the rotation will not be better off by joining the association. He will leave the association. The second last person who now

becomes the last person will decide the same and also leave the association since him/her will not be better off in joining the association. In his study, Gugerty (2007) shows ROSCA is for the purpose of buying divisible goods rather than indivisible goods.

### **Net Present Value Analysis and ROSCA Participation**

Brink and Chavas (1991) used net present benefit analysis in choosing between ROSCA and saving against an interest and going for an interest-bearing loan from a formal financial institution. Their illustrations are as follows:

Let's assume we have M individuals who wish to obtain an indivisible good A. The options open to them include joining a ROSCA group, borrowing an interest-bearing loan from the bank and saving alone (Autarky). In the ROSCA, M will be equivalent to the number of periods in the rotation and also the number of individuals in the rotation. We assume further that the indivisible good (B) yields benefit (b) in every period once it has been obtained by each individual (j). Therefore the net benefit of the ROSCA in period t for individual j will be given by:

$$Y_{jt} = \begin{cases} w-c & t < j \\ w-c+b & t \leq j \end{cases}$$

Where c is the contribution one makes to the ROSCA whereas w is the overall income one obtain in each period. We will assume zero discount rate.

The benefit to the first individual (J=1) will be obtained by adding:

$$\sum_{t=1}^M Y_{1t} = \sum_{t=1}^M (w - c + b)$$

$$M (w-c + b) = M (w-c) + Mb.$$

The last person on the rotation only benefits from b in the last period. Therefore the total benefit of the last person on the circle is given by:

$$\sum_{t=1}^M Y_{M1} = M(w - c) + b$$

If  $j$  is the individual's rank in the rotation such that,  $1 \leq J \leq M$ , Then generalizing net benefit of an individual with rank  $J$  is given by:

$$M(w - c) + (M - J + 1)b.$$

Now, the per-capita benefit one will obtain from the ROSCA will be given by:

$$\frac{1}{M} \sum_{j=1}^M M(w - c) + (M - J + 1)b$$

$$\text{Which will reduce to } Mw - B + \frac{(M+1)}{2} b$$

$$\text{Since } \sum_{j=1}^M J = \frac{M(M+1)}{2} \text{ and } c = \frac{B}{M}$$

Now let's consider saving against an interest being an alternative to ROSCA. Interest is assumed to be paid each period (that is no compound interest) so the total benefit of such savings for an individual  $j$  will be given by:

$$M(w - c) + \sum_{j=1}^M jrc = M(w - c) + \frac{M(M+1)}{2}rc$$

Where  $r$  is the interest rate and  $c$  is the amount each individual saves at a particular point in time.

The individual will prefer ROSCA to saving with an interest when

$$M(w - c) + \frac{(M+1)}{2} b > M(w - c) + \frac{M(M+1)}{2}rc \quad \text{but } c = \frac{B}{M}$$

That is

$$b > rB$$

Thus the benefit an individual in the ROSCA group obtain periodically after the indivisible good is attained needs to be sufficiently higher in relation to the interest on savings. If  $b > rB$ , it will imply that there are positive returns in joining the ROSCA. Thus ROSCA will be considered as Pareto superior to saving with the bank against interest.

Let's assume the next alternative of borrowing against an interest rate from the bank. So here the total repayment amount equals  $B + i (M-1) B$ . where  $i$  is the interest rate on credit. So the net benefit of an individual who goes in for such a loan will be  $M (w + b) - B - i (m-1) B$ . An average individual will prefer the ROSCA to the contracting of loan when;

$$M (w - c) + \frac{(M+1)}{2} b > M (w + b) - B - i (M - 1) B$$

Given  $B = Mc$ , reduces to the following condition:

$$b < 2iB$$

Thus ROSCA will be preferred to borrowing against an interest if and only if the benefit obtained from acquiring the good is less than  $2ib$  or the individual will go in for the loan if otherwise.

In conclusion, we have established that an average individual in the ROSCA will choose ROSCA due to its profitability when the benefit he/she obtains after owning the indivisible good lies between  $rB$  and  $2iB$ . That is,  $rB < b < 2iB$ .

