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Self help groups:

Evidence from India



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Self Help Groups: Evidence from India*

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Abstract

We use novel data from a primary survey conducted in two districts in West Bengal (India) to study the impact of joining an SHG on a) the social insurance enjoyed by members, b) the annual income of members. Propensity score matching and the treatment effects model is used to estimate results. We find that joining an SHG has a positive impact on both variables of interest. Additionally, we provide supportive evidence to show that joining an SHG increases the decision making ability of members (women) regarding household matters.

1 Introduction

Since credit constraints affect the lives of millions of individuals in developing countries, microfinance has received a lot of attention in the past decades, both from policy makers and researchers. In this paper, we will use new data from a primary survey conducted in two districts of West Bengal (India) to shed some more light on two main questions. One, does being a member of a microfinance group provide an individual with additional social insurance? Two, does being a member of a microfinance group lead to an increase in income?

While the latter question has been extensively studied in the literature, there is little convincing evidence about the nature of returns to microfinance. The earliest serious attempt to empirically assess the impact of microcredit is by Pitt and Khandker (1998) who find substantial positive effects of the Grameen Bank on poverty. Khandker (2005) found microcredit contributed to reducing poverty among poor borrowers and within the local economy. The impact appears to be larger for those households who were initially extremely poor compared to moderately poor

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households. These findings are further supported by case-study evidence (Farashuddin and Amin, 1998). Chemin (2008) uses the method of propensity score matching and the same data as Pitt and Khandker (1998) showed that microfinance had a positive impact on participants' expenditure, supply of labour and male/female school enrolment. Imai and Azam (2012) shows that microfinance reduces poverty in Bangladesh by applying different household fixed effects models, and difference in difference and propensity score matching (DID-PSM) to a sample of participants and non-participants of microfinance programmes. In this paper, we use primary data to show that access to microcredit for self help group members leads to an increase in income when compared to non members in the same set of villages. We show this result using the method of propensity score matching and the treatment effects model.

The relationship between social insurance and microfinance has been less studied in the literature. In our survey, we ask women to report how much they think they can raise in an emergency by borrowing from others. We use this variable to judge the level of social insurance enjoyed by an individual (and her family by extension). We use propensity score matching estimators and estimates from the treatment effect model to show that members of SHGs can raise a much higher amount than non members in an emergency situation. The literature on whether access to micro credit leads to better social capital or social insurance is relatively smaller. Also, most studies focus on whether social insurance leads to better repayment of groups and lesser defaults while we try to measure the impact of SHG membership on vulnerability to shocks. Wydick (1999) studies 137 lending groups in Guatemala and finds no clear evidence of a correlation between higher levels of social capital within the group and improved repayment rates. Sharma and Zeller (1997), who study credit groups in Bangladesh, and Ahlin and Townsend (2007), who study group loans given by BAAC in Thailand, find that groups with greater numbers of family members have higher default rates. Feigenberg et al. (2010) provides more compelling evidence on the effect of social capital on borrower behaviour. They show that frequent meetings help build social capital which reduces defaults since members can bail each via an informal insurance mechanism.

Additionally, we provide supportive evidence that being in a SHG increases the decision making power of women regarding key family matters. In our survey, we ask women to report their decision making power¹ for several important household decisions like finance, medical treatment, food and household expenses etc. We find that not only has the decision making power of members increased since they joined the SHG², there is evidence to suggest that members enjoy greater decision making power than non-members. Furthermore, we compare the impact of joining an SHG on the change in decision making power (over the last 6 months) for newer members with non-members. We find supportive evidence suggesting that joining the SHG has

¹They could respond with 1 = No say; 2 = Say in some petty matters but not important ones; 3 = Say in almost all matters; 4 = Say in all matters.

²We asked them to report their decision making ability before they joined the SHG.

increased the decision making power of women.

Our data comes from a primary survey in the state of West Bengal in India (563 individuals who are part of a SHG and 235 individuals who are not part of a SHG) across 25 villages in two districts - Birbhum and Bardhaman. The survey collected detailed information about demographics, loans and their usages, data on whom individuals interact with for social insurance etc. All the group heads were also interviewed regarding group details and also village characteristics for each village in the sample were collected.

The rest of the paper is organized as follows. Section 2 describes our survey and dataset. Section 3 presents some descriptive statistics highlighting important variable distributions. In section 4, we present our main analysis on the impact of joining an SHG on social insurance and income. We also provide supportive evidence to show the impact on decision making ability. Section 5 concludes the paper.

2 Details of Survey and Data

Our data is based on a primary survey of a random sample of Self Help Groups (SHGs) registered with the Paschim Banga Grameen Bank (PBGB). Paschim Banga Grameen Bank is a regional rural bank (RRB) and was established by the amalgamation of three erstwhile Gramin Banks viz. Howrah Grameen Bank, Bardhaman Grameen Bank and Mayurakshi Grameen Bank in 2007. They have operations in four districts – Bardhaman, Birbhum, Hooghly and Howrah with their headquarters located in Tikiapara, Howrah.

