AN ECONOMIC MODEL OF SELF-HELP GROUPS: POLICY IMPLICATIONS FOR BANKS AND NGO INITIATIVES

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Abstract: In India, the Self-Help Group (SHG) has emerged as a suitable innovative institution in bringing formal financial sector credit to poor. This article constructs an economic typology of SHGs based on four important economic variables, namely, interest on members' savings paid by the SHG, sharing of SHG surpluses by members, members' claim on exit from the SHG and lending rates charged by the SHG to members. An economic analysis of each type of SHG shows these variables to be important in terms of the members' costs of borrowing and demand for credit. Based on the analysis, some leads for a set of policy guidelines for each type of SHG are presented. Copyright © 2001 John Wiley & Sons, Ltd.

INTRODUCTION

The economics of micro finance views market failure as the primary reason for the inability of formal financial institutions (FFIs) to directly serve the needs of poor individuals. Various innovative schemes have found ways out of this impasse, making credit to the poor a financially viable proposition. These schemes have increased loan recovery rates and reduced the high fixed costs in dealing with small and frequent loans, thereby allowing FFIs to give poor borrowers access to credit at reasonable rates of interest.

Innovative schemes, including intensive loan collection methods and incentives to repay, savings schemes as loan insurance, group lending and other peer monitoring devices, have been widely adopted in many countries and the experiences of institutions like the Grameen Bank in Bangladesh, the BancoSol in Bolivia and KREP in Kenya are well documented.[1]

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[1]For a comprehensive survey on the economics of micro finance and various innovative schemes, see Hulme and Mosley (1996).

In India, the Self-Help Group (SHG)[2], has emerged as a suitable innovative institution to link poor borrowers to FFIs. The credit activity of an SHG typically begins with its members' own savings and some supplementary resources in the form of grants or interest-free loans, used as a revolving fund to provide loans to individual members.[3] With sufficient experience, the SHG then seeks to enhance its revolving fund by obtaining grants and loans from NGOs and FFIs, including commercial banks and re-finance organizations like the National Bank for Agriculture and Rural Development (NABARD) and Small Industries Development Bank of India (SIDBI).

Though SHG credit remains a small fraction of total refinance to the rural sector in India, it is expected to grow into an important credit delivery system to the rural poor. NABARD (1999) envisages the SHG-bank linkage program to 'cover at least one third of the rural population by the year 2008 through one million SHGs'. In tune with these expectations, most studies elaborate on the 'success' of the SHG in reducing FFI lending costs, increasing loan recovery rates to very high levels[4] and giving the rural poor access to formal credit.

This paper does not examine these claims. Instead, it draws attention to four economic variables, namely:

(i.) Interest on member's savings paid by the SHG.
(ii.) Sharing of SHG surpluses[5] by its members.
(iii.) Member's claim on exit from the SHG.
(iv.) Lending interest rates charged to members by the SHG.

As we will see, the choice[6] of these variables has a significant effect on each member's cost of borrowing and demand for credit; the outcome not necessarily being in the best interest of the SHG or its members. A set of economic guidelines on the most appropriate choice of these variables, based on an understanding of the economics of SHGs, needs to be developed and passed on to SHGs by FFIs and NGOs involved in such initiatives.

AN ECONOMIC TYPOLOGY OF SHGs

From available studies and reports, supplemented by discussions with NGO co-ordinators, we construct an economic typology of SHGs in Table 1. This typology is not exhaustive. Several permutations and combinations in the economic organisation of SHGs are possible. However, the three types constructed below do reflect what is most commonly found in practice in India.[7]

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[2]Self-Help Groups are often involved in a wide range of socio-economic activities with credit being just one of them. In this paper when we refer to an SHG, we do so only to its credit activity.
[3] For a practitioner's view of SHGs, see Fernandez (1998)
[4]Fernandez (1998) and Karmakar (1999) report recovery rates of 95 per cent. During discussions with NGO workers, recovery rates reported were as high as 99 per cent, if not 100 per cent.
[5]Surpluses are income from lending less cost, including any interest payments on loans, members' savings, etc.
[6]Choice here means both, qualitative or a matter of policy, as well as quantitative or assigning values to the variable. For example, the SHG will first have to decide whether it would pay members interest on savings and, if yes, the percentage of interest to be paid.
[7]The common feature of SHG are their membership size of 15–20 and monthly contribution of about Indian Rupees 20 (approximately US $ 0.5). This amount is typical but could vary. Weekly, instead of monthly, contributions are also common depending on how wages are received by members.

