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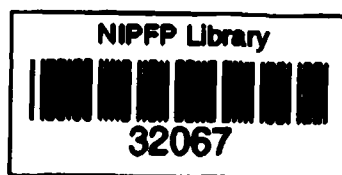


**Charles W. Calomiris
Indira Rajaraman**

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The role of ROSCAs: lumpy durables or event insurance?

Charles W. Calomiris^a, Indira Rajaraman^{b, *}

^a *Graduate School of Business, Columbia University, New York 10027, USA*

^b *National Institute of Public Finance and Policy, New Delhi 110067, India*

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Abstract

The stylised representation of ROSCAs in recent theoretical work as a device driven by impatience for lumpy consumer durables misses the important insurance role of this pervasive informal financial institution in the developing world. That insurance role explains why ROSCAs with concurrent bidding are the dominant means of determining the sequence and pricing of allocations. In ROSCAs so structured, the recipient and the implied interest rate for each period's allotment are determined by competitive bids at the time of distribution. We use an example of an actual bidding ROSCA to demonstrate the extent of unpredictable needs for funds, as reflected in the volatility of interest rates implicit in winning bids. © 1998 Elsevier Science B.V. All rights reserved.

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1. Introduction

The ROSCA (rotating savings and credit association), an informal financial institution widely reported in the developing world, has attracted some theoretical attention in recent years (Besley et al., 1992, 1993).¹ This paper addresses the

* Corresponding author. Tel.: +91-11-669303; fax: +91-11-6852548; e-mail: indira@nipfp.ernet.in.

¹ See also Besley and Coate (1995) and Von Stockhausen (1982) on related arrangements.

issue of whether the stylised representation of ROSCAs in these models retains the essence of the arrangement and its purpose.

A ROSCA is a voluntary grouping of individuals who agree to contribute financially at each of a set of uniformly-spaced dates 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. Allotment is either through lottery (random ROSCAs) or auction (bidding ROSCAs). Bouman (1977) (p. 205) sees bidding ROSCAs as having evolved in response to the need of participants for greater control over order of access.² When all members have been so served, the group disbands, although it may regroup and repeat the process. The variation on this basic theme between and within countries is known to be enormous. Group size is usually small, because the burden of contract enforcement falls upon the group.³ The interval between payment dates ranges from one day to six months. Where the rate of inflation is high, the pot may be denominated in kind and the contribution in money correspondingly indexed. ROSCAs have been reported in the extensive field literature to exist in the developing world in both urban and rural areas, among both males and females, and among all classes including the poor. ROSCAs are not by any means confined to the poor; but evidence on participation by the poor is very widespread.⁴

In recent theoretical work, Besley et al., 1993 (hereafter B-C-L), model ROSCAs as a means of acquiring indivisible consumer durables.⁵ The survey by

² A third possibility is allotment through membership hierarchies such as order of joining, or group consensus, or the discretion of the ROSCA organizer; the last shades into the bidding ROSCA where the organizer can be bribed to alter order of receipt, as reported by Geertz (1962) (p. 258) among the Ibos.

³ There is general agreement that the majority of ROSCAs are "self-selected peer groups which shape their own organization and make their own rules" (Bouman, 1979, p. 259). There are also large-group interest-paying variants reported from India and Ethiopia, which shade into a more bank-like intermediary role.

⁴ The only systematic field survey with structured interviews covering about 900 respondents is that reported in Adams and Canavesi de Sahonero (1989), for Bolivia. Other field reports range from less formal and much smaller surveys (e.g., in Mexico by Cope and Kurtz, 1980), to the anthropological and anecdotal. Reviews of these are available in Geertz (1962), Ardener (1964), Anderson (1966), Bouman (1977), and Holst (1985). Female participation is often reported to be higher than male participation (Adams and Canavesi de Sahonero, 1989; Ardener, 1964; Geertz, 1962). The hallmark of ROSCAs is their accessibility to the poorest, which often is attributed to low transaction costs of ROSCAs (Bouman, 1977, p.183). Indeed, Kurtz (1973) (p. 55) sees poverty as a particular "correlate of ROSCA participation."

⁵ There is no role for saving in the B-C-L model other than to enable consumer durables acquisition, since households by assumption can neither lend nor borrow. There is also no time preference, but there is impatience for consumer durable ownership because utility from all other consumption is non-separable from, and enhanced by, such ownership. ROSCAs are motivated by this impatience because without them, large purchases would be delayed for all; with ROSCAs, participants can make such purchases with less delay.