### **Transaction Cost Theory and ROSCA Participation**

Adam Smith, in the classical school of thought, explained specialization, to be the determinant of the productivity level in an economy. Specialization, on the other hand, can be realized when there is an exchange which involves its own expense – a transaction cost (Coase, 1998). There is an inverse relationship between transaction cost and specialization or division of labour

alongside productivity in an economy. Transaction cost depends positively on the existing institutions which include the legal, political, education and social system.

According to the neoclassical economists, the efficient market works only when transaction costs are zero. Whenever there are transaction costs, then institution matters. This confirms the reason for the argument by New Institutional Economists (NIE) that institution matters in the world where much of the national income goes into transaction cost.

The formation of the institution is underpinned by the transaction cost which in turn is dependent on the level of information completeness and the capacity of human beings to undergo the information processing. According to North (1995:2), “the cost of transaction arises because information is costly and asymmetrically held by the parties to exchange. The way of measuring the multiple valuable dimensions of the goods or services exchanged or of the performance of agents and the cost of enforcing agreement determines transaction cost”. Hence institutions are built to reduce the level of uncertainty in an exchange.

The individuals and the institution as a whole with a bargaining power as a result of the institutional framework have a crucial responsibility in perpetuating the system. According to game theory, the probability of obtaining a cooperative solution will be high when there is a repetition of the game many times. This gives complete information about the performance of each player. If the game is not repeated by the players, then the gain from cooperation will be outweighed by the gain from defection. Hence it is the repetitive nature of ROSCA that renders its default rate to be low as well as its exchange cost (Gugerty, 2007).

Institutions are made up “formal rules, informal norms, and the enforcement of characteristics of both” (North 1995). And the combination of these three determines the performance of the economy. Sandsør (2010) states that low transaction cost, including low traveling cost and distance as well as low bureaucratic cost, are the basic characteristics of ROSCA. According

to Geertz (1962) ROSCAs are institutions that show the transformation of a society from agrarian to commercial.

Besley et al. (1993) in their seminal contribution developed a ROSCA theory by saying that, there is an inverse relationship between the size of ROSCA contribution and the size of ROSCA. Thus when the size of ROSCA is large (a lot of members in the association), the size of ROSCA contribution is small (members contribute small amount) and the opposite is also true.

### **Other Theories of ROSCAs**

According to Besley et al. (1992) individuals who participate in ROSCA are credit constrained. Thus people who join ROSCA are mostly people who do not have access to the formal credit market. This may be as a result of lack of collateral security or inadequate availability of formal financial sectors.

Ardener (1995) argues that where incomes are very low, where there is no formal social security network, where ill health stalks and a variety of calamities, however, a system of low cost, ROSCA helps to meet the challenges for all. She also believed that ROSCAs are informal finance mechanism that is predominantly used by the poor.

Handa and Kirton (1999) disputed the fact that ROSCA participants are credit constrained as proposed by Besley et al. In trying to explain why wealthier individuals are members of ROSCA, they observed individuals who are unlikely to be credit constrained in the formal financial market and found out that, these individuals also part-take in ROSCA. Moreover, lack of assets for collateral is given as a reason why people should choose an informal finance mechanism (such as the ROSCA) over a formal financial institution.

A theory that has also gone through viral empirical studies is the theory that, women are more likely to participate in ROSCA than men.

At a theoretical level, Anderson and Baland (2002), rely on an intra-household conflict in consumption decision and of the existence of asymmetric preferences for household goods between men and women.

A theory regarding the link between ROSCA participation and durable goods acquisition was developed by Besley et al (1993, 1994), they confirmed that, in a world where a number of individuals have an aim of acquiring an indivisible durable consumable good and has no access to external help or formal financial intermediation, ROSCA provide a good means of realising gains from inter-temporal trade.