Table 1.   Economic typology of SHGs.

	Type I	*Type II*	*Type III*
Interest on member's savings	No	Yes	No
Sharing of surpluses	No	No	Yes
Member's claim on exit from SHG	Savings[8]	Savings	Savings
Interest rate on lending[9]	Fixed & unique	Fixed & unique	Fixed & unique

ASSUMPTIONS, NOTATIONS AND NUMERICAL VALUES

We make the following assumptions throughout our analysis:

- No transactions costs in lending and borrowing, like documentation, travel costs, etc.
- The SHG begins with members' savings only. The SHG subsequently decides whether or not to seek external grants and loans.
- The entire Common Fund of the SHG, which consists of members savings, surpluses earned as well as grants and external loans (if taken), is available for lending. No reserves are held by the SHG.
- Loans are used for productive or financial investment only. Loans for consumption and contingencies are not explicitly considered.

We use the following notations and abbreviations:

m = number of members in the SHG

M_j = an individual member where $j = 1, \ldots, m$

s_j = savings of each member j.

d = interest forgone on savings; for example, if a member deposited her savings in a local bank or post office instead of the SHG. Members consider this forgone interest a fixed cost.

e = interest rate paid by the SHG to members on savings as in type II SHG only.

r = the SHG's lending rate to members which is fixed and unique; r is also the marginal cost of borrowing.

L_j = amount borrowed by each member j from the SHG.

D_j = member j's demand curve which is also her marginal return curve.

AR_j = member j's average return curve[10]

X = external loans and grants; X is taken net of any interest payable on these loans.

CF = Common Fund

Rs = Indian Rupees

For sake of graphical illustration, we assume $m = 2$. Though one needs to be cautious in generalizing arguments from numerical examples, we thought it appropriate to use a few in our analysis. The values chosen for the variables are based on convenience, though close

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[8]In all three types, savings refer to principal saved and do not include interest on savings.

[9]Though some SHGs charge variable rates, these are usually purpose related, i.e. higher rates for consumption loans, not on the basis of size or duration of loan. Moreover, in spite of close monitoring of loan usage by other group members, the fungibility of credit makes it very difficult to ascertain the actual use of credit. Lending rates of SHGs are typically 2 per cent per month, which is higher than direct borrowing from FFIs and much lower than informal market rates that are usually in the region of 5 per cent per month.

[10]The slope of the marginal return curve is not twice that of the average return curve since we take these as *percentages* of loan amount.

to what is found in the 'real-world'. Unless otherwise specified, we will use the following values for the variables given below:

$s_1 = s_2 = \text{Rs.240}$
$d = 0.10$
$e = 0.06$
$r = 0.24$

AN ECONOMIC ANALYSIS OF A TYPE I SHG

In a type I SHG, the Average Borrowing Cost[11] of each member j is:

$$ABC_j = \frac{ds_j + rL_j}{L_j} \quad \text{for } j = 1, \ldots, m$$

or

$$ABC_j = \frac{ds_j}{L_j} + r \tag{1}$$

Figure 1[12] illustrates the economic decisions of the SHG members where the Common Fund $OO' \geq = L_1 + L_2$. Borrowing by L_1 (L_2) is measured in the direction O–O' (O'–O). At $L_1 = L_2 = 0.5(OO')$, $ABC_1 = ABC_2 = d + r$. This means that a member can borrow her share of CF at an average cost equal to the foregone interest on savings, d, plus the lending rate, r. If a member can increase her loan share beyond $(1/m)(CF)$, she can reduce her average costs, but only at the expense of other members who will incur an average cost greater than $d + r$. Where a member borrows the entire CF, $ABC = (d/m) + r$, since $s_j = \sum L_j/m$ and $L_j = \sum L_j$, summing over $j = 1, \ldots, m$.

An Ideal Type I SHG

Suppose, in a two member SHG, as in figure 1, we have a situation where the demand for loans of both members exceeds the CF. Given the co-operative nature of an SHG, we can expect each member to obtain a loan of equal size or $L_1 = L_2 = 0.5(CF)$. With $X = 0$, each member then, in effect, is borrowing her own savings, at an average borrowing cost of $(d + r)$, which in our numerical example is 34 per cent. The question arises as to what motivates people to borrow their own savings at a cost. We give two possible reasons.

