



Determinants of Rotating Savings and Credit Associations (ROSCAs) Features: Evidences from Asmara

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Abstract

Purpose: participation in rotating savings and credit institutions is very prevalent in developing countries including Eritrea. This is despite the fact that such participation is costly in terms of the opportunity cost of time spent in meetings and the risk of loss from defaulting participants. Thus, the objective of this study is to investigate two often overlooked common features of Rotating Savings and Credit Associations (ROSCAs) namely form of balloting and contribution frequency.

Design/methodology/approach: a survey was conducted among 464 respondents from the city Asmara and its environs. Multinomial logit (MNL) was employed to estimate members preferred kind of balloting and preferred periods of contributing to the pot.

Findings: the findings of this study suggest that gender, age, household size, educational level, occupation, marital status, ethnicity, and bank account are found to be significant variables influencing members' choice of balloting form. Similarly, the findings reveal that gender, ethnicity, marital status, religion, bank account, membership to a number of ROSCAs and duration of a ROSCA are found to be significant variables in explaining the choice of respondents' period of pot contribution.

Discussion: this study shows that many of this city's dwellers can and do save; hence, the belief that the poor do not save should be abandoned.

Keywords: ROSCAs, social-based information, pot allotment, choice of balloting form, Eritrea

Introduction

Informal cooperation among human societies can be traced back to the ancient times when people started to work together to enhance their efficiency in hunting, gathering, shelter construction, saving and loan activities. Those informal associations are still widely used, especially in low income countries and among immigrant population in some developed countries.

One type of the major informal institutions and a popular form of traditional financial intermediary is the rotating savings and credit association (ROSCA) (Aliber, 2001; Bouman, 1995a; Callier, 1990, Chiteji, 2002). ROSCAs allow individuals to save (Rutherford, 2000; Gugerty and Miguel, 2005) and improve the wellbeing of their members along with their community at large (Benda, 2012). ROSCAs were around even before the introduction of money in world economy.

Despite some characteristic variations, ROSCAs routinely follow the same pattern. According to Ardener and Burman (1995) a ROSCA is a voluntary grouping of individuals who meet together on a regular basis and agree to contribute financially at each of a set of uniformly-spaced dates (say every evening, once a week, or once in a month) and contribute some fixed amount of money towards the creation of a fund, which will then be allotted in accordance with some prearranged principle to each member of the group in turn.

Those who champion ROSCAs argue that these organizations are effective because they intertwine the social and economic domains, building on local cultural concepts and values (e.g., Ardener and Burman, 1995). To secure commitment, ROSCAs attract membership from close communities and kinships within which potential members' personal attributes and circumstance are common knowledge, and from whom 'social collateral' is easily extractable. Such collateral includes sanctions and reciprocity.

Their primary purpose of ROSCAs is to pool funds from multiple participants in order to achieve certain financial goals. In addition to ROSCAs' economic aspects, ROSCA meetings also provide opportunities for feasting and networking (Ambec and Treich, 2007). Thus, ROSCAs serve both an economic and social functions.

Various scholars note that ROSCAs are important and popular in many developing countries in Africa, Asia, and South America and within very different western immigrant communities (Bouman, 1977; Woolsey, 2001). They are often go by local names: Tontines in West Africa, Hui in China, Muzikis or Likelambas in Democratic Republic of the Congo, Ekub in Eritrea and Ethiopia, Stokvel in South Africa, Mukando in Zimbabwe, Isusu in Nigeria, Susu in Ghana, Tandas in Mexico, and Chits or Kuries in India. Each name describes a slight variation of the basic institution or a regional/linguistic difference (Valez-Ibanez, 1983).

The popularity of ROSCAs can be estimated by the number of the people who participate in the schemes. They involve between 50 and 95 per cent of the adult population in several African countries (Ardener, 1964; Ardener and Burman, 1995). Similarly Kimuyu (1999) conducted survey of 115 household in Central Africa and reported that 45% of them were participating in ROSCAs. Anderson and Baland (2002) found that within 57% of the households in Kibera slum Nairobi, at least one person belonged to a ROSCA. Similarly, Johnson (2004) found that 49% of respondents in Central Africa belonged to ROSCAs. The rate of participation among the adults in Congo, Cameroon, Gambia, Liberia, Ivory Coasts, Togo and Nigeria changes between 50% and 95% (Bouman, 1995). Moreover, Besley and Levenson (1996) found that 68% to 85% of the Taiwanese population participates in ROSCAs.