Gugerty (2007) postulated that what lures an individual in joining a ROSCA is the ability to save in an effective way rather than impatience. "Savings require self-discipline and ROSCA provides a collective mechanism for individual self-control in the presence of time-inconsistent preference and in the absence of alternative commitment technologies"

Kedir et al. (2011) on theoretical grounds postulated that savings and deposits from an interest paying oriented bank provide a relatively lower yield, but a relative safer instrument of investment for poor people. On the other hand, random ROSCA is quiet riskier. The basic form of its riskiness is its lottery nature of given out pots to the lucky participants. Since no rate of interest is attached to savings associated with ROSCA, a late receipt of pot implies a loss of guaranteed interest income that a bank deposit would have granted. Also given borrowing constraint, an early ROSCA pay-out gives a major source of finance to a lumpy investment of capital goods, notwithstanding consumer durables. Thus ROSCA participation is riskier but gives higher yield, whereas investment in bank deposits is safe but its yields are lower.

Adams and de Sahonero (1989), Handa and Kirton (1999) made a theoretical postulation that, married women of middle age who have acquired at least basic education are more likely to be ROSCA participants.

Anderson and Baland (2002), Rutherford (2000), Vetrivel and Chandrakumaramangalam (2010) hypothesized that credit-constrained individuals are banned from the credit market because they lack a minimum starting budget. On the same line, Besley et al. (1993), Levenson and Besley (1996), hypothesized that poor people are banned from formal credit market since they don't have collateral security to start with. So they should be motivated to participate in ROSCA than wealthier people.

Recent studies by Kimuyu (1999) and Varadharajan (2004) suggest that the very poor people are less motivated to participate in ROSCA because they lack minimum starting budget.

#### **4. Some empirical studies**

Sandsør (2010) conducted empirical studies using data from Kibera slum. Among the 16 and older individuals in 511 households, resulting 1270 observations, the percentage of the groups that have registered were reported to be only 10%. This means that majority of the ROSCA groups operate under illegal sense. About 98% of the leaders of the association were elected and most of the association (about 91%) meets on a regular basis. 74% had penalties associated with not attending meetings. It was also reported that the probability of a ROSCA participant being a couple is high. And participants are also less likely to have completed primary school. Furthermore, it was reported that there exists a higher probability that a ROSCA participant is having a job.

According to Vradharajan (2004) Whiles married individuals are more likely to participate in arisan. Highly educated individuals, on the other hand, had a significant and positive correlation with the arisan participation as compared to individuals with no education. In conclusion, he found that in Indonesia ROSCA are not necessarily meant for poor people, rather the rich have a higher probability of participating in ROSCA.



Handa and Kirton (1999) conducted an econometric research on the economics of rotating savings and credit associations, where they took their evidence from Jamaica. They concluded that bankers of ROSCA in Jamaica are old, rich and have enough experience on the smooth running of the association. And payment to these bankers has a significant relation with the sustainability of the partner. Their analysis supported the theory that was postulated by T. Besley et al. (1993) that, there exists an inverse relationship between the size of the ROSCA and the periodic contribution of the association. 71% of their sample reported using their ROSCA winnings for the purchase of consumer durables. A significant proportion (14%) reported using their pot for precautionary savings for unplanned expenses.

According to Dagnelie and Lemay-Boucher (2012), empirical analysis by Handa and Kirton (1999) and Brink and Chavas (1991) agree with their evidence collected from a sample of 496 households in Cotonou, Benin that: ROSCA participants are mainly poor individuals who do not have enough access to formal institutions. Finally, they drew a conclusion that women are less likely to be a member of ROSCA than men in Cotonou: while men constitute 51% of all adult population, women being the minority constitute 45% of all ROSCA members. The likelihood for a woman to participate in ROSCA in Cotonou is 15%, this increases to 21% when she is married and 22% if she works (24% if she does both). Men have an overall probability of 19% of participating in ROSCA, 32% when they live as couples and 31% if working (35% if both). Their analysis also disagrees with the fact that, ROSCA participants are mainly women. 18% of all ROSCA surveyed were exclusively made up of women, whereas 26% were made up of men. And the remaining of the groups was made up of both men and women with 63% having a majority of male members.

## 5. Methodology

### Data Source

Primary data was used for the study. The data was obtained from administering questionnaires to respondents and conducting interviews. The questionnaire was administered to ROSCA participants, whereas in some cases, interviews were conducted.

### Target Population

The population of interest in relation to the primary data comprises of the total number of people living in the Asunafo North Municipality. According to population and housing census, the total population of the municipality is about 124,685. The population consist of people living in the areas of Goaso, Mim, Akrodie, Fawohyeden, Ayomso and their remote villages.