A typical SHG consists of 10 female members in the village. There are no members from the same household in one group. Once a group is formed they choose a group leader and a group name is assigned. A group then opens a saving account with PBGB. The group also decides on its basic rules like the frequency of meetings, its location, amount of savings of the group in each month and the minimum amount of savings by its members. A group can also decide to lend money to its members out of the group's savings and charge an interest rate on such loans. PBGB encourages such internal loans before providing a loan to the group. Once a group is stable in its functioning, the group then applies for a loan from PBGB. The loan given by the bank is against no collateral and is joint liability. The group distributes the loan to its members according to the needs of its members for their projects. A credit linked SHG is one, which has received credit from PBGB whereas a savings linked SHG is one which has a savings account with the bank but has not received credit yet. As of 31st March, 2015 the number of credit linked SHGs with PBGB were 34220 and number of savings linked were 44447.

Repayment of the loan is generally made at the meetings. There is some flexibility on repayment within the group, but peer pressure ensures that loans are effectively repaid, so that the

default rate for bank loans is very low. Some groups also charges their members an additional interest rate over and above the interest rate charged by the bank. The income that is generated from this additional interest is deposited in the group's savings account.

Our survey was conducted in the state of West Bengal in India in July and August 2016 across two districts - Birbhum and Bardhaman. The survey was carried out across 14 villages from two blocks in Bardhaman, and 11 villages across two blocks in Birbhum. The two blocks covered in Bardhaman district are Burdwan-II and Galsi-II, and the two blocks covered in Birbhum are Murarai-I and Nalhati-II. A random sample of 57 SHGs were chosen across these 25 villages with 28 groups in Bardhaman and 29 groups in Birbhum. Each group member in a SHG was interviewed using a detailed questionnaire. A total of 563 SHG members were interviewed, with 281 members in Bardhaman and 282 members in Birbhum. In order to assess the impact of being a member of a SHG, we also surveyed a random sample of women who are not members of SHGs in the same villages. A total of 235 (with 116 individuals from Bardhaman and 119 from Birbhum) such non members were interviewed using a detailed questionnaire. Thus, a total of 797 individuals were surveyed.

For each member we collected information on the occupation, marital status, husband's occupation (if married), income details and other household characteristics. We did the same for the individuals who are not part of any SHG. In addition to this each group leader was interviewed regarding the overall group demographics, number of loans taken and amount, frequency of weekly meetings etc. We also collect data on village level characteristics like population, number of individuals belonging to different religion, caste etc.

3 Descriptive Statistics

In this section, we will look at the demographics of the members belonging to SHGs as well as individuals not belonging to SHGs.

3.1 Demographics and Income

We primarily focus on the age, religion, marital status, education and income. Table 1 provides detailed descriptive statistic of these demographics. The average age of the SHG members is 39 years while the average age of the non-SHG members is 33 years. The survey was carried out in villages in rural areas and hence education levels are pretty low. Apart from the years of education, individuals were also asked to report whether they can read or write. 61 percent of SHG members in Bardhaman said that they cannot read and write while 44 percent of the non-SHG members cannot read and write. On the other hand, in Birbhum, 42 percent of the SHG group members cannot read and write while 36 percent of the non-SHG members in Birbhum

cannot read and write. 273 SHG members (50.4 percent) have zero years of education, and 160 out of 259 (62 percent) have zero years of education among non-SHG members.

As reported in Table 1, 85 percent of the women were married among SHG members and 83 percent married among non-SHG members. Among the SHG members, 61 percent of them are Hindus and rest are Muslims while among the non-SHG members, 63 percent are Hindus and rest are Muslims. In Bardhaman, out 397 people surveyed, 85 percent are Hindus, while the remaining are Muslims. Similar proportions in terms of religion are present when we compare members and non-members in Bardhaman. However, in Birbhum, of the 401 individuals, 57 percent are Muslims, while the remaining 43 percent are Hindus. The proportions are similar when we compare members and non-members in Birbhum.

The caste status we consider here is defined by four main caste categories (variable name *group-category*): schedule caste (SC), scheduled tribe (ST), other backward classes (OBC) and General. Among SHG members, 48 percent belong to SC, 12 percent belong to ST, 15 percent to OBC and the rest 25 percent to the general category. Among the non-SHG members, 47 percent belong to SC, 13 percent belong to ST, 17 percent to OBC and the rest 23 percent to the general category. There is almost no ST representation in Birbhum (both among members and non-members) but it has a higher presence of individuals from general category relative to Bardhaman.

Table 1 reports the own annual income and this appears to be higher for the SHG members as compared to non-SHG members. The average annual income of a SHG member is Rs.25689 while that of a non-SHG member is Rs.16779. The same pattern holds for husband's income as well. However, the proportion of Below Poverty Line (BPL) card holders is higher among the SHG members as compared to non-SHG members. 70 percent of the SHG members possess a BPL card while only 61 percent of the non-SHG members do so.