The economic literature on ROSCAs, has rationalized the existence of ROSCAs as informal responses to diverse financial market failures that are deemed commonplace in developing countries and among immigrant communities in developed economies. In complement to this, Salahuddin, *et al.*(2015)stated that, due to the malfunctioning of formal financial institutions a large population of these countries is financially excluded from the formal financial sectors and for such group of people ROSCAs are an important source for enjoying the financial services. Accordingly,ROSCA members are mainly poor individuals who have little access to formal savings and credit markets and ROSCAs have provided them desperately needed credit when no other credit alternatives are available to them.

ROSCAs succeed not only because they are more accessible but because they provide efficient borrowing, saving and social solutions.The amount of financial services received from ROSCAs can be applied to various needs. Hence, researchers in economics (Besley *et al.*, 1993, 1994; Dejene, 1993), development studies (Bouman, 1994, 1995b; Tirfe, 1999) or anthropology (Ardener, 1964) agree on the huge role and potential that ROSCAs have in the daily life of the society practicing them.Accordingly,Kibuuka (2006)stated that ROSCAs offer individuals a self-restraint environment for saving and a chance to save in small installments with a sense of informality. Moreover, ROSCA reduces the information asymmetry as it has inherent selection, monitoring and enforcement mechanisms.In addition, the transactions are usually carried out within familiar communal networks, reciprocity in borrowing and free from official eyes.

However, participating in ROSCAs entails various costs too. ROSCAs generally do not provide interest payments to their members and members could suffer the risk of default by other participants. In addition, members suffer from less flexibility than saving on their own and as well as pay opportunity costs to spend time taking part in group meetings. Despite all these costs, ROSCAs enjoy popularity which proves that ROSCAs must be beneficial to their members.

While the above description explains the broad principles behind ROSCAs, ROSCAs around the world, however, vary considerably in their functioning and organization. Often, membership of a particular ROSCA is based either on gender, income, social standing, individual attitude, origin or identity or on the purpose for which it was formed (Khan, 2012).

In addition, typically ROSCAs vary between each other in membership size (number of participants), amount of periodic contribution (amount of money paid periodically), the amount of money going to be paid to the person in turn (allotment), the amount of period meetings, cyclic duration (duration of ROSCA cycle) and mode of selecting a winner. Therefore, there are six main topics that people wishing to participate in ROSCAs have to consider before joining one. Generally, the amount of money paid periodically (pot) is determined by dividing the total amount of money contributed into the number of participants and the period of meetings is determined by dividing the duration of cycle into the number of participants (Anderson, 2003).

Some scholars predicted that with economic development of countries these types of institutions would eventually fade away (Geertz, 1962; Schrader, 1992). On the contrary, as opposed to fading away ROSCAs continue to embellish and play a greater role in the lives of poor people all over the world. This is because these institutions are embedded with values, norms, and customs of societies and continue to provide economic and social benefits to members of these societies (Germidis, *et al.*, 1992; Narayan, *et al.*, 2000).

The theoretical and empirical literature on the economics of ROSCAs advances various motives why individual households join ROSCAs. Economic theories suggest that individuals join ROSCAs for different motives which include, among others, the need to acquire consumer durables (Handa and Kirton, 1999; van den Brink and Chavas, 1997; Besley and Levenson, 1996;

Besley *et al.*, 1993); intra-household conflict in resource allocation (Anderson and Baland, 2002; Ardener and Burman, 1995); insurance (Klonner, 2003; Calomiris and Rajaraman, 1998); self-control over the use of funds in the presence of time inconsistent preferences (Gugerty, 2003) and handling social pressure (Ambec and Treich, 2003). After reviewing the debate in the literature, many fairly conclude that no consensus is reached on the issue of why people join ROSCAs. In practice, we observe individuals/household join ROSCAs for multiple of reasons without a focus exclusively on one motive as indicated above.

Another feature of ROSCAs that merits investigation would be to look at them from the point of view of the mechanism they would use to allocate the 'Pot' (fund). The decision on how to allocate the funds; however, varies from one ROSCA to the other. There are three main ways of doing so (Geertz, 1962). In ROSCAs, groups of individuals voluntarily pool their regular savings, with disbursements determined either by random (lottery) draw or decision by the ruling body or bidding until every member has received the 'pot'. Obviously, those members who have already received the pot earlier cannot receive the pot again, though they still, have to contribute to the pot.

Discretionary allocation (decision by the ruling body): here the organizer has the discretion of determining the order in which members receive the pot. This is non-transparent and though it allows the organizer to bear in mind the need of the members, the method can create issues regarding the 'fairness' of the process. This method is usually only used in smaller ROSCAs where the organizer has a reputation and significant confidence of the members. A similar but different version shows that the organizer receives the first pool of money and then according to a random assignment the fund rotates to a particular member at each meeting until every member has a turn to the pot (Henever, 2006).