### Sample Size

The sample of the study was based on the residents of the municipality who were participants of ROSCAs. And the sample size was based on the formula

$$n = \frac{N}{1 + N(\alpha)^2}$$

Where,

n= sample size

N= Population

$\alpha$  = 95% confidence interval.

$$n = \frac{124685}{1 + 124685(0.05)^2}$$

$$= 398.72$$

This is approximately 400

## **Sample Methods**

Both purposive and convenient sampling techniques were used in the study since the research was being constrained with time and resources. Purposive sampling technique is a non-random sampling technique which was used to select ROSCA participants for the study whereas the convenient sampling technique was also used to select respondents who were ready and in the position to respond to the questionnaire. With regards to the purposive and convenient sampling technique, the questionnaire was administered approximately for a period of 3 weeks to participants of ROSCA.

## **Data Collection Instruments**

The instruments that were used in the primary data collection were questionnaires. Primarily, collection of data for the study was through administered questionnaire to ROSCA participants. But due to factors such as high illiteracy rate and the research being constrained with time, interviews and observations were somehow used at some point in time. The questionnaires administered were both open and closed ended questions. With the data collection, the researcher started from Goaso (the Municipal capital) to Akrodie, Fawohyeden, Ayomso and finally to Mim.

The questionnaire was made up three sections, the first section considers the basic characteristics of the individual participant. The second section considers the savings behaviour of the individual participants. And the final section considers the other questions which include the expenditure behaviour of the participants.

The questions comprise of both structured and unstructured questions. The structured questions were straight forward with plausible answers in which respondents were asked to choose from and also dichotomous questions with two answers, yes or No. On the other hand, unstructured questions were used to acknowledge the genuine opinions of respondents on certain issues.

## The Primary Data Estimation

The researcher employed a binary Probit model in the analysis. The dependent variable (Y) was obtained when respondents were asked “why did you join the association?” the dependent variable (Y) took the value of one (1) if an individual participant joined the association because it shortens the time period he/she could have wait in case he was to save alone thereby making him/her better-off and zero if otherwise. The model specification is given by

$$\Pr (Y= 1) = \Phi (\beta_0+ \beta_1sex+\beta_2age + \beta_3Marital\_ + \beta_4educ\_lev +\beta_5 emp\_stat +\beta_6income+ \beta_7amount\_s + \beta_8 access +\beta_9account +\beta_{10}valuable )..... (2)$$

Where,

- $\Phi$  is the commutative distribution function for the standard normal.
- Sex is a dummy variable which represents either the person is a male or female (sex equals one if the participant is a female and zero if otherwise).
- Age is the age of individual participants.
- Marital\_ is a dummy variable which represents the marital status of the participant (marital\_ equals to one if the individual participant is married and zero if otherwise).
- Educ\_lev is a dummy variable which represents the educational level of individual participants (educ\_lev equals one if individual participants' level of education is low or if participants have no formal education and zero if otherwise).
- Emp\_stat is a dummy variable which represents the employment status of individual participant (emp\_stat equals one if the individual participant is unemployed and zero if otherwise).
- Income represents the income status of the participants.
- Amount\_s represents the amount saved out of income.

- Access is a dummy variable which represents individual's access to the formal financial institution.
- Account is a dummy variable which represents whether the individual participant has an account with a formal financial institution or not (account equals one if the individual has an account with a formal financial institution and zero if otherwise).
- Valuable is a dummy which represents whether the individual has a valuable asset or not. This is also to tell us if the participant is rich or poor. Those with valuable assets were regarded as rich since assets measure permanent income and those without valuable assets were regarded as being poor. (Valuable equals one if respondents has valuable assets and zero if otherwise).

## **6. Findings and Discussions**

A probit model which is similar to what Varadharajan (2004) used in his analysis of ROSCA. The dependent variable took the value of one (1) if respondents join the association due to its Pareto superior allocation and zero if otherwise.