In terms of occupation, women in SHGs in Bardhaman are primarily agricultural labourers (53 percent), bird/animal farming (13 percent) and housewife(10 percent) while women who are non-members are primarily housewives (37 percent) and agricultural labourers (35 percent). In Birbhum, women belonging to SHGs are primarily housewives (31 percent), Tobacco/puffed rice maker (17 percent) and agricultural Laborers (15 percent) and women who are non-members are primarily housewives (69 percent) and tobacco/puffed rice maker (7 percent).

3.2 Financial Literacy

Now we look at some of the important variables that would correspond to the financial literacy of the respondents. Table 2 reports such descriptive statistics where it shows that almost 95 percent of the SHG members have never approached a commercial bank for a loan while around

Table 1: Descriptive Statistic: Demographics

Variable	Mean	Standard Deviation	Min	Max	N
Age (in years)					
SHG members	39.06	9.67	15	98	544
Non-SHG members	33.18	13	16	85	241
Years of Education					
SHG members	3.29	3.89	0	15	530
Non-SHG members	5.11	4.54	0	15	241
Married					
SHG members	0.85	0.36	0	1	564
Non-SHG members	0.83	0.38	0	1	241
Age at the time of Marriage (in years)					
SHG members	16.34	2.27	11	28	542
Non-SHG members	16.62	2.63	5	30	226
Belongs to Hindu Religion					
SHG members	0.61	0.49	0	1	564
Non-SHG members	0.63	0.48	0	1	241
Belongs to SC					
SHG members	0.48	0.5	0	1	564
Non-SHG members	0.47	0.5	0	1	241
Belongs to ST					
SHG members	0.12	0.32	0	1	564
Non-SHG members	0.13	0.34	0	1	241
Belongs to OBC					
SHG members	0.15	0.35	0	1	564
Non-SHG members	0.17	0.38	0	1	241
Housewife					
SHG members	0.2	0.4	0	1	564
Non-SHG members	0.51	0.50	0	1	241
Own Annual Income (in Rs.)					
SHG members	25689.42	27256.6	0	300000	516
Non-SHG members	16779.19	21823.8	0	120000	198
Husband's Annual Income (in Rs.)					
SHG members	69467.91	197294	0	3000000	508
Non-SHG members	59995.45	86736.15	0	1200000	220
Number of Children					
SHG members	2.48	1.28	0	10	564
Non-SHG members	1.88	1.26	0	8	241
Number of Female Children					
SHG members	1.22	1.09	0	7	564
Non-SHG members	0.87	0.89	0	5	241
Number of Members in the Household					
SHG members	4.3	1.58	1	12	546
Non-SHG members	4.4	1.85	1	12	240
Number of Earning Members in the Household					
SHG members	1.97	0.77	1	5	546
Non-SHG members	1.66	0.85	0	6	239
Possession of BPL card by the Household					
SHG members	0.70	0.46	0	1	564
Non-SHG members	0.61	0.49	0	1	241

3 percent of the non-SHG members have never approached a commercial bank for a loan. Most of the respondents didn't know the interest rate paid by a bank on fixed deposits and the interest rate charged by the commercial bank on a loan. Thus, there is a serious concern regarding the level of financial literacy among both the SHG members as well as non-members.

Table 2: Descriptive Statistic: Financial Literacy

Variable	Mean	Standard Deviation	Min	Max	N
Approached a Commercial Bank for a loan					
SHG members	0.05	0.22	0	1	564
Non-SHG members	0.03	0.18	0	1	241
Have an account in a commercial bank/post office					
SHG members	0.46	0.49	0	1	564
Non-SHG members	0.43	0.5	0	1	241
Household Member have an account in a commercial bank/post office					
SHG members	0.62	0.49	0	1	564
Non-SHG members	0.66	0.47	0	1	241
Do not know the interest rate paid on a fixed deposit with a commercial bank					
SHG members	0.90	0.3	0	1	564
Non-SHG members	0.94	0.24	0	1	241
Do not know the interest rate charged by a commercial bank for a loan					
SHG members	0.82	0.39	0	1	564
Non-SHG members	0.76	0.42	0	1	241

3.3 Loans and its Usage

In this section we provide descriptive statistics of the loans taken by the SHG members. Table 21 provides the details for the last three loans taken by SHG members which is provided in the appendix. The monthly repayment generally is around Rs.500-600. The interest rate that they pay depends upon the additional interest rate that a group decides to charge its members on top of the bank's interest rate. Members of SHGs mostly take these loans for their own business (98 percent), for meeting family expenses (1 percent) and for some other purposes (1 percent). Out of the total 563 respondents who belong to SHGs, 31 have defaulted at least once. 10 women could not repay the loan once. The primary reasons for defaulting, as stated by them, are own and family health issues, and natural calamity.

The groups also lend money to its members from its own savings account. The average size of these loans are lower as compared to the average loan size when borrowed from the bank. The average loan size from internal savings is Rs.1916. Members generally take these loans for their own business (90 percent) and the remaining take the loans for meeting family expenses (7 percent) and some for other purposes (3 percent).