Random allocation (random lottery draw): in this kind of ROSCA a random draw is held to determine who receives the pot. The winner of this period is no longer eligible for having his name in the subsequent draws. The drawing continues till the second last period when there are two people left who have not yet received the pot.

Bidding ROSCA: the members contribute a specific amount of money to the ROSCA at a constant rate over its lifetime and bid competitively for the pool which is allocated to the higher bidder. Accordingly, the winning bidder makes a lump sum extra payment to the remaining members. A bidding ROSCA, is one where bids could be made at the beginning for the whole life of the cycle or at the beginning of each period in the cycle. Bari (1998) argues that this is largely utilized by ROSCAs run by businessmen and professional people. Unlike textbook financial markets with a single interest rate, every participant in a bidding ROSCA effectively pays a different interest rate. So recipients of early pots demonstrate a willingness to pay higher interest rates than late recipients. However, many African based ROSCAs do not usually carry out bidding practices.

Members have different preferences in relation to when to receive the pot. Some would like to get it as soon as possible while others prefer to have it late. The early pot motive (Besley *et al.*, 1993) theory assumes that all ROSCA participants would prefer to receive the pot at the earliest possible time so as to maximize the benefits from the ROSCA. Receiving the pot at the beginning has a further advantage of reducing the risk of default from other members who may leave the ROSCA after receiving the pot. The first person to receive the pots gets a loan from other members which he pays in installments (through the regular contributions) while the last one to receive the funds makes a saving.

However, empirical data verifies that there are also members who prefer to receive the pot at later periods. Gugerty (2007) observed that in Western Kenya, the largest proportion of participants prefer to receive funds in the period just after the harvest. According to Gugerty (2007) participants feel that money received during this period was not obligated to be used for food or fees. Older participants in her sample had higher relative preferences for receiving early in the year, when school fees are due and food stocks are low. The holiday season (October – December) was the least favored time to receive the pot; participants reported that money got “used up” in the entertaining of visitors and preparations for holiday celebrations.

As aforementioned many scholars have tried to investigate people’s motives for joining ROSCAs and continued to ignore investigating other characteristics and traits of ROSCAs such as pot allotment mechanisms, preferred period for receiving the pot and frequency, cycle and amount of contributions. Moreover, all recent econometric studies of ROSCAs are exclusively concerned with the determinants of ROSCA participation (Aliber, 2001; Anderson and Balland, 2009; Gugerty, 2000; Handa and Kirton, 1999; Besley and Levenson 1996) and almost none of these econometric researches analyze ROSCAs pattern of allocation decisions and the preferred periods of receiving the pot *inter alia*. Instead many treat these ROSCAs’ traits as a black box.

Therefore, it is the objective of this paper to deal with two important characteristics of ROSCAs namely the determinants of ROSCAs pot allotment mechanisms and determinants of members preferred periods of receiving the pot and determinants to the frequency of members’ contribution to the pot. The decision of how to allocate the funds; however, varies from one ROSCA to the other and different needs and expectations of people cause ROSCA to have different types of allocation of funds. The first person to receive the pots gets a loan from other members which he/she pays in installments (through the regular contributions) while the last one to receive the funds makes a saving.

Anecdotal evidences indicate that many Eritrean individuals who live in both urban and rural areas are still served by different forms of informal financial institutions. However, out of the informal financial institutions ROSCAs are the most prevalent in the country.

The head offices of the formal financial institutions of Eritrea are located in the city of Asmara and its residents seem to have a better access to these formal financial services than people living in rural areas of the country. Yet participation in ROSCAs among the city’s residents is prevalent. However, literature works on Eritrea have not yet included topics related to the abovementioned quantitative topics. It can be argued that the socio-economic characteristics of the individuals determines how the allocation decision of the pot will be made and also to the frequency of members’ contribution to the pot. Moreover, earlier literature on ROSCAs in Eritrea has addressed questions of ROSCAs efficiency by ignoring factors and variables that influence individuals’ choices as a result there is limited information regarding group characteristics although such information can result in a better understanding of individual’s participation in ROSCAs and is very fundamental in understanding how ROSCAs function in the country. To this end, it is believed that this work will fill the information gap by conducting a rigorous analysis on ROSCAs of the city of Asmara. By taking institutional characteristics into consideration, social-based information should be addressed and discussed, since ROSCAs belong to local level community associations.