Table 5.1 probit regression

Why ROSC	Coef	std. Err	p>z
Age	0.0131938	0.0270168	0.625
Sex	-0.343009	0.6285642	0.956
Marital_	2.929124	0.8540669	0.001
Educ_lev	5.003173	1.049289	0.000
Emp_stat	3.641996	0.9019385	0.000
Income	-0.002045	0.0006618	0.002
Amount_s	0.010330	0.0026165	0.000
Access	0.294524	0.6356313	0.643
Account	-0.419420	0.5876568	0.475
Valuable	-0.631783	0.5160093	0.221
_cons	-11.4809	2.887353	0.000

Source: field survey

**Table 5.2 Marginal Effect from the Probit Estimates**

(1)	
VARIABLES	y1

Age	0.000396 (0.000808)
Sex	-0.00102 (0.0189)
marital_	0.0878*** (0.0219)
educ_lev	0.150*** (0.0169)
emp_stat	0.109*** (0.0192)
Income	-6.13e-05*** (1.71e-05)
amount_s	0.000310*** (6.05e-05)
Access	0.00883 (0.0190)
Account	-0.0126 (0.0175)
Valuable	-0.0189 (0.0149)
Observations	400

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Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Field survey, 2017

Table 5.2 above shows the results of the Probit model. The Probit model was used to analyse why respondents participate in ROSCA. The dependent variable took the value of one if respondents join the association because it shortens the time period they would have wait in case they were to save alone thereby making each of them better off with the exception of the last one in the rotation who will be indifferent and zero if otherwise.

Participants' access to formal financial institutions was used as a measure of whether the participant lives in a rural area or an urban area in the municipality. Those who had access to formal financial institutions were classified as living in the urban areas in the municipality and those who don't have access to formal financial institutions were classified as participants who live in the rural areas of the municipality. Again, participants were asked whether they have valuable assets or not. Since assets measure one's permanent income level, respondents who answered yes were regarded as not being poor and those who answered no were regarded as being poor. With educational level, respondents were asked what their highest level of education was. Those with secondary/vocational, HND/diploma, university, and professional qualification were classified as highly educated participants and those with no education and primary/JHS/middle were regarded as no or low level of education.

Age, sex, whether participants have valuable assets and whether participants have accounts with formal financial institutions were not statistically significant, however, marital status, educational level, employment status, income levels, the amount saved out of income were statistically significant.



Marital status, educational level, employment status, the amount saved out of income have a positive influence on the probability of predicting the superiority of ROSCA as a determinant of ROSCA participation. Income, on the other hand, has a negative influence in predicting Pareto superiority of ROSCA as a determinant of ROSCA participation. The Pseudo  $R^2$  of 0.9093 implies that about 90.93% of the variation in the decision to join ROSCA because of its Pareto superior allocation is jointly explained by the explanatory variables.

Marital status is significant at 1% and it indicates that, when ROSCA participant is married, the probability that he/she joins ROSCA due to the fact that the association shortens the time period he/she could have wait in case they were to save alone thereby making each of them better off with the exception of the last one in the rotation who will be indifferent is explained by marital status. The marginal effect of marital status indicates that 1% increase in participants who are married will increase the probability of joining ROSCA due to its Pareto superior allocation by 8.78%.

Educational level is also significant at 1% and it indicates that, ROSCA participants who have no or low level of education are more likely to join the association due to its Pareto superior allocation. The marginal effect of educational level on the other hand indicates that 1% increase in ROSCA participants who have acquire low or no level of formal education will increase the probability of joining ROSCA due to its Pareto superior allocation by 15%.

Employment status and amount saved out of participants' income are all significant at 1%. The marginal effect of employment status and amount saved out of participants' income indicates that when ROSCA participant is unemployed and the amount he/she saves out of his/her income increases by 1%, the probability that he/she joins ROSCA due to its superior allocation will increase by 10.9% and 0.031% respectively.

Finally, incomes of ROSCA participants are also significant at 1% and have a negative influence on predicting the superiority of ROSCA as a determinant of ROSCA participation. The marginal effect of income indicates that a unit increase in ROSCA participant's income will decrease the decrease the probability of joining ROSCA due to its superior allocation by 3.72.