Besley (1995), drawing upon the B-C-L model, classifies ROSCAs under informal credit rather than informal insurance (Besley, 1995, pp. 2176–2179). For bidding ROSCAs, B-C-L view a bid as “a pledge to contribute a certain amount to the ROSCA at a constant rate over its life, in exchange for the right to receive the pot at a certain meeting date” (B-C-L, 1993, p. 797). This implies, in effect, a menu offered to participants at the time of ROSCA formation of receipt-date/bid pairs. Members contribute unequally towards a uniform receipt differentiated only by timing of receipt. Under heterogeneous preferences, the order of receipt will be determined by the individuals’ valuation of early consumption, and the (implicit) interest rate across adjacent periods will decline over time deterministically. If preferences are uniform, members will be indifferent at the margin between the different pairs, and the implied interest rate will be the same across all periods. So reduced, the B-C-L bidding ROSCA becomes in effect a bundled variant of the random ROSCA.

With one exception, none of the field studies surveyed by Ardener (1964) (p. 213), Bouman (1979) (p. 270) and Holst (1985) (p. 129) report ROSCAs of the B-C-L *ex ante* bidding variety.⁶ Instead, they report arrangements where bids are concurrent with allotments. Each allottee receives the fund minus his bid, which is not determined in advance, and can therefore vary with the contingent needs of the bidders.⁷ Field evidence reported in the World Development Report 1989 (International Bank for Reconstruction and Development, 1989) records the prevalence of concurrent discount bids of this type in India, China, Thailand and Africa. Indeed, even with random ROSCAs, there exists evidence of accommodation to uncertainty regarding the timing of need of the fund through secondary market transactions.⁸

Undoubtedly, the indivisibility of consumption goods motivates at least some ROSCAs. But by itself, this approach cannot explain the fact that actual allocations received by participants are subject to *ex post* variation via the bidding process. The prevalence of *ex post* variation in allocations suggests an important insurance feature to ROSCAs. By allowing participants to bid concurrently for pots, those who suffer large unpredictable needs for immediate cash can pay to

⁶ The single case in the literature of an *ex ante* bidding ROSCA of the B-C-L variety is reported by Campbell and Ahn (1962), for Korea, where contributions towards a uniform fund vary not only between individuals, but also for the same individual before (more) and after (less) receipt of the fund.

⁷ Ardener (1964) (p. 213) distinguishes between non-random ROSCAs where “the pattern of payments... (is) known in advance” (see ²) and bidding ROSCAs, where they are not.

⁸ Evidence on internal tradability of allotment order with or without explicit compensation is in Fernando (1986) (p. 254), Begashaw (1978) (p. 254), and Bouman (1977) (p.188). The latter (p. 205) also reports ROSCAs with a parallel reserve fund from which borrowing can be done at a rate of interest against eventual receipt of the fund. Evidence on transferability of ROSCA entitlements to external creditors, or use of these as loan collateral, is in Ardener (1964) (p. 215), Bouman (1977) (p.207), and Bouman (1979) (p.269).

place themselves at the head of the line for the pot. In circumstances where several people simultaneously suffer such a shock, bidding allows the participant in greatest need to compensate others for early access to funds.

Any theorising about the poor in developing countries has to accord centrality of focus to uncertainty and the need for buffers against that uncertainty, as emphasised in Deaton (1990). B-C-L argue against viewing the primary function of ROSCAs as insuring against risk, because the fund ‘‘only permit(s) individuals to deal with situations which cannot recur, since the pot may be obtained no more than once’’, and because ROSCAs cannot insure against common shocks. These arguments are not convincing grounds to reject the view that insurance motivates ROSCAs. For recurring risks, insurance against multiple events over time is possible through simultaneous membership in more than one ROSCA, or multiple shares in a single ROSCA.⁹ Furthermore, the timing of even anticipated non-recurring events like a funeral or dowry payment can be sufficiently uncertain that there is a need for insurance through concurrent bidding. Such events can be mainly independent across participants. Of course, even if needs for cash are positively correlated among a group of individuals, there will still be beneficial risk sharing as long as the correlation is not perfect.

For a given level of feasible contribution, the size of the wealth shock insured against can be varied by the size of the group joined, with a corresponding trade-off against the length of time between bidding.¹⁰ The longer the bidding interval, the greater the chance that members in need of funds will suffer illiquidity between bidding dates. When the frequency of contribution and allotment is daily, that risk is reduced to near-zero. Daily ROSCAs are reported from many regions among daily labourers and providers of urban street services such as hawkers and shoeshine boys;¹¹ thus, the potential insurance function is at its most complete, not surprisingly, for ROSCAs formed by the poorest socio-economic class. For these participants, it is unlikely that the driving economic motive behind participation in daily ROSCAs could be the acquisition of durable goods. ROSCA ‘pots’ may be used to purchase consumer durables, ex post, when exigencies insured against do not materialize during the life of the ROSCA, akin to the unintended bequest component of savings behaviour in developed countries

⁹ There are several field reports of multiple membership, such as that by Geertz (1962) (p. 246) for Java, where almost every woman is said to have belonged to several. The only numerical estimate of the extent of multiple membership is in Adams and Canavesi de Sahonero (1989), for Bolivia, at 10% of total ROSCA membership.