(i) Equal loan size does not mean equal loan amounts. Loan size, strictly speaking, is the product of loan amount and loan duration. This makes it possible for members to get access, *at a time*, to a loan amount larger than their own accumulated savings which otherwise may not be possible.

(ii) Access to external low cost funds including grants and loans from FFIs, would increase OO' to $OxOx'$. With the increased availability of loanable funds, members

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[11]Following Ladman (1984), except that we consider the interest foregone by the member on her savings as the fixed cost. See also Hulme and Mosley (1996).
[12]Figures are not to scale.
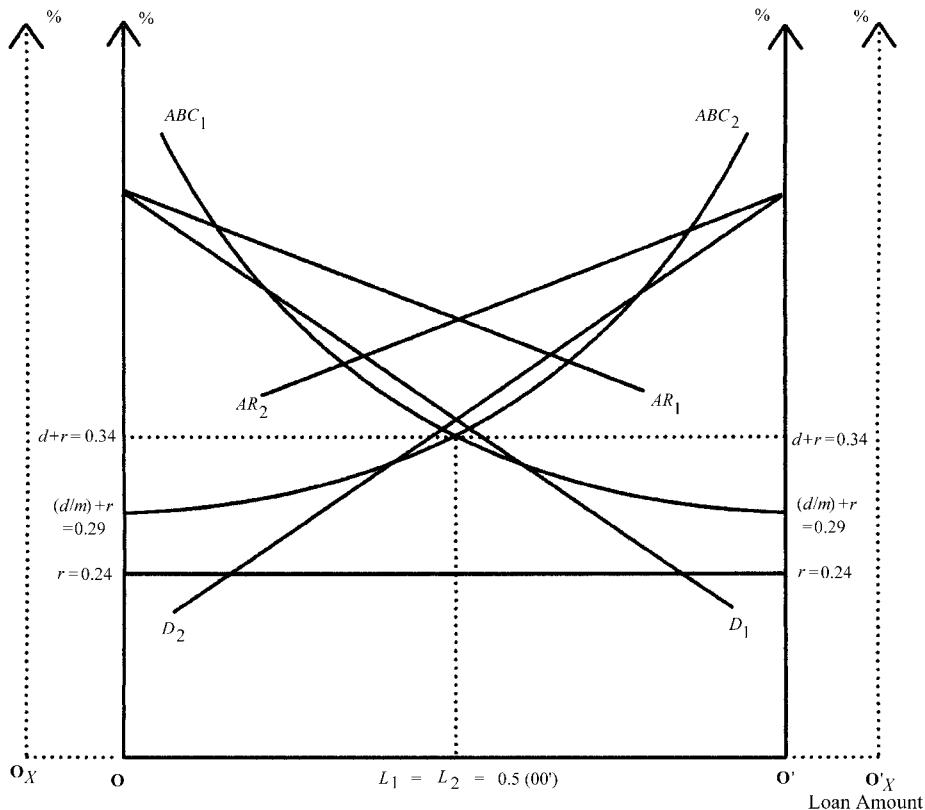
Figure 1. A type I SHG with excess demand for loans.

will benefit from larger loan sizes which, even if equally shared, exceed their savings contribution. This increase in loan size lowers the average fixed cost of borrowing (sd_j/L_j), so that for sufficiently large L_j, foregone interest on savings becomes insignificant. The inflow of external funds to a SHG can be substantial. For example, a 1:1 grant from an NGO, supplemented by a 1:4[13] loan from a bank, could raise a Type 1 SHG's Common Fund from about Rs 6000[14] at the end of year 1, to about Rs 50000. In this SHG, with 20 members and a per capita borrowing of Rs 2500, average fixed borrowing cost reduces to less than 0.001[15] so that ABC will (almost) equal r. A rapid growth in CF may also require the SHG to stimulate demand for loans through a decrease in r[16] and consequently, *ABC*, thereby further benefiting members.

Members borrowing their own money at a cost of $(d + r)$, or 34 per cent in our example, then makes economic sense since it forces a rapid growth in the CF, on the basis of which the SHG can leverage a larger amount of X.