Very few members belonging to SHGs take loans from money lenders, relatives/friends, micro credits and banks. These loans are taken infrequently and atmost once in a year or for some members once in 2 or 3 years.

3.4 Social Insurance and Decision Making Ability

In this subsection we study how being part of a SHG leads to higher social insurance and empowerment of women. Table 3 provides some raw data on the former. In this table, a medium size loan is considered equivalent to half the monthly family income and large size loan is considered as equivalent to their monthly family income. After joining the SHG, members can approach 3.8 members on average in a group for a medium size loan and 2.7 members on average for a large size loan. Before joining the SHG, they could on average approach 1.74 and 1.12 for a medium size and for a large size loan respectively.

Individuals interact on an average with 8.8 members outside group meetings and exchange gifts, attend social gatherings, perform prayers etc. with 7.7 members on average. This indicates that there is social capital that gets built by being part of a SHG. Also, in times of emergency, a SHG member can raise Rs. 2746.21 from group members and Rs.1692.41 from people outside group members on average. Hence, on average, a member can raise Rs.4425.75 in times of an emergency which is higher than non-SHG members who can raise Rs.2550.42 on average. Additionally, SHG members can now raise much more now as compared to an average of Rs.1895.96 which a member was able to raise before joining SHG.³ 83 percent of SHG members responded that the number of persons who can help them during an emergency have increased after joining the SHG.

Table 3: Descriptive Statistics on Social Insurance

Variable	Mean	Standard Deviation	Min	Max	N
No. of members whom can be approached for a medium size loan in group	3.8	3.1	0	13	544
No. of members whom can be approached for a large size loan in group	2.7	2.8	0	13	544
No. of members whom one interacts outside group meetings	8.8	1.6	0	13	543
No. of members with whom one exchange gifts, attend social gatherings, perform prayers etc	7.7	2.6	0	13	543
No. of members one approaches for non-financial help (social occasions, illness etc.)	6.3	3.2	0	13	544
No. of members whom can be approached for a medium size loan outside group	1.74	1.65	0	10	541
No. of members whom can be approached for a large size loan outside group	1.15	1.47	0	20	543
No. of members whom can be approached for a medium size loan before joining SHG	1.74	1.76	0	10	543
No. of members whom can be approached for a large size loan before joining SHG	1.12	1.27	0	10	543
Amount of money that can be raised in case of an emergency from members in a group (in. Rs)	2746.21	3452.12	0	50000	541
Amount of money that can be raised in case of an emergency from individuals not in group (in. Rs)	1692.41	2646.51	0	20000	540
Amount of money that can be raised in case of an emergency from individuals before joining SHG (in. Rs)	1895.96	3449.79	0	50000	542
Amount of money that can be raised in case of an emergency					
SHG members	4425.75	4673.86	0	55000	536
Non-SHG members	2550.42	7173.74	0	100000	238

Now we look at some of the descriptive statistics related to empowerment and decision making ability. Among the SHG members, 75.6 percent contribute towards the family budget while only 33.3 percent of the non-members do so. If we study the subjective beliefs held by both members of Self Help Groups (SHG) and non members, the message is that women (on both sides) believe that joining an SHG is welfare improving. Among SHG members, 83.89 percent of women believe that their quality of life has improved after joining the SHG, 84.81 percent feel more integrated with the society post joining SHG. Also, 73.06 percent feel that their morale (with respect to stress, anxiety, confidence etc.) has improved and 72.04 percent of

³Figures are in nominal prices

SHG members feel that their self esteem has increased after joining SHG. On the other hand, among non SHG members, 51.05 percent believe that their quality of life would improve after joining SHG and 47.9 percent think that they would be more integrated to the society if they join. Also, among the non members, 49.79 percent feel that their morale (with respect to stress, anxiety, confidence etc.) would improve upon joining a SHG and 54.20 percent feel that their self esteem would improve if they were part of a SHG.

Table 15 in subsection 15 shows the change in decision making ability among women since joining SHG on certain major important factors like food and family expenses, finance, education of female children etc. The table indicates that there has been an improvement in the decision making ability of women since joining SHG.

4 Analysis

4.1 Social Insurance

Joining a SHG can help women and her family by increasing their level of social protection. Since group members are financially interlinked (and may have more social interactions as a result of being in the same SHG), members could enjoy higher⁴ informal insurance. The idea is that group members insure each other towards financial shocks.

To identify the effect of joining a SHG on informal insurance, we asked a simple question which reveals information about the level of vulnerability faced by SHG members as compared to non members. Our question was: “*In times of an emergency, how much money can you raise by borrowing from other people?*” While, this question is about the subjective beliefs of people⁵, it none the less reveals, at the very least - the eased mental state of women who are in self help groups compared to those who are not, at best - the actual level of social protection enjoyed by members of self help groups. We also asked women in SHGs to recall how much money they could have raised from others in an emergency *before joining the SHG*. Additionally, we asked members of Self help groups to report separately - how much money they can raise in an emergency from other group members, and how much money they can raise in an emergency from non-members. Generally, we will add these two numbers to get how much a member can raise in an emergency. However, we will also provide more conservative numbers by using only what group members can raise within their group and compare this to what non-members can raise in an emergency.