Methodology

In conducting this study both primary and secondary data were used. Secondary data was collected from different public institutions and primary data was collected from individual residents of the city using survey questionnaire. A total number of 500 questionnaires were

distributed and data from 464 correctly completed questionnaires were used, which is a response rate of 92.8 percent. Individuals were contacted based on a stratified random sample of residential addresses and were requested to give information related to their participation in ROSCAs. In order to achieve this we took only three out of nine administration districts of the city (Akria, Maitemenai and Godaif). These districts are the most populous districts and are located at the opposite exit corners of the city.

The questions forwarded to respondents were arranged based on relevance to the respondents' experiences with ROSCAs. This questionnaire comprises extensive range of parameters, such as savings and borrowing behavior of a respondent, membership size and amount of money contributed by a respondent, type of pot (fund) allotment decisions taken in his/her ROSCA and his/her preferred time to receive the pot (fund). In addition, the socio-demographic features of the respondent such as age, gender, marital status, household size, monthly income, employment and level of education are also included.

This study employs a quantitative approach for the purpose of examining magnitudes of the effects of various factors. Data collected were analyzed and interpreted by using SPSS version 23 and multinomial logit (MNL) regression model.

Eritrea is a country with a long history of war for independence. Its formal financial sector is still at its rudimentary stage and requires a lot of willpower, effort and policy management from policy makers to join the world stage. In addition, most of the banks are located in urban areas of the country away from the majority of the population. Even though much is not yet done to study the informal financial sector of the country, anecdotal evidences and some descriptive studies shows that people have been making use of these informal financial institutions like ROSCAs for centuries. Nowadays, there are also some microfinance institutions active in the country trying to reach specially the rural population of this nation.

As mentioned above, previous studies emphasized only on the rationale for participation in ROSCAs leaving behind other questions unanswered such as the decision on pot allotment mechanism, payment preference periods and frequency of paying contributions to the ROSCA's pot. To this end, this study endeavors to answer "*which socioeconomic variables (factors) may influence respondents in deciding to join which ROSCAs.*" This study is the first of its kind in the Eritrean context and we believe that it will contribute to the debate.

Discussions and results

The logit model is the most common economic method of describing how individuals choose between different alternatives and it is based on the assumption that individuals choose the alternative that provides them the highest utility. The model also shows how strongly different factors influence the choice of alternatives and the linkages between the factors (variables) (Bester *et al.*, 1996; Ben-Akiva, 1985; Algiers and Widlert, 1995).

The utility of the alternative ROSCAs modalities is dependent on the different characteristics of the alternatives, the design of the chosen ROSCAs, and the responders. The utility is described as a function of these factors (variables).

These models were first introduced in the context of binary choice models, where the logistic distribution is used to derive the probability. Their generalization to more than two alternatives is referred to as multinomial logit model (MNL) (McFadden (1974; Michel Bierlaire, 1997).

McFadden (1974) first introduced the MNL model to explain the choice of transportation modes of urban commuters with the random utility model. The model is preferred since it permits the analysis of decision across more than two categories in the dependent variable; therefore,

making it possible to determine choice probabilities of different channels. In addition, MNL is simpler to compute compared to Multinomial Probit (MNP) model which poses a challenge in computing multivariate normal probabilities for any dimensionality above two (Greene, 2003).

The modeler assumes the utility U_{ij} of a ROSCA balloting procedure model (that is, specifically balloting takes place either at the ROSCA's formation period, at the beginning of each round, at the request of a member or at the discretion of an organizer) to a member j . In addition, this study also looks at frequency of paying contributions to the ROSCA's pot (daily, weekly or monthly), and includes a deterministic component V_{ij} and an additive random component ϵ_{ij}

$$U_{ij} = V_{ij} + \epsilon_{ij} \tag{1}$$

Here, the deterministic component of the utility function is linear in parameters. Assuming that the random component, which represents errors in the modeler's ability to represent all the elements that influence the utility of a mode to an individual, is independently and identically Gumbel-distributed across individuals and alternative modes. The model (MNL) is as follows:

$$P_{ij} = \frac{\exp V_{ij}}{\sum_i \exp V_{ij}} \tag{2}$$

Where P_{ij} is the probability that alternative mode i is chosen by member j and i is the set of, for instance, different ROSCA's ballot procedures. The closed form of the MNL makes it straight forward to estimate (maximum likelihood estimation procedure), interpret and use. Detailed work on theory, shortcomings and some applications can be found in the literature (Greene, 2003).