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[13]Reserve Bank of India guidelines stipulates a saving to loan ratio of 1:1 to 1:4. See Fernandez (1998).
[14](Rs 20 × 12 months × 20 members)(1 + 0.24) = ~Rs 6000.
[15]Of course, s_j and $d(s_j)$ will increase over time. Even then, with X, large increases in L_j would reduce average fixed costs significantly.
[16]For example, Fernandez (1998) reports, from case studies, SHG lending rates declined from 36 per cent in 1991 to 15 per cent in 1993 to 12 per cent in 1995.
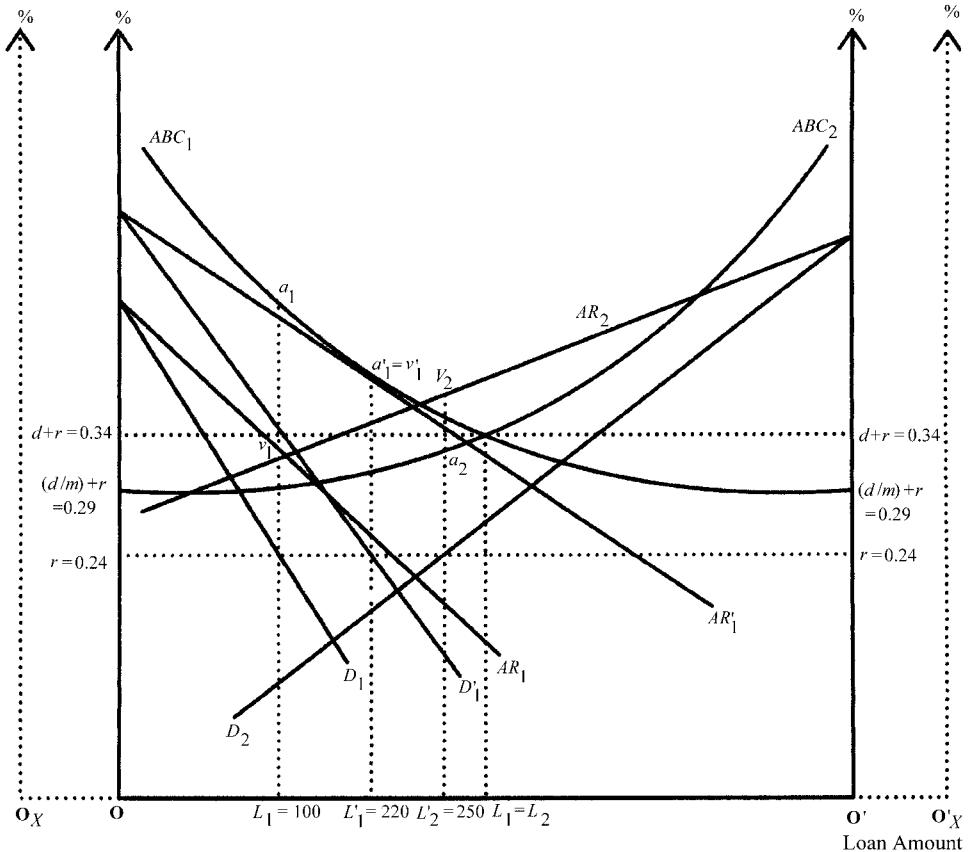
Figure 2. Non-ideal type I SHG.

There is a section within the NGO sector that resists the idea of SHGs seeking external loans and grants. This analysis shows why this policy may not be practical one, given that, without X, point (i) above alone, does not seem an adequate *raison d'être* for a group of people to borrow their own money at such high costs.

A Non-Ideal Type I SHG

It is optimistic to expect a healthy demand for loans from all members at all times in all SHGs. Taking this into account in Figure 2, we consider a member, M_1, who is relatively poor[17] as compared with M_2. In this SHG, given D_1[18], M_1s optimal demand for loans is L_1. However, at L_1, ABC is a_1 and AR only v_1. M_1 is unable to break-even. In such a situation, where borrowing for productive investment is not feasible, the member's demand for loans will reduce to zero, making her incur a fixed cost of ds_1, since neither a periodic interest on

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[17] This analysis will also be useful to understand the problem of SHGs working with the ''core poor'' or the 'poorest of the poor'.
[18] This limited demand for productive loans could be due to M_1's initial endowments of assets, resources, education, skills or training.

her savings is received from the SHG nor does she have a claim to any interest on exit from the SHG. Continuing in an SHG without borrowing money cannot be the preferred choice of M_1 over a longer period of time[19] If so, a type I SHG not only fails to make credit available to the poor members like M_1, it also inflicts a financial loss on them by not compensating them for their foregone interest on savings while they remain in and even at the time of their exit from the group.