First, let us consider simple summary statistics. If we compare only what the members could

⁴Compared to non-members.

⁵We ask them how much they *think* they can raise in an emergency, not how much they actually raised in an emergency that has occurred in the past.

raise before and after joining the self help help groups, we find that on average the women believe that they can raise about *Rs*2083 more than what they would have before joining the self help group. Comparing members and non-members currently, the average amount that an SHG member believes she can raise in an emergency is about *Rs*1938 more than the women who are not in any SHG. Even if we use the more conservative amount for SHG members (amount they can raise in an emergency by borrowing only from other group members), on average an SHG member can raise *Rs*574 more than a non member.

Adding weight to the story of social insurance, we spoke to members who, in the past, had lent money to those fellow group members who were in need of funds. We asked them if they would have lent the money had the recipient not been a fellow group member? About 43% replied ‘no’. Furthermore, we spoke to those group members who had received monetary help from other group members in the past and asked them if they would have even asked that particular group member for help if that person had not been in the same group? About 46% of the respondents said ‘no’. When we asked SHG members if the number of sources who may help in an emergency has changed after joining the SHG, about 83% women said that they had increased.

The above statistics encouraged us to investigate more rigorously the question of whether joining an SHG leads to better social insurance. The main empirical challenge here is selection bias as stated earlier - those who did not join an SHG may be systematically different in some unobserved characteristic from those who did join SHGs. Thus, our result that SHG members enjoy better social protection could be driven by these unobserved variables.

To limit the impact of selection bias, we use propensity score matching (subsection 4.1.1) to estimate the impact of joining an SHG on the amount an individual can borrow from others in an emergency. Subsequently, we also calculate this effect in a treatment effects model (subsection 4.1.2). In the appendix, we provide a list of all variables used in regressions and their explanation in table 20.

Table 4: OLS: Social Insurance, No. of obs. = 620

Outcome Variable - <i>amountwithdrawinEmergency</i>	Coefficient	(Std. Err.)
1.timeinSHGcateg	2549.197***	(695.362)
2.timeinSHGcateg	1059.822***	(419.709)
3.timeinSHGcateg	1623.082***	(365.829)
4.timeinSHGcateg	1710.666***	(379.941)
annualincomeown	0.009*	(0.006)
annualincomehusband	0.001*	(0.001)
age	2.278	(51.621)
agesq	0.162	(0.588)
religion	343.069	(416.897)
Intercept	3316.219	(3085.390)

Profession, Block, Group category, Education fixed effects are suppressed

This regression indicates that being in an SHG increases the level of social protection⁶. However, this regression does not address the problem of selection bias. We assuage this problem with results from the propensity score matching estimation in subsection 4.1.1, and with a treatment effects model in subsection 4.1.2.

4.1.1 Propensity Score Matching- Social Insurance

The average treatment effect on the treated (ATT) results from different propensity score matching methods are provided in table 5. Note that Income, *amountwithdrawinEmergency* outliers were removed.

Table 5: Propensity Score Matching Estimates, No. of Obs = 662

Kernel biwt	Kernel Normal	Kernel epan	LLR	Neighbour(1)	Neighbour(5)
1814.24*** (238.09)	1836.66*** (236.20)	1808.48*** (238.04)	1905.57*** (307.92)	1926.70*** (301.92)	1849.74*** (256.55)

Table 5 clearly shows that had the SHG members not joined the SHG, they would have been able to raise about Rs1800 less than what they are now able to in an emergency. The average monthly income of SHG members is about Rs2156, so Rs1800 is roughly equivalent to about 83% of a month's earnings, a significant amount.

The estimates from the first stage logit model (outcome variable is a dummy variable called *ingroup* which takes the value 1 if the individual is in a SHG and zero otherwise) are presented in table 6. We match based on the log odds of the propensity score to attenuate bias originating from the fact that our ratio of treated to non treated individuals is different from the one in the actual population. For variables influencing selection, we choose those which are likely to have affected selection into treatment (joining SHG) *at the time at which the decision was made*. Though we are impaired by our lack of knowledge of the value taken by different variables when the decision to join (or not join) a SHG was taken, we address this problem by using those variables which are consistent across time and are not influenced themselves by treatment.

The test for balanced variables is shown in table 7. As desired, this table reveals that we cannot reject the hypothesis that the selection variables have the same mean in the treated and the control sample.

Next, we provide a robustness test for our result by using a more conservative measure for the amount group members can borrow in times of an emergency. In particular, we use *conserveemergencyingroup* as the outcome variable of interest. For members of SHGs, this variable depicts what an individual member can raise in an emergency by borrowing from *only*

⁶Note there are very few observations in the category *timeinSHGcateg=1*, so we take that coefficient with a pinch of salt.