Sex, age, whether individual participants have account with formal financial institutions or not, whether participants have valuable assets or not (rich or poor) and the probability that they join the association due to the fact that it shortens the time period they would have to wait in case they were to save alone, thereby making all of them better off with the exception of the last person on the rotation are independent. Thus whether the individual participant is a child, youth or aged doesn't predict his/her vulnerability of joining the association because it gives Pareto superior allocation. Again, either the individual is a male or female doesn't predict his vulnerability of joining the association because it gives Pareto superior allocation. Finally, living in the rural or urban area and being rich or poor doesn't predict your vulnerability of joining the association due to its Pareto superior allocation.

### **Qualitative analysis of ROSCA participants**

One of the qualitative analysis was based on why people join ROSCA. Respondents were given options to choose from which include; because it shortens the time period they would wait in case they were to save alone, because there is no formal financial in their community, because it serves as insurance, because they don't have collateral to secure loan from formal financial institution and others.

**Table 5.3 Reasons Why Respondants Join ROSCA**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Why did you join the Association</b>		
<b>Because it shortens the time period I would wait in case I was to save alone</b>	<b>287</b>	<b>71.75</b>
<b>Because there is no formal financial institution in my community</b>	<b>41</b>	<b>10.25</b>
<b>Because anytime I am in need and it's not even my turn in the rotation, I can be given the pot</b>	<b>54</b>	<b>13.50</b>
<b>Because I don't have collateral to secure loan from the formal financial institution</b>	<b>16</b>	<b>4</b>
<b>Others</b>	<b>2</b>	<b>0.50</b>
<b>Total</b>	<b>400</b>	<b>100</b>

**Source: field survey 2017**

In Table 5.3 above, respondents were asked: “Why did you join the association”. The options open to them were, because it shorten the time period the respondent would wait in case he/she was to save alone, because there is no formal financial institution in respondent’s community,

because anytime they are in need and it's not even their turn in the rotation they can be given the pot, because they do not have collateral security to secure loan from the formal financial institutions. Finally, respondents who did not see any of the reasons to be their prime reason for joining the association were to select the "others" and indicate their main reason if others.

Out of the 400 respondents interviewed 71.75% (n=287) joined the association because it shortens the time period they would wait in case they were to save alone. 10.25% (n=41) joined the association because they do not have any formal financial institutions in their community. Also, 54 respondents representing 13.50% joined the association because anytime they are in need and it's not even their turn in the rotation, they can be given the pot. Sixteen (16) participants representing 4% joined because they don't have collateral security to secure a loan from the formal financial institution, with two (2) participants having other reasons apart from the four reasons.

### Characteristics of ROSCA participants

In achieving one of the specific objectives, the characteristics of ROSCA participants were reviewed.

**Table 5.4 Characteristics of ROSCA Participants**

<b>Variables</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Sex of respondents</b>		
<b>Male</b>	<b>107</b>	<b>26.75</b>
<b>Female</b>	<b>293</b>	<b>73.25</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>
<b>Marital status of respondents</b>		

<b>Married</b>	<b>301</b>	<b>75.25</b>
<b>Single</b>	<b>86</b>	<b>21.5</b>
<b>Divorce</b>	<b>8</b>	<b>2</b>
<b>Widow</b>	<b>5</b>	<b>1.25</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

#### **Highest level of education of respondents**

<b>Highly education</b>	<b>86</b>	<b>21.5</b>
<b>Low or no level of education</b>	<b>314</b>	<b>78.5</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

#### **Employment status of respondents**

<b>Employed</b>	<b>65</b>	<b>16.25</b>
<b>Unemployed</b>	<b>335</b>	<b>83.75</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

#### **Criterion for allocating the pot**

<b>Balloting</b>	<b>281</b>	<b>70.25</b>
<b>Lottery</b>	<b>117</b>	<b>29.25</b>
<b>Bidding</b>	<b>2</b>	<b>0.5</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

#### **How often respondents meet**

<b>Weekly</b>	<b>309</b>	<b>77.25</b>
<b>Monthly</b>	<b>91</b>	<b>22.75</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

#### **Respondents access to formal financial institution**

<b>Yes</b>	<b>269</b>	<b>67.25</b>
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No	131	32.75
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Do you have valuable assets**

Yes	173	42.25
No	227	56.75
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Do you receive financial assistance elsewhere**

Yes	233	58.25
No	167	41.75
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Relationship with the person**