If M_1 is determined to stay on in the SHG[20], without incurring continued loses, she would have to increase her demand to at least D_1' with AR_1', where, with a loan amount of L_1', she manages to break-even with $a_1' = v_1'$. In a rural economy, with limited investments avenues, what are the opportunities for a poor individual like M_1 to increase her demand to D_1'? One possibility could be lending[21] in informal credit markets. M_1 could consider borrowing L_1' at an ABC of a_1', use part of it for productive investments and re-lend the balance, at a rate of interest high enough so as to yield an average return of v_1'.

Where such re-lending opportunities exist and is a financially viable option in terms of its returns and risks, it is quite possible that M_1 may wish to increase her demand even further so as to yield positive return on her loan.

Meanwhile, the relatively better off member, M_2, whose investment opportunities are reflected by D_2 and AR_2, will borrow an amount of L_2 from the SHG. By doing so, her ABC is only a_2, compared to the a_1 that M_1 had to bear at L_1. With an AR of v_2, M_2 earns a profit rate of a_2v_2 on her loan of L_2. The availability of surplus funds in the SHG, could also motivate M_2 to re-lend in informal markets to increase her profits from borrowings.

With reference to our numerical example, at $L_1 = L_2 = 0.5$ (CF), $ABC_1 = ABC_2 = d + r = 0.34$. Given D_j, at $L_1 = 100$, $ABC_1 = 0.48$ which means that M_1 would require $AR < 0.48$ (with $L_1 = $ Rs 100) to break-even. Since, this is not possible, as in Figure 2, she will have to increase demand to D_1' where, at $L_1' = $ Rs.220, $a_1 = v_1' = 0.35$. If M_1 is unable to increase her demand, she would incur a fixed cost of ds_1, which increases over time, ultimately inducing her to exit from the SHG.

On the other hand, M_2 will borrow $L_2 = 250$ with $AR_2 = v_2 < a_2 = 0.336$. This is less than 0.34, i.e. what she pays in an 'ideal type I SHG', where her loan would be rationed to half the CF. M_2 can do so only because of M_1's weak demand for loans.

In a non-ideal type I SHG, the inflow of X may not have the same positive effects as in the case of an ideal type I SHG, since:

(i) even a reduction in r and ABC may not be sufficient to induce productive investment by M_1 if, as in Figure 2, $ABC > AR$; rather, the increase in spread between average borrowing costs and informal market lending rates may induce M_1 to re-lend so that she can remain in the SHG;

(ii) where insufficient demand for loans is pervasive amongst all members, under utilization of the CF could mean that interest on X is being borne through a depletion of capital assets rather than from SHG income.

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[19] ds_1 will increase with increases in s_1. Further, we must consider compounding ds_1.

[20] Over time, a member will want to stay on in a type I SHG because she has no claim to the interest she has paid to the SHG on her borrowings and interest on savings foregone for the entire period. Remaining in the group would at least give her access to her own contributions. This motive to retain access to one's share of the Common Fund may also induce members to consider re-lending to non-SHG individuals, when adequate productive investment opportunities do not exist.

[21] Re-lending does entail risk. However, the sums involved here are small and many non-SHG individuals including friends, relatives, local shopkeepers and traders, could be perceived as relatively low risk borrowers.

A Corrected Non-Ideal Type I SHG

Overcoming the lack of investment opportunities available to poorer members like M_1 has no short-term solution. However, some changes in economic variables available to an SHG, could lessen the 'unfair' burden on such members who face continuing losses while they remain in, and even if they exit from, such an SHG. A simple corrective measure that an SHG could undertake is to ensure that loans of all sizes entail an equal *ABC*. The lending rate, r, must then be flexible and increasing with respect to loan size. Equating ABC for all members requires: -

$$\left(ABC_1 = \frac{ds_1}{L_1} + r_1 \right) = \left(ABC_2 = \frac{ds_2}{L_2} + r_2 \right) = \ldots = \left(ABC_m = \frac{ds_m}{L_m} + r_m \right) \qquad (2)$$

This is illustrated in Figure 3, where we have equal ABC_j and variable r. For loans of small amounts, r is negative and large in absolute terms, implying that these borrowers must be compensated for their foregone interest on savings.