Table 6: Logit: Propensity Score

Variable	Coefficient	(Std. Err.)
age	0.772***	(0.120)
agesq	-0.014***	(0.003)
agecub	0.0007***	(0.0001)
2.groupcategory	0.339	(0.305)
3.groupcategory	0.070	(0.381)
4.groupcategory	0.005	(0.340)
completedyearsofeducation	-0.020	(0.028)
2.religion	0.252	(0.333)
diffageatmarriage	-0.004	(0.029)
3.numericblock	0.292	(0.262)
4.numericblock	0.322	(0.317)
5.numericblock	0.588*	(0.308)
bplcard	-0.206	(0.219)
Intercept	-11.791***	(1.799)

Table 7: Balance: Propensity Score

Variable	Treated	Control	t
age	39.20	39.20	0.00
agesq	1631.1	1632.9	-0.03
agecub	71925	72269	-0.08
2.groupcategory	0.138	0.155	-0.71
3.groupcategory	0.15	0.14	0.41
4.groupcategory	0.20	0.22	-0.66
completedyearsofeducation	3.18	3.1225	0.25
religion	0.34	0.32	0.67
diffageatmarriage	6.69	6.87	-0.85
3.numericblock	0.26	0.26	0.11
4.numericblock	0.23	0.23	0.00
5.numericblock	0.22	0.20	0.92
bplcard	1.28	1.28	-0.25

other group members, while keeping the variable value the same as before for non-members. The average treatment effect on the treated (ATT) results from different propensity score matching methods are provided in table 8. Income, *conserveemergencygroup* outliers were removed.

Table 8: Propensity Score Matching Estimates, No. of Obs = 681

Kernel biwt	Kernel Normal	Kernel epan	LLR	Neighbour(1)	Neighbour(5)
574.77***	585.77***	568.15***	590.92**	183.91	486.22**
(218.97)	(216.99)	(218.90)	(286.74)	(286.74)	(237.53)

As we can see from table 8, even when we compare what group members can raise in an emergency *within* their group to what non-members can raise in an emergency, we find that group members are better off. The balance test for these estimates is given in table 22 in the appendix.

4.1.2 Treatment Effect Model

In this subsection, we compute the impact of joining an SHG on the amount an individual can raise in an emergency in a treatment effect model. To identify the impact, we use the difference in the age of the husband and wife as a variable which affects selection (join or not join SHG) but not the outcome (*amountwithdrawinEmergency*). The idea is that the larger the difference between the age of the husband and the wife, the less independent the wife is to make her own decisions and join an SHG. However, this variable should not influence the amount the wife can raise in an emergency. The result from the treatment effect estimation is presented in table 9.

This model indicates that members of SHGs are, on average, able to raise about Rs3926 more than non members in an emergency. The difference between the estimates from the propensity score matching methods and the treatment effect model highlights the limitations of a cross-sectional dataset in providing accurate estimates of the impact of joining a SHG. However, since both model estimates are significant and positive, we take this as reassuring supportive evidence of the positive impact of joining an SHG on social insurance.

The Wald test of independent equations i.e. the test which hypothesizes that the two equations (selection and outcome) are independent has a chi square value of 5.45, so we can reject this hypothesis. The correlation coefficient is -0.41 indicating that the relevant unobserved variables are those which affect selection and outcome in opposite ways. For example, a woman coming from a more ‘influential’ family may be less likely to join a SHG but more likely to raise a higher amount in an emergency.

We conduct the same robustness check as we did in subsection 4.1.1. We use *conserveemergen-*

Table 9: Treatment Effect model

Variable	Coefficient	(Std. Err.)
Equation 1 : amountwithdrawinEmergency		
annualincomeown	0.029***	(0.007)
annualincomehusband	0.002	(0.003)
age	-123.035*	(71.378)
agesq	1.404*	(0.770)
2.groupcategory	203.602	(417.834)
3.groupcategory	-240.420	(556.629)
4.groupcategory	552.031	(474.943)
2.religion	-119.996	(482.929)
completedyearsofeducation	70.766*	(39.796)
3.numericblock	128.725	(354.230)
4.numericblock	613.501	(450.378)
5.numericblock	740.827*	(447.100)
1.ingroup	3926.602***	(891.831)
Intercept	1378.882	(1351.472)
Equation 2 : ingroup		
age	0.138***	(0.024)
agesq	-0.001***	(0.0002)
2.groupcategory	0.201	(0.193)
3.groupcategory	-0.114	(0.281)
4.groupcategory	-0.087	(0.243)
completedyearsofeducation	-0.015	(0.019)
2.religion	0.214	(0.249)
diffageatmarriage	-0.027	(0.020)
3.numericblock	0.257	(0.164)
4.numericblock	0.273	(0.215)
5.numericblock	0.566***	(0.216)
bplcard	-0.012	(0.140)
Intercept	-2.587***	(0.609)
Equation 3 : atrrho		
Intercept	-0.439**	(0.188)
Equation 4 : Insigma		
Intercept	7.970***	(0.049)
Equation 3 : atrrho		
Intercept	-0.440	(0.189)
Equation 4 : Insigma		
Intercept	7.970	(0.049)
Income, <i>amountwithdrawinEmergency</i> outliers were removed		

cyingroup as our outcome variable to get more conservative estimates of the impact of joining a SHG on the level of informal insurance. These results are presented in table 10.