¹⁰ Further flexibility may be obtained by having one share split between more than one member, as reported by Begashaw (1978), for Ethiopia.

¹¹ The survey by Adams and Canavesi de Sahonero (1989) reports that daily ROSCAs accounted for 15% of all ROSCAs in Bolivia; altogether, 56% of all ROSCAs met more frequently than monthly. Other sources reporting daily ROSCAs are Begashaw (1978) (p. 260) for Ethiopia, Geertz (1962) (p. 248) for Java, and Nayar (1983) for India, as cited in Bouman (1977).

(Kotlikoff and Spivak, 1981).¹² Field studies that collect information on the actual disposition of ROSCA pots may in that case underestimate the insurance role of the institution.

The insurance function of ROSCAs is explicitly mentioned in the surveys by Bouman (1977) (p. 200), Bouman (1979) (p. 267), Geertz (1962) (p. 247), and Ardener (1964) (p. 219), who links the insurance function to bidding ROSCAs in particular, but sees it performed also by random ROSCAs where the order is alterable. It is important to recognise that ROSCAs primarily insure against event uncertainty rather than the agricultural income uncertainty emphasized in Deaton (1990). Such inherently non-idiosyncratic risks (at least within a region) cannot be handled through ROSCAs, although even there ROSCAs may play a role. An interesting hypothesis advanced by Rosenzweig and Stark (1989), and validated using data from South India, suggests that households may select brides from villages at some distance so as to reduce the covariation between agricultural failure in her natal and marital locations. Insurance claims of this sort placed by the marital family may be the kind of exogenous shocks that the natal family might insure itself against through the mechanism of concurrent-bidding ROSCAs.

Section 2 presents the bidding pattern from an actual concurrent bidding ROSCA. We argue that the large fluctuations in the discount rate implied by the bidding process are consistent with an important insurance role.

2. A sample bidding ROSCA

Table 1 presents information for an actual ROSCA allotted through concurrent bidding that operated monthly over the period July 1985 to June 1987 in an Indian city. Thirty members each contributed Rs 200 to constitute a fund of Rs 6000 every month. In all months other than the second, in which the organizer/enforcer took the pot, bids were invited and the highest bidder received Rs 6000 minus his bid. If the funds remaining after allotment were large enough, a second round of bids was invited and another allotment was either made (as in month 1, for example), or not (as in month 3). Any post-bidding residual was held by the organizer and carried forward with interest to be added to the fund available for distribution the next month. The residual in the last month was distributed equally

¹² That this happens fairly often is attested to by the fact that there is evidence from India and Korea (Bouman, 1977, pp. 206–209) of banks organizing ROSCAs, and offering deposit facilities for those wishing to hold the fund in liquid form. It is also reasonable to expect that ROSCAs of the B-C-I variety would be encouraged or organized by purveyors of durable goods, since they stand to gain from ROSCAs directed uniquely at durable goods acquisition.

among all members.¹³ Concurrent bidding ROSCAs share with random ROSCAs the advantage of uniform and equal contributions, and as long as the formula for disposal of the residual remaining after (the unequal) allotment is transparent and simple, the fairness of the arrangement is easily assessed.¹⁴

Bidding ROSCAs end when all participants have succeeded in winning one pot. Multiple allotments in six of the months resulted in a 24-month lifespan for the ROSCA in Table 1. If bidders had had perfect foresight about the actual duration of the ROSCA from the beginning, then the monthly interest rate implicit in each period's winning bid would solve the following equation:

$$\text{Pot}_t = \text{Pot}_{24} / (1 + i)^{24-t},$$

where t is the bidding period. Table 1 presents these calculations, also plotted in Fig. 1. The actual duration of the ROSCA is not, in fact, known in advance. What is known *ex ante* is that the upper and lower bounds of the duration of the ROSCA are 30 and 16 months, assuming the number of pots per month can never exceed two (and cannot exceed one in the month in which the organizer takes the fund).