In our numerical example, setting $ABC_1 = ABC_2 = 0.24$ with $L_1 = 100$ and $L_2 = 250$, will require $r_1 = 0\%$ and $r_2 = 14.4$ per cent. In Figure 3, M_1 with *AR* of v_1 is still unable to cover *ABC*. However, unlike the case where r was fixed, M_1 could decide not to borrow from the SHG and collect an amount of Rs 24[22].

On the other hand, M_1 may choose to increase her demand, with re-lending as an option, to give her a net return of more than Rs 23.76 that she could get by reducing her borrowings to the minimum nominal amount of Rs 1. For example, with D_1' and AR_1', the following condition must be satisfied to induce M_1 to borrow: $L_1'(v_1' - a_1')$ Rs 23.76[23].

Our analysis, however, makes it clear that in a type I SHG charging a flexible r according to equation (3) above, a member is compensated for the foregone interest on savings in proportion to her borrowings, so that her absolute 'need' to exit from the SHG or to increase demand through re-lending, is dampened.

AN ECONOMIC ANALYSIS OF A TYPE II SHG

Unlike a type I SHG, a type II SHG pays members an interest on their savings, e, periodically. Equation (1) is adjusted to:

$$ABC_j = \frac{(d - e)s_j}{L_j} + r \quad \text{for } j = 1 \ldots m. \qquad (3)$$

Since e is a constant, our above analysis for a type I SHG holds good for $d > e$ except that the ABC_j curve in Figure 1 and 2 will be flatter and lower in a type II SHG. In the case

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[22]If we assuming, for sake of convenience, that M_1 must borrow a minimum nominal amount of Rs 1, then $r_1 = -23.76$, where a negative r means a positive return to M_1.
[23]Strictly speaking, we must assume that the loan of Rs 1 is not used for any productive purpose and therefore ignore v_1 in figure 3.
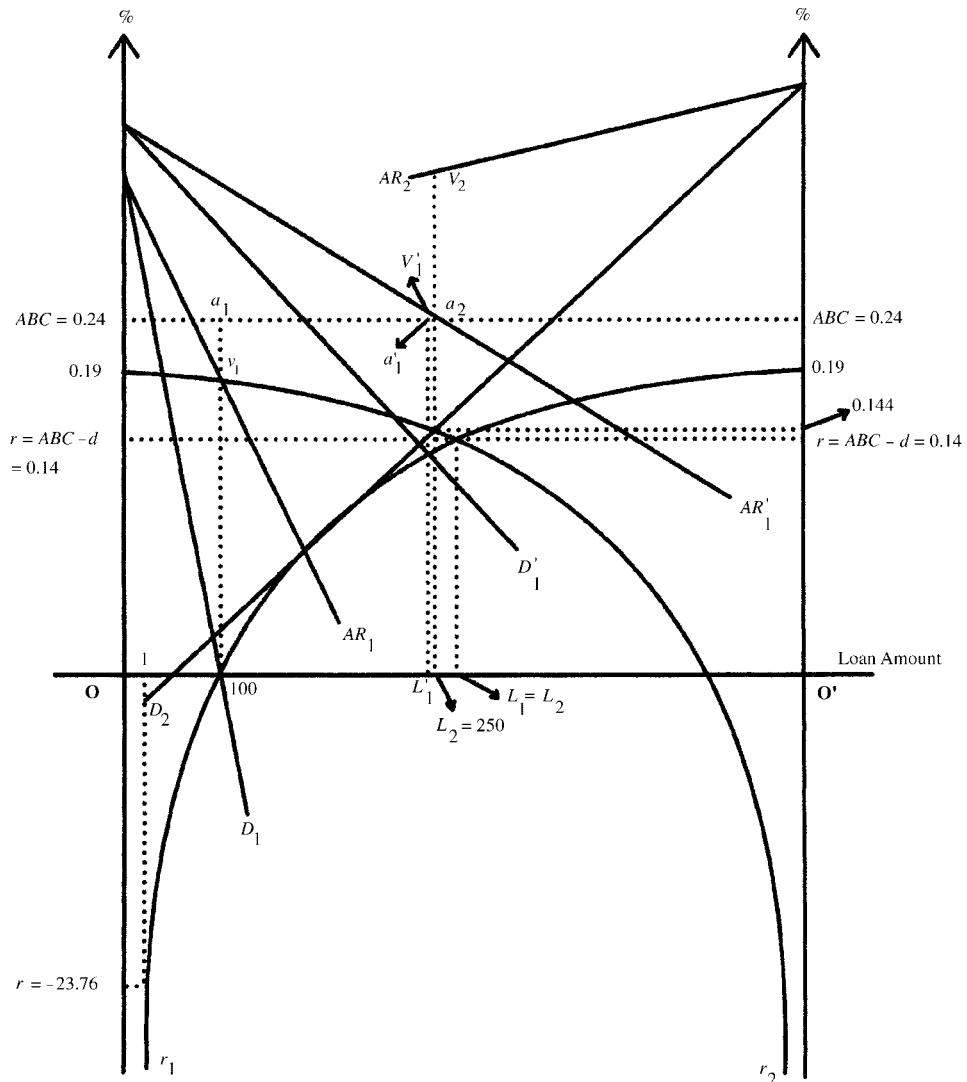
Figure 3. A corrected type I SHG.