The robustness check confirms our intuition. Members of SHGs are, on average, able to raise (from other group members) about Rs2000 more than non members in an emergency. The Wald test of independent equations i.e. the test which hypothesizes that the two equations (selection and outcome) are independent has a chi square value of 5.43, so we can reject this hypothesis. The correlation coefficient is -0.46 indicating that the relevant unobserved variables are those which affect selection and outcome in opposite ways.

4.2 Income

Women who are members of SHGs are primarily engaged in income generating activities. In this section we would like to study if being part of a SHG increases the income of members as compared to non-SHG members. To identify this, all respondents were asked to report their own annual income. As reported in Table1, the average annual income of SHG members is Rs.25689 while that of non-SHG members is Rs.16779. As indicated earlier, 50 percent of non-SHG members are housewives while only 20 percent of SHG members identify their main profession as housewives. We want to highlight this statistic upfront as this will drive some of the annual income differences between members and non-members.

Advocates of microfinance believe that micro credit empowers women by providing them with loans which eventually help earn on their own and contribute to their family. The major empirical challenge here is selection bias - those who did not join an SHG may be systematically different in some unobserved characteristic from those who did join SHGs. To limit the impact of selection bias, we use propensity score matching (subsection 4.2.1) to estimate the impact of joining an SHG on the amount an individual earns annually. Subsequently, we also calculate this effect in a treatment effects model (subsection 4.2.2).

4.2.1 Propensity Score Matching- Own Income

The average treatment effect on the treated (ATT) results from different propensity score matching methods are provided in table11. Note that outliers in Income and other variables were removed. Table11 shows that had the SHG members not joined any group, they would have earned somewhere between Rs. 5800 - Rs. 6800 less annually as compared to what they earn now. They would have earned around 22-26 percent less than what they earn now if they were not SHG members. This additional income earned by them would not only help their households but also empower them in the society.

The estimates from the first stage logit model (outcome variable is a dummy variable called

Table 10: Treatment effect model: Conservative Estimates

Variable	Coefficient	(Std. Err.)
Equation 1 : conservemergencyingroup		
annualincomeown	0.016***	(0.005)
annualincomehusband	0.004**	(0.002)
age	-47.574	(50.726)
agesq	0.531	(0.545)
2.groupcategory	199.263	(284.637)
3.groupcategory	252.821	(369.685)
4.groupcategory	435.041	(321.907)
2.religion	-219.285	(322.569)
completedyearsofeducation	57.584**	(27.178)
3.numericblock	164.898	(244.529)
4.numericblock	775.870**	(307.338)
5.numericblock	548.889*	(308.375)
1.ingroup	2071.381***	(669.161)
Intercept	325.589	(927.902)
Equation 2 : ingroup		
age	0.140***	(0.024)
agesq	-0.001	(0.0002)
1b.groupcategory	0.000	(0.000)
2.groupcategory	0.211	(0.194)
3.groupcategory	-0.009	(0.276)
4.groupcategory	-0.101	(0.242)
completedyearsofeducation	-0.015	(0.019)
1b.religion	0.000	(0.000)
2.religion	0.136	(0.246)
diffageatmarriage	-0.035*	(0.021)
3.numericblock	0.274*	(0.164)
4.numericblock	0.294	(0.214)
5.numericblock	0.596***	(0.213)
bplcard	-0.025	(0.139)
Intercept	-2.552***	(0.609)
Equation 3 : athrho		
Intercept	-0.504	(0.216)
Equation 4 : Insigma		
Intercept	7.586	(0.057)
Income, <i>conservemergencyingroup</i> outliers were removed		

Table 11: Propensity Score Matching Estimates, No. of Obs = 556

Kernel biwt	Kernel Normal	Kernel epan	LLR	Neighbour(1)	Neighbour(5)
6149.11***	5877.12**	6160.10***	6806.77**	6829.59**	6195.72**
(2359.56)	(2326.24)	(2355.77)	(2955.16)	(2955.16)	(2468.72)

ingroup which takes the value 1 if the individual is in a SHG and zero otherwise) are presented in table 12. Similar to the case for social insurance, we match based on the log odds of the propensity score to attenuate bias originating from the fact that our ratio of treated to non treated individuals is different from the one in the actual population. For variables influencing selection, we choose those which are likely to have affected selection into treatment (joining SHG) *at the time at which the decision was made*. Though we do not have the precise information or knowledge about the value taken by different variables when the decision to join (or not join) a SHG was taken, we address this problem by using only those variables which are consistent across time and are not influenced themselves by treatment.