Husband	124	53.22
Wife	10	4.29
Friend	22	9.44
Relative	77	33.05
<b>TOTAL</b>	<b>233</b>	<b>100</b>

**Do you have account with formal financial institution**

Yes	215	53.75
No	185	46.25
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Can there be change of order in time of need**

Yes	386	96.5
No	14	3.5
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Change of order of rotation after each round**

<b>Yes</b>	<b>343</b>	<b>85.75</b>
<b>No</b>	<b>57</b>	<b>14.25</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Registration of the Association**

<b>Yes</b>	<b>77</b>	<b>19.25</b>
<b>No</b>	<b>323</b>	<b>80.75</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Are there any written rules governing your association**

<b>Yes</b>	<b>250</b>	<b>62.5</b>
<b>No</b>	<b>150</b>	<b>37.5</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Are there any penalties associated with not attending ROSCA meeting**

<b>Yes</b>	<b>388</b>	<b>97</b>
<b>No</b>	<b>12</b>	<b>3</b>
<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Source: field survey 2017**

It can be discerned from 5.4 that, females constitute a greater portion of ROSCA participation. The results demonstrate that majority of the respondents 73.25% (n=293) are females whilst 26.75% (n=107) are males. This indicates that indeed females are more likely to participate in ROSCA than males. This confirms the assertion made by Gugerty (2007) and Varadharajan (2004) that females are more likely to participate in ROSCA than males and disagrees with the assertion by Dagnelie and Lemay (2012) that, males are more likely to participate in ROSCA than females.

In Table 5.4 above also gives the marital status of the 400 ROSCA participants interviewed. The majority of the participants are married. The percentage of participants who are married

constituted 75.25% (n=301), those who are single constitute 21.5% (n=86) whilst 2% (n=8) and 1.25% (n=5) goes for divorce and widowed respectively. This confirms the findings by Varadharajan (2004) and Sandsør (2010) that married individuals are more likely to participate in ROSCA.

Respondents were asked what their highest level of education was. It can be ascertained in Table 5.4 that, those with no level of education and primary/middle/JHS were regarded as having low or no level of education. On the other hand, participants with secondary/vocational, HND/diploma, university and professional education were regarded as being highly educated. From the table, those with no or low level of education constitute the majority 78.5% (n=314) of ROSCA participation whilst those with high level constituted 21.5% (n=86). This confirms the conclusion made by Sandsør (2010) that, ROSCA participants are less likely to acquire higher education. However, it disagrees with the findings by Lasagni and Lollo (2011) that ROSCA participants are highly educated.

Table 5.4 above also shows the employment status of the ROSCA participants. Participants who are unemployed constitute the greater proportion of ROSCA participation. Out of 400 ROSCA participants, 83.75% (n=335) are unemployed and do not receive any fixed amount of salary every month. But they are into farming, learning a trade, petty trading, and store keeping. However, those who had white colour jobs constituted 16.25% (n=65).

Table 5.4 above also depicts the criterion used in the disbursement of ROSCA funds to its members. 70.25% (n=281) indicated that the criterion for their disbursement of fund to its members is through balloting, whilst 29.25 (n=117) indicated that they used lottery as their major criterion for disbursement. 0.5% (n=2) indicated they use bidding as their criterion for disbursement of the fund. Based on the available data, it was found out that most of the rotating



savings and credit associations' use balloting as their main criterion of disbursement of the fund as claimed by Owusu et al. (2013).

Respondents were asked how often they carried out their ROSCA meetings. The closed-ended options included daily, weekly, bi-weekly and monthly. It can be ascertained from Table 5.9 that, out of the 400 respondents, 77.25% (n=309) indicated that their ROSCA meetings are carried out on weekly basis whilst 22.75% (n=91) indicated that their meetings are carried out on monthly basis. No respondent indicated their meetings to be daily and bi-weekly. This is to conclude that most of the rotating savings and credit associations meet on weekly basis to contribute to the pot.