SPSS analytical system has been used to determine which parts of the questionnaire were relevant and which were not to each other. The procedure used for the variables assesses the number of commonly used measures and also provides information on the relationships between the individual items in the scale such as gender, age, household size and mode of alternative ROSCA's procedures and bylaws.

We also attempted to analyze the influence of the several variables such as respondent's possession of a bank account, savings behavior of respondent, amount of money contributed by respondent to ROSCA, monthly income and expenditure of respondent on influencing the choice of a mode of a ROSCA. In addition, the influences of socio-demographic variables on choice of a mode of a ROSCA were considered.

The designing of mode choice model needs extensive evaluation of observed data and the efficiency of whole model system. In the current study, specific parameters are predicted to impact members' behavior when they have different choice of ROSCA's modes. Some of the parameters (such as amount of periodic contribution by a member, savings and borrowing behavior of a member, number of ROSCA's member is currently involved, of ROSCA's life cycle and membership size of a ROSCA) are considered to be substantial in literature, while other variables are presented exclusively to deal with specific research problems. These requirements consist of the parameters such as age (*Age*) gender (*Gender*), educational (*Education*) level, monthly income (*Income*) in Eritrean Nakfa, ethnicity (*Ethnicity*), religion

(*Religion*), occupation (*Occup*), marital status (*Mstatus*) and household size (*HHsize*) of the member has also been considered.

In the first round aMNL model for a type of ballot procedure has been designed for four options which are, ballot takes place “at the ROSCA’s formation period”, “at the beginning of each round”, “at the request of a member” or “at the discretion of an organizer”, to compare the application of these modes and determine the aspects, which might impact ROSCAs’ members. In this model, the dependent variable was “0” for formation period, “1” for beginning of each round, “2” for member’s request and “3” for discretion of the organizer. In the second round a MNL model for preferred period of receiving the pot has been designed for four dependent variable options that are receiving the pot “0” at early rounds, “1” at the end of rounds, “2” at holiday periods, or “3” no preferred period. In the third round aMNL model for frequency of paying contributions to the ROSCA’s pot has been designed for three dependent variable options which are “0” for daily, “1” for weekly” and “2” for monthly. The mode choice results can be used to compare the attractiveness of the different alternatives by different modes to determine their relative usage.

The data comprises of 464 members of different ROSCA groups working and living in the city of Asmara and 58.8% of these are females. The average age of respondents is 38.48 years old with the minimum age being 19 while the oldest is 80 years of age. The number of average school years of our respondents is 10.92 years. Of the total respondents 43.8% are employed by the public sector followed by those who are employed by the formal private sector (21.6%). The informal sector employs around 26% of respondents while the unemployed consists of 8.1%.

The statistical summaries (see table 1) shows the four different kinds of balloting categories namely ballot takes place at the ROSCA’s formation period, at the beginning of each round, at the request of a member or at the discretion of an organizer. Further descriptive results show that of the total respondents 33% claimed to have their balloting decided at the ROSCA formation period, 37.9% at the beginning of each round, 21.6% stated that their ROSCA’s balloting takes place at the request of a member, and 7.5% indicated that balloting in their ROSCA takes place at the discretion of the ROSCAs organizer (leader).

When conducting further analysis, balloting at the beginning of each round is taken as a base (reference) so that the other three choices (Formation, Request and Discretion) were compared to this base. The model summary as presented in table 1 shows a Likelihood Ratio value of 514.452 which is significant at the 0.05 level. The Nagelkerke and McFadden Pseudo R-squared values of 0.744 and 0.517 reveals the model is useful in predicting the ROSCAs balloting practices. Table 1 and table 2 provide further details.

Table 1: Statistical Results

Model	Fitting criteria	Likelihood Ratio Tests		
Intercept only	1157.254	Chi-square	Df	Significance
Final	985.588	171.666	33	.0001
<i>The Goodness-of-Fit</i>				
Pearson		1378.58	1305	0.77
Deviance		975.403	1305	1.00
<i>Pseudo R-squared</i>		Cox and Snell	Nagelkerke	McFadden
		0.304	0.336	0.147

Table 2: Classification

Classification					
Observed	Predicted				
	formation	beginning	request	discretion	Percent correct
Formation	70	57	23	3	45.8%
Beginning	30	131	15	0	74.4%
Request	20	34	45	1	45.0%
Discretion	13	17	1	4	11.4%
Overall percentage	28.7%	51.5%	18.1%	1.7%	53.9%

Table 3: MNL results of balloting at formation, at request orat discretion as compared to beginning of rounds