Assuming that participants can predict duration may be defensible as a rough approximation on the grounds that ROSCA participants are repeating a game that has been played many times, but it is certainly possible that the updating of priors regarding duration as a function of the bidding process could lead to errors in our measure of fluctuations in interest rates from period to period, as we discuss below. Of course, from the standpoint of deterministic models of ROSCAs (like B-C-L) our assumption of perfect foresight regarding future bidding, and hence duration, is unobjectionable. The final pot was not known in advance. The rules of this ROSCA set the final pot equal to the pot that resulted from bidding in the penultimate period. For simplicity, the final pot is assumed to be expected at Rs 6000 in our calculations.

That spending exigencies not anticipated at time zero can and do seem to arise in the course of operation of the ROSCA is strongly supported by the fact that the bids do not monotonically decline from one period to the next as they would if interest rates were constant or declining over time (as implied by the deterministic B-C-L model, with homogeneous or heterogeneous preferences, respectively). Months in which the implicit interest rate was higher than in the preceding month are 4, 6, 7, 10, 13, 15, 16, 17, 18, 20, 21 and 23 (Fig. 1). The rate of interest on sums carried forward shows the same tendency as the implied rate of discount to

¹³ Distribution of the residual without multiple allotments is the mode of disposal in all months in the sample ROSCAs reported in Radhakrishnan et al. (1975) and Bouman (1979), where there was no augmentation of the fund at any date with past residuals.

¹⁴ The contribution may appear to vary between time-periods only because it may be reported after subtraction of the dividend, either concurrently, or as in the samples in Radhakrishnan et al. (1975), in the next time-period; but it is uniform between contributors.

Table 1

Details of an urban Indian Rosca operated from 1985 to 1987, with 30 members, each contributing Rs 200 at intervals of 1 month

Month	Draws	Balance from previous month	Interest on balance	Discount bid	Fund received	Monthly interest rate (%)
1	1	0	0	3150	2850	3.29
	2	–	–	2855	3145	2.84
2	3	5	0	0	6000	0.00
3	4	5	0	2205	3795	2.21
4	5	2210	100	2250	3750	2.38
	6	–	–	2200	3800	2.31
5	7	760	30	1800	4200	1.90
6	8	2590	125	1825	4175	2.04
	9	–	–	1920	4080	2.17
7	10	460	20	2050	3950	2.49
8	11	2530	100	1700	4300	2.10
	12	–	–	1700	4300	2.10
9	13	30	0	1400	4600	1.79
10	14	1430	0	1400	4600	1.92
11	15	2830	50	1075	4925	1.53
12	16	3955	65	800	5200	1.20
13	17	4820	75	810	5190	1.33
	18	–	–	890	5110	1.47
14	19	595	25	715	5285	1.28
15	20	1335	25	880	5120	1.78
16	21	2240	50	810	5190	1.83
17	22	3100	75	905	5095	2.36
18	23	4080	45	960	5040	2.95
19	24	5085	15	205	5795	0.70
20	25	5305	15	435	5565	1.90
	26	–	–	385	5615	1.67
21	27	140	–	330	5670	1.90
22	28	470	–	200	5800	1.02
23	29	670	–	120	5880	2.04
24	30	790	–	120	5880	...

Bidders receive the fixed total contribution (Rs 6000) less their bid (col. 5). Thus, in each row (i.e., for each draw), columns (5) and (6) must sum to Rs 6000. The organizer took the third draw at a zero discount. After subtraction of all draws made in any month, the residual is carried forward to the next month. This balance together with the interest on it (col. 3+col. 4), when added to the freshly constituted fund of Rs 6000 yields the total sum available for distribution in each month. The last balance of Rs 910 was equally distributed among all 30 members. Multiple draws reduced the life of the Rosca from a maximum possible 30 months to an actual of 24 months. The calculation of the implicit monthly interest rate is explained in the text.

fluctuate around a generally falling trend over time, and is of the same order as the rate of discount. This suggests that the funds may have been lent to members of the ROSCA, with perhaps bidding and one-time access similar to that operating in the case of the pot itself.