where $d = e$, average fixed borrowing cost reduces to zero and $ABC = r$. This situation is analogous to a corrected type I SHG.

In spite of these advantages, type I SHGs are commonly found in India. One reason could be that in a type I SHG, the CF will grow at a faster rate through forced savings and thereby its capacity to leverage X. This may dissuade members from implementing a policy of paying interest on savings to members, preferring a type I SHG to a type II SHG, especially in cases where access to grants and external FFI loans are an overriding objective of SHG formation. A solution to this problem could be to increase the savings contribution of members gradually over time.

AN ECONOMIC ANALYSIS OF A TYPE III SHG

In a type III SHG[24], members' fixed cost by way of interest foregone on savings is compensated by sharing the surpluses of the SHG. Adjusting ABC_j for her share of surplus means:

$$ABC_j = \frac{rL_i + ds_i - [r(\sum L_j)/m]}{L_j} \quad j = 1, \ldots, m$$

or

$$ABC_j = r + \frac{ds_j - [r(\sum L_i)/m]}{L_j} \quad j = 1, \ldots, m.$$

Assuming equal savings by all members and that the *entire Common Fund is borrowed by members* gives us:

$$s_j = \sum L_j/m$$

Therefore

$$ABC_j = \frac{(d - r)s_1}{L_j} + r \tag{4}$$

With $d < r$, we must have

$$ABC_j < r.$$

For a two member type III SHG, ABC_1 and ABC_2, with fixed , are illustrated in Figure 4. At $L_1 = L_2 = s_1 = s_2$, $r = d$. Suppose that all members must borrow a minimum nominal amount of Rs 1. Then, $L_1' = $ Rs 1 and $L_2 = $ Rs 479, gives us $ABC_1'^{25} = -33.36$ and $ABC_2 = 0.17$ implying that M_1 is compensated not only for the fixed cost of interest foregone (as in a corrected type I SHG) but also gets a share of the surplus earned by the SHG from lending Rs 479 to M_2. On the other hand, even though $r = 0.24$, the ABC for M_2 is only about 17 per cent since half the SHG's surplus goes back to her.

It is interesting to note that in type I and type II[26] SHGs, with fixed lending rates r, ABC decreased with increases in loan amounts, but always remained higher than r, as illustrated in Figures 1, 2 and 3. On the other hand, in the case of a type III SHG, a fixed and unique lending rate, r, yields an increasing ABC curve, which lies below r, for all loan amounts. This has important implications. Any positive demand for loans will be feasible one for M_1 since ABC_1 is always less than r. Consider D_1. M_1s demand for loan is Rs 100 with an ABC $= a_1 = 0.096$. However, whether M_1 will actually take this loan is dependent on the AR_1 and her decision will be based on whether: $L_1(v_1 - a_1) \geqslant L_1'(v_1' - a_1')$

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[24]A Type III SHG bears some resemblance to the literature on external financing of labour-managed firms. See Vanek (1977, ch. 8 and 9).

[25] A negative ABC indicates a net average 'return' to the member.