Variables	Formation				Request				Discretion			
	Coeff.	Std. error	Sig.	Odds Ratio	Coeff.	Std. error	Sig.	Odds Ratio	Coeff.	Std. error	Sig.	Odds Ratio
Intercept	2.560	0.896	0.004		3.266	1.259	0.009		-1.946	1.491	0.192	
Age	0.012	0.013	0.356	1.012	-0.030	0.017	0.070*	0.970	0.049	0.019	0.010*	1.050
HHsize	-0.112	0.060	0.064*	0.894	-0.217	0.084	0.010*	0.805	-0.201	0.098	0.041*	0.818
Education	-0.083	0.039	0.034*	0.920	-0.135	0.047	0.004*	0.874	-0.029	0.061	0.629	0.971
Gender (1)	0.828	0.268	0.002*	2.289	0.018	0.334	0.957	1.018	1.283	0.441	0.004*	3.607
Occup (1)	0.243	0.418	0.562	1.275	0.390	0.477	0.413	1.477	-1.495	0.641	0.020*	0.224
Mstatus(1)	-0.089	0.309	0.774	0.275	-1.337	0.389	0.001*	0.263	0.822	0.520	0.114	2.274
Ethnicity (1)	-1.221	0.385	0.001*	0.295	1.246	0.799	0.119	3.476	-0.394	0.710	0.580	0.675
Baccount(1)	-0.407	0.259	0.116	0.665	-0.599	0.310	0.053*	0.549	0.221	0.434	0.610	1.248
Eborrow(1)	-1.292	0.282	0.0001*	0.275	-1.602	0.317	0.000*	0.201	-0.324	0.504	0.519	0.723

- a. The reference category is beginning of each round
- b. * Statistically significant at 5% significance probability level

As stated above, the basic idea behind the estimation was to identify factors influencing members' choice of ROSCA of their likings. The estimations using the MNL model is presented on table 3. TheMNLestimates shows that age (*Age*), gender(*Gender*), house hold size (*HHsize*), ethnicity (*Ethnicity*), marital status (*Mstatus*),education (*Education*), occupation (*Occup*), bank account (*Baccount*), borrow (*Eborrow*) are found to have significant influenceon the probability that a ROSCA member chooses balloting to take place at the beginning, formation, request or discretion.The basic test of the estimates are indicated by their signs (+ or -).

Age is significantly related to 'beginning' and 'discretion'. In the first place it has asignificant negative sign indicating that respondent with higher age have a higher probability to choose 'beginning'balloting in contrast to the 'request'. One possible reason for this result is that in contrast to young people who are risk takers older people have the tendency to show risk averting behavior and feel more secure to have (beginning) with more flexibility than 'formation'. In contrast to the above result, age variable has a significant positive sign under the dependent variable 'discretion' indicating that respondent with higher age have a higher probability to choose discretion in contrast to the beginning. Perhaps this could be that older people have more social capital and trust on ROSCA leaders; hence, giving the right to choose to these leaders.

Regarding household size, the results reveal that respondents with larger family size have a higher probability to choose 'beginning' form of balloting in contrast to the others. A possible reason for choosing this form of balloting in contrast to the others is the simple fact that big families need more resources to maintain themselves, are most of the time in need of more liquid assets such as cash and prefer to have more flexibility in their chance of getting the pot by choosing 'beginning'.

As far as education is concerned, it was found to explain significantly the 'formation' and 'request' forms of balloting. The coefficient for education was negative for 'formation' and 'request' form of balloting, which implied that as people got more years of education the probability to choose the balloting form 'beginning' increases in contrast to the other two. One possible reason is that educated people have more exposure, knowledge and more investment opportunities. Thus, they wish to receive the pot early so as to invest it in new ventures.

Gender variable (*gender1*) has substantially contributed to explain the formation and discrete form of balloting. The coefficient for gender was positive for both forms, which implied that males were more likely to choose these forms of balloting. It seems plausible that males were more liquid, less afraid of risk of default and show more preference for the random balloting at the formation of the ROSCA or leave it to be decided at the discretion of the ROSCA chairman.

The coefficient of the variable occupation (*occup1*) was found to be negative and significant, indicating that for people working in the public sector the probabilities of selecting a discrete form of balloting decreases vis-à-vis the beginning form of a balloting. This result may have been influenced by the fact that people working in the public sector in Eritrea are poorly paid and always have an awkward liquidity state and could not live the chance of getting the pot at the discretion of a third party.

Similarly the significant negative sign on marital status (*Mstatus1*) variable for request form of balloting indicates that married respondents prefer to get their pot at the beginning than to officially request for the pot. The possible reason is that they do not want to leave the chance of getting the pot early in exchange of getting it at the whim of a chairperson.