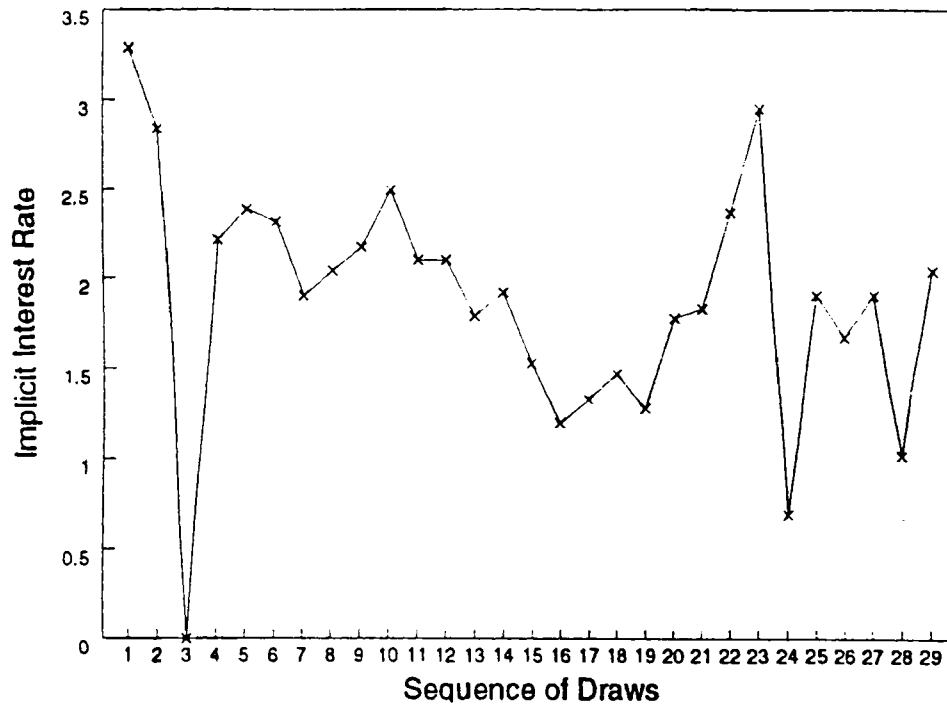


Fig. 1. Monthly implicit interest rates by draw.

Events whose timing was not anticipated as recently as the previous month account for fluctuations in demand for funds and changes in interest rates across periods. Updating of priors regarding the duration of the ROSCA cannot explain the variation in measured interest rates, at least for some periods. Because month 18 was a single-allotment month, for example, any updating from month 18 to month 19 on the basis of bidding in month 18 would have been in the direction of a longer expected duration. That would imply a rise in measured interest rates from month 18 to month 19 (since the formula has a constant expected duration). Instead, the measured interest rate fell from month 18 to month 19. Similarly, because month 6 was a double-allotment month, updating about T from month 6 to 7 should have produced a fall in the measured interest rate from month 6 to month 7; but there is instead a rise in the interest rate from month 6 to month 7. Thus, the actual behaviour of interest rates in these months cannot be explained by changes in duration expectations, which would have produced changes in the opposite direction. It is clear from the large month to month variation in the implicit interest rate that the purpose of ROSCA membership would not have been served as well by a pre-arranged ordering of disbursement, as in the B-C-L model.

Interestingly, in months 6 and 13, in both of which there were multiple allotments, the winning bid in the second round was higher than in the first round. These were both months in which the fund carried forward was high enough to ensure a second round of bidding, and in which bidders seem to have concealed

their need in the first round in the hope of getting a lower bid in the second round.¹⁵

3. Conclusion

Insurance of net expenditure risk can explain the widely-reported prevalence of concurrent bidding ROSCAs. Insurance may play a role in random and other non-bidding ROSCAs as well, where there is evidence that secondary market transactions perform a similar function to concurrent bidding. We do not claim that insurance motivates all ROSCAs, but neither can the predictable consumption of lumpy durables be the sole motive. Future research on ROSCAs should focus on the variation in winning bids over time as a means of gauging the importance of insurance as a motive.

The value of ROSCAs as insurance devices is further suggested by the variation in their bidding frequency, which is closely tied to the frequency of wage income receipts, with the low end of the range found among daily-hire labourers, hawkers and others for whom income receipt is by the day, and the upper end of the range found among agriculturists with widely-spaced income receipts dictated by crop cycles.

Bidding ROSCAs are an effective way to deal with net expenditure risk in the presence of enforcement costs, information costs and transactions costs. Bidding ROSCAs are not perfect devices for protecting against risk because (1) enforcement considerations limit the number of participants and (2) covariant risk among any subset of participants will lead to imperfect insurance (i.e., the interest rate implicit in the winning bids will vary from month to month with the number of exigencies that affect the group). Thus, ROSCAs are better able to insure against event uncertainty than against the income uncertainty emphasized by Deaton (1990). Inherently, non-idiosyncratic risks like agricultural price fluctuations cannot be eliminated through ROSCAs, although even here, ROSCAs may play a supplementary role. In the presence of asymmetric information (that limits more precise, state-contingent insurance), it may be hard to design superior insurance schemes.

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¹⁵ Bouman (1979) (p. 270) reports 'crafty' bidding practices whereby those in need of funds are competitively bid up to a higher discount than necessary by other members.

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