[26]Where $d > e$
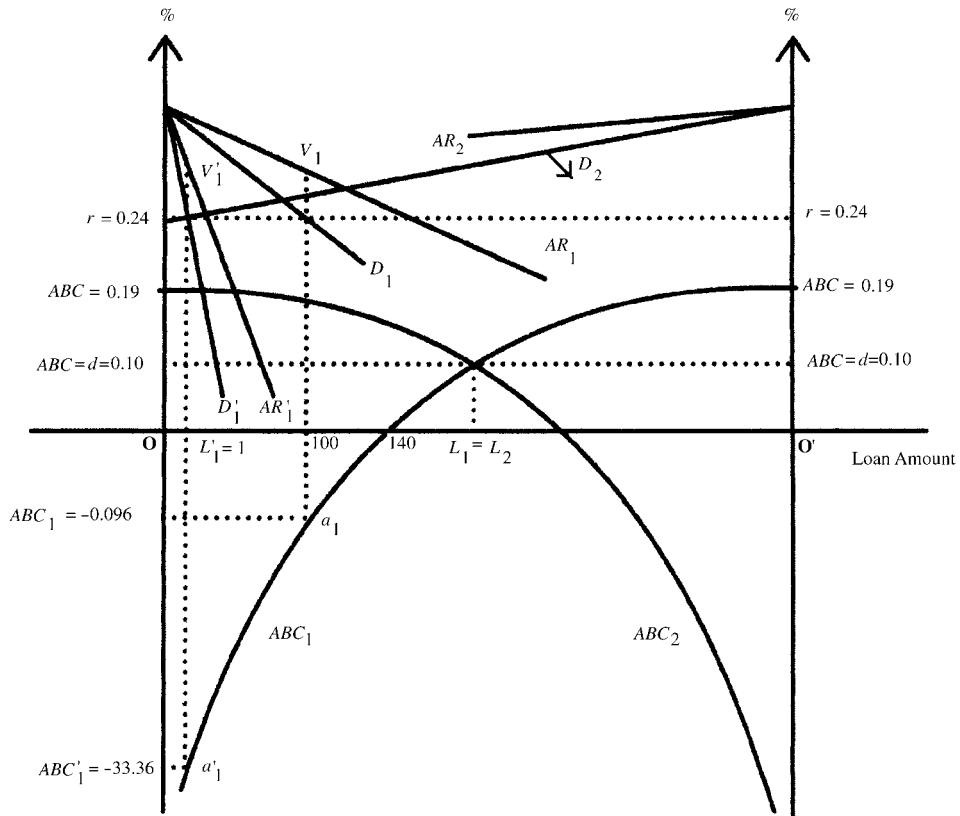
Figure 4. Type III SHG.

i.e. $100[v_1 - (-0.096)] \geq 33.36$.[27] If this condition is not met, M_1 will to settle for the minimum nominal loan of Rs 1 only.

An important assumption made in our analysis is that the entire CF is borrowed by members. M_1s strategy to borrow only Rs 1 and earn a higher return than when she borrows Rs 100 will be effective only if M_2 borrows the balance CF or Rs 479 at r which we have assumed to be the case in figure 4 where M_2s optimal loan demand as Rs 479. If, however, the contraction of loans by members is not matched by a compensating demand from other members, a type III SHG activity could face a demand shortage and consequently where interest on X is payable, capital depletion may become necessary.

In spite of the above possibility, it is apparent from our analysis that a type III SHG is not only more fair to the relatively small or poorer borrowers, it also relieves the pressure off members like M_1 to seek opportunities for re-lending in informal markets. However, as in the case of type II SHGs, the rapid growth in CF to leverage X may be used as an argument against a type III SHG. This ignores the point that all members, even the core

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[27] Once again, as in note 21, we assume that the loan of Rs 1 is not used for productive purposes and therefore we ignore v_1 in Figure 4.

poor in the group, can afford and should even be willing to make a higher saving contribution from their share of the surplus.

CONCLUSION AND POLICY IMPLICATIONS FOR FFI AND NGO INITIATIVES WITH SHGs

Our economic model of the SHG offers some leads on a possible set of guidelines for the SHG sector:

Type I SHG: fixed *ABC*, flexible *r* according to equation (2)
Type II SHG ($d > e$): fixed *ABC*, flexible *r* according to equation (3)
Type II SHG ($d = e$): $ABC = r$, increase compulsory savings over time to compensate slower growth of CF
Type III SHG: fixed *r*, increase compulsory savings over time to compensate slower growth of CF.

The model can also form the basis for a survey-based empirical study of economic typology of SHGs and important issues facing microfinance practitioners, including the problem of retaining the core poor in SHGs, re-lending by SHG members in informal markets, the difficulty for members to sustain interest in a self-financed SHG, the motivation for SHGs to obtain grants and external loans and the implications of weak investment demand of the poor.

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