Ethnicity was another variable considered to influence the choice of balloting. As the dominant ethnic group in Asmara is Tigriana, the respondents belonging to it are designed with 1 and all respondents belonging to other ethnic groups are designed with 2. The coefficient of this variable (*Ethnicity1*) was found to be significant with a negative sign for the formation form of balloting implying that Tigriana ethnic group prefers to join ROSCAs which have the beginning form of balloting. This can be attributed to the fact that within the metropolitan area the social capital and social fabric of this ethnic group seems to be relatively loose creating more anonymity and making people to be more conscious of default risk.

In addition, bank account variable (*Baccount*) signifies whether the respondent has a bank account with any formal financial institution. The significant negative sign on bank account (*Baccount1*) for request form of balloting indicates that respondents with bank accounts prefer to join ROSCAs with random balloting at the beginning of each round. A possible reason for their choice of this form of balloting might be that they want to try their chance at a draw rather than competing against other members to give a better and convincing reason to persuade the ROSCA chair to get the pot at his/her convenience.

Finally, the categorical variable 'borrow' (*Eborrow*) indicates whether the respondent borrows money regularly from formal and/or informal sources of credit and the negative significant sign indicates that the respondent prefers the beginning ballot to the formation and request forms.

One possible reason can be that the individual has other sources of financing and beginning form of balloting gives him/her more flexibility and freedom comparing to the other two.

Further analysis was conducted to determine members' choice of preferred contribution period to the pot: with monthly contribution is taken as a base (reference) so that the other two choices (daily and weekly) were compared to this base. The model summary as presented in table4 shows a likelihood ratio value of 803.32 which is significant at the 0.0001 level. The Nagelkerke and McFadden Pseudo R-squared values of 0.256 and 0.103 reveals that the model is useful in predicting the members' preferred period of contributing to the pot. Table 4 and table 5 provide further details.

Table 4: Statistical Results

Model	Fitting criteria	Likelihood ratio tests		
Intercept only	656.994	Chi-square	Df	Significance
Final	579.128	77.865	26	0.0001
<i>The Goodness-of-Fit</i>				
Pearson		268.713	162	.0001
Deviance		185.577	162	0.099
<i>Pseudo R-squared</i>		Cox and Snell	Nagelkerke	McFadden
		0.135	0.190	0.117

Table 5: Classification

Observed	Predicted			
	Daily	Weekly	Monthly	Percent Correct
Daily	5	0	31	13.9%
Weekly	1	3	49	5.7%
Monthly	1	2	370	99.2%
Overall percentage	1.5%	1.1%	97.4%	81.8%

Table 6: MNL results for Daily and Weeklyas compared againstMonthlypot contribution

Variables	Daily				Weekly			
	Coeffi.	Std. error	Sig.	Odds Ratio	Coeffi.	Std. error	Sig.	Odds Ratio
Intercept	1.294	0.999	0.195		1.373	0.930	0.140	
<i>Gender (1)</i>	0.810	0.397	0.041*	2.249	-0.118	0.325	0.717	0.889
<i>Ethnicity (1)</i>	-1.507	0.677	0.026*	0.222	-0.213	0.569	0.708	0.808
<i>MStatus(1)</i>	1.074	0.393	0.006*	2.926	0.156	0.328	0.635	1.169
<i>Religion (1)</i>	-0.159	0.721	0.826	0.853	-1.336	0.535	0.013*	0.263
<i>Baccount(1)</i>	-0.712	0.401	0.076*	0.491	-0.033	0.319	0.919	0.968
<i>NoROSCAs (2)</i>	-2.033	0.817	0.013*	0.131	-1.748	0.623	0.005*	0.174
<i>Duration</i>	-2.146	0.831	0.010*	0.117	-0.888	0.847	0.295	0.412

- a. The reference category is monthly contribution
- b. * Statistically significant at 5% significance probability level

Again MNL estimation was employed to identify factors influencing members' choice of contribution period to the ROSCA pot and the choices are whether he/she likes to contribute monthly, weekly or daily. The summary of estimations using the MNL model is presented on table6. The results of the MNL estimates shows that gender (*Gender1*), ethnicity (*Ethnicity1*), religion (*Religion1*), marital status (*Mstatus1*), bank account (*Baccount*), borrow (*Eborrow*) and

duration (*Duration*) are found to have significant influence on the probability that a ROSCA member chooses the one that he/she prefers and based on that joins a ROSCA.