Table 5.4 also shows individual participants access to formal financial institutions. Those who have access to these institutions were classified as participants who live in the urban centres of the municipality and those without access were classified as those who live in the rural areas of the municipality. From the table, it can be seen that out of the 400 ROSCA participants, 67.25% (n=269) lived in the urban areas of the municipality whilst 32.75% (n=131) lived in the rural areas of the municipality. This gives an indication that people living in urban areas are also more likely to participate in ROSCA as indicated in the GLSS 6 report. It also confirms the assertion by Lasagni and Lollo (2011) that, ROSCA participation in urban villages are higher than ROSCA participation in rural villages and also confirms the postulation by Handa and Kirton (1999) that, ROSCA participants are not credit constrained as postulated by Besley et al.,(1993,1994).

Table 5.4 above also depicts the results when ROSCA participants were asked whether they have valuable assets. Assets as a measure of permanent income were used to measure the wealth of the participants. Those who answered yes are classified as not being poor and those who answered no are classified as being poor. Poor participants constitute the majority 56.75%

(n=227) whilst rich participants constitute 43.25% (n=173). This confirms the assertion by Dagnelie and Lemay (2012), and Varadharajan (2004) that, poor people are more likely to participate in ROSCA.

In Table 5.4, out the 400 ROSCA participants interviewed, the majority 58.25% (n=233) receive financial assistance elsewhere. Whilst 41.75% (n=167) receive no financial assistance from anybody. This is to say that, people who participate in ROSCA receive extra financial support from other sources.

Table 5.4 above also shows the relationship that exists between the 233 ROSCA participants who receives financial assistance elsewhere. Greater proportion 53.22% (n=124) receive the financial assistance from their husbands, 33.05% (n=77) receive their financial support from their close relatives whilst 4.29% (n=10) and 9.44% (n=22) receive their financial supports from wife and friends respectively. This confirms the assertion by Gugerty (2007) that, married women are more likely to participate in ROSCA.

Table 5.4 again demonstrates that a greater proportion of the ROSCA participants have an account with formal financial institutions. Out the 400 participants interviewed, 53.75% (n=215) have an account with formal financial institutions, whilst 46.25% (n=185) do not have an account with any formal financial institutions. This is an indication that most of the people who have an account with formal financial institutions are also ROSCA participants. This confirms the claim by Handa and Kirton (1999) that ROSCA participants are not credit constrained.

In Table 5.4, 96.5% (n=368) answered yes to the question, "in the case of need, can a participant change his/her order of rotation". Whilst the remaining 3.5% (n=14) answered no. This supports the insurance motive of joining ROSCA postulated by Besley et al. (1992) and

confirms the conclusion by Sandsør (2010) that, ROSCA helps in pooling resources to help participants who are in need.

Respondents were also asked whether their association changes the order of rotation after each round. Table 5.4 also shows clearly the response of the respondents. Out of the 400 ROSCA participants, 85.75% (n=343) of the people answered yes whilst the remaining 14.25% (n=57) answered no. This is an indication that most of the ROSCA groups reverse their order of rotation after each round. This confirms the assertion by Sandsør (2010) that most of the ROSCA groups change their order of rotation after each round of the life of the association.

It can be observed from Table 5.4 that, out of the 400 respondent interviewed, 80.75% (n=323) ROSCA participants reported that their association is not registered, whilst 19.25% (n=77) also reported that their association has been registered. This means that majority of the ROSCA groups operate in the illegal sense as concluded by Sandsør (2010).

Respondents were asked whether they have written rules governing the association. Table 5.9 depicts the response of respondents. Out of the overall ROSCA participants, 62.5% (n=250) answered yes, whilst 37.5% (n=150) responded no. This is an indication that, most ROSCA groups have written rules governing their association.

According to Table 5.4, out of the 400 ROSCA participants, 97% (n=388) answered yes to the question "Are there any penalties associated with not attending meetings", whilst 3% (n=12) answered no. this gives an indication that most of the ROSCA groups have penalties associated with not attending meetings which confirm the findings by Sandsør (2010).

## **7. Conclusion**

From the field survey analysis, the majority of ROSCA participants join the association because the association shortens the time period they would wait in case they were to save alone. It is recommended that ROSCA participants who have access to formal financial institutions (participants living in urban centres), participants who have accounts at formal financial institutions, participants who are rich and aged participants should be educated on how ROSCA constitutes its Pareto superior allocation.

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