The significant positive sign on the variable gender (*Gender1*) indicates that male respondents than females have a higher probability to choose a daily contributing ROSCA than the monthly one. One possible reason could be that many males work on a kind of jobs such as taxi drivers, retailing and other informal jobs in which they get cash money on daily basis and prefer to deposit it in a ROSCA pot rather than keeping it idle with them.

The coefficient of ethnicity variable (*Ethnicity1*) was found to be significant with a negative sign for the period of contribution indicating that the Tigrigna ethnic groups have a higher probability to prefer the monthly contribution. Perhaps this behavior can be traced back to the fact that majority of this ethnic group are civil servants and regular private sector employees with a monthly salary and the monthly pot ROSCA is the one that suits them best.

Regarding marital status, the significant positive sign (*Mstatus*) indicates that married respondents have a higher probability to choose a daily contributing ROSCA than the monthly one. One possible reason might be that married individuals do not want to be seen at home by their partners holding idle cash on daily basis and they regularly deposit it with a daily ROSCA.

Religion is another variable considered in this study. The two dominant religions in Eritrea are Christian and Islam. Since in Asmara and its environs Christian population dominates in number, the data collection is designed in such a way that "1" indicates Christian, while "2" shows a Muslim. The coefficient of religion variable (*Religion1*) was found to be significant with a negative sign for the period of contribution indicating that there is a high probability that Christian religion follower to choose the monthly pot ROSCA. As aforementioned, majority of the city's residents are Christians and live and work as civil servants and as private sector employees with regular monthly salary. Accordingly, this could be taken as a possible reason for their choice of the monthly pot contribution.

As far as bank account is concerned, the coefficient of this variable (*Baccount*) was found to be significant with a negative sign for the period of contribution indicating that respondents who have a bank account with financial institutions have a higher probability to choose monthly rather than daily contributing ROSCA. This could be attributed to the fact that these respondents have an alternative mechanism of depositing their daily cash other than in a daily ROSCA.

In addition, the number of ROSCAs to which a respondent can be a member was considered. A respondent can be a member of one ROSCA with sign of "1" or more than one ROSCA with a sign of "2". The significant negative sign on this variable (*NoROSCAs*) indicates that respondents having more than one membership have a higher probability to choose a monthly contributing ROSCA than the daily or weekly ROSCAs. This might be that it is easy for her/him to control her/his cash flow and accounts with the monthly than the other form of ROSCAs.

Finally, duration variable (*duration*) indicates the length of a ROSCA's life cycle and the significant negative sign on this variable indicates that a respondent has a higher probability to choose the long duration ROSCA. This implies that the longer is the duration the higher is the probability a respondent to choose a monthly ROSCA. It is obvious that daily and weekly ROSCAs are of a shorter duration and people with monthly source of income would be forced to choose the longer duration ROSCA as his/her source of income is also of monthly nature.

Conclusions and recommendations

The main objective of this study is to investigate which socioeconomic variables influence respondents in deciding to join which ROSCAs. The key finding on members' choice of balloting form is that gender, age, household size, education level, occupation, marital status, ethnicity, and bank account are found to be significant variables influencing the decision. Similarly, other variables such as gender, ethnicity, marital status, religion, bank account, membership to a number of ROSCAs and duration of a ROSCA are found to be significant variables in explaining the choice of respondents' period of pot contribution.

The findings on the choice of balloting form and choice of respondent's period of contribution implies that any policy measure designed to transform ROSCAs must address the multiple features of the ROSCAs which include the above variables among others. Moreover, any design of a micro-finance product aimed at replacing ROSCAs which does not address these elements might be doomed to fail. It also implies that ROSCAs are compliments to formal finance rather than substitutes.

Any successful microfinance efforts meant to tap the savings among the poor which is currently in ROSCAs. However, as their savings are relatively small, there should be no minimum deposits requirements but rather they should be accepting any amount. Collaboration between microfinance, banks and electronic money transfer service providers should entail agreements that the poor deposit these low amounts and be able to transfer them to their bank accounts.

Given that the study was undertaken in a specific urban setting, we recommend the need for a comparative investigation into the socio-cultural institutions that influence participation in ROSCAs in the rural and other urban areas of Eritrea. This is because the rural areas pose different cultural values from the urban in terms of the institutions that influence participation because of the cultural diversity of the residents in urban areas. In addition, a similar study should be done in among minority (ethnically) groups to compare results with the findings of this study. This is because different ethnic backgrounds may pose different cultural values.

The government needs to recognize the role that ROSCAs play in the provision of financial services to the poor. It; therefore, should ensure allocation of funds to support further research on how these organizations and the mechanisms in which they operate can be leveraged to develop financial services that can meet the needs of the low income earners.

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