Table 12: Logit: Propensity Score

Variable	Coefficient	(Std. Err.)
age	0.692***	(0.137)
agesq	-0.012***	(0.003)
agecub	0.00007***	(0.00002)
2.groupcategory	0.37	(0.328)
3.groupcategory	-0.027	(0.451)
4.groupcategory	-0.125	(0.395)
completedyearsofeducation	0.039	(0.082)
2.religion	0.329	(0.4)
diffageatmarriage	-0.008	(0.249)
3.numericblock	0.351	(0.276)
4.numericblock	0.415	(0.350)
5.numericblock	0.743*	(0.337)
bplcard	0.006	(0.028)
Intercept	-10.800***	(2.09)

Variables like squared and cube terms of completedyearsofeducation and diffageatmarriage are suppressed

The test for balanced variables is shown in table 13. As desired, this table reveals that we cannot reject the hypothesis that the selection variables have the same mean in the treated and the control sample.

4.2.2 Treatment Effect Model

In this subsection, we compute the impact of joining a SHG on the annual income of an individual using a treatment effect model. To identify the impact, we use the 'number of earning members in the family'. The idea is that the latter variable affects the selection into SHG - if more people are earning in the family (keeping number of household members fixed), then the family probably encourages work from all members which positively affects the probability of the woman joining the SHG (this could be because the family needs money or because the family is open minded about women working) b) the fact that there are more earning members should not affect woman's annual income except via affecting her decision to join SHG. So this

Table 13: Balance: Propensity Score

Variable	Treated	Control	t
age	39.37	39.47	-0.16
agesq	1643.1	1651.9	-0.14
agecub	72741	73194	-0.1
2.groupcategory	0.148	0.155	-0.28
3.groupcategory	0.145	0.151	-0.24
4.groupcategory	0.21	0.21	-0.18
completedyearsofeducation	3.005	3.08	-0.28
religion	0.34	0.32	0.61
diffageatmarriage	6.57	6.70	-0.6
3.numericblock	0.29	0.30	-0.41
4.numericblock	0.23	0.23	-0.16
5.numericblock	0.19	0.16	1.03
bplcard	1.28	1.30	-0.74

Variables like squared and cube terms of completedyearsofeducation and diffageatmarriage are suppressed

variable affects selection but not outcome. The result from the treatment effect estimation is presented in table 14.

This model indicates that members of SHGs are, on average, able to earn Rs. 20900 more as compared to non members. The difference between the estimates from the propensity score matching methods and the treatment effect model highlights the limitations of a cross-sectional dataset in providing accurate estimates of the impact of joining a SHG similar to the case of social insurance. However, both models predict that there is a significant and positive impact on own income by joining a SHG.

The Wald test of independent equations i.e. the test which hypothesizes that the two equations (selection and outcome) are independent has a chi square value of 13.91, so we can reject this hypothesis. The correlation coefficient is -0.37 indicating that the relevant unobserved variables are those which affect selection and outcome in opposite ways.

4.3 Decision Making Ability

Next, we would like to know if joining a SHG has empowerment effects on the woman as measured by a change in the domestic decision making ability for important matters. In the survey we asked women to report their ability to influence decisions on several key family matters like finance, financial assets, health care and education. They could respond with 1= No say; 2= Say in some petty matters but not important ones; 3= Say in almost all matters; 4= Say in all matters.

Additionally, to gauge how these decision making abilities have changed over time, we asked the women to report how their decision making ability was 6 months back and also 1 year back.

Table 14: Treatment Effect model

Variable	Coefficient	(Std. Err.)
Equation 1 : annualincomeown		
age	-562.061	(411.485)
agesq	6.152*	(4.592)
2.groupcategory	14010.46***	(2650.429)
3.groupcategory	-7035.22*	(3261.295)
4.groupcategory	-5994.927*	(2887.117)
annualincomehusband	0.009	(0.018)
memberofhh	-610.853	(527.624)
2.religion	4138.586	(2847.777)
completedyearsofeducation	-386.918	(237.436)
3.numericblock	5968.566**	(2294.595)
4.numericblock	-12651.58***	(2763.014)
5.numericblock	-10317.75***	(2618.094)
1.ingroup	20900.22***	(3804.599)
Intercept	24606.79	(8834.202)
Equation 2 : ingroup		
age	0.161***	(0.022)
agesq	-0.001***	(0.0002)
2.groupcategory	0.125	(0.179)
3.groupcategory	0.132	(0.229)
4.groupcategory	0.117	(0.206)
completedyearsofeducation	-0.0008	(0.016)
earningmember	0.454***	(0.088)
memberofhh	-0.090*	(0.039)
annualincomehusband	.000003*	(0.00000155)
2.religion	0.126	(0.202)
3.numericblock	0.102	(0.154)
4.numericblock	0.215	(0.191)
5.numericblock	0.461*	(0.185)
bplcard	-0.0135	(0.126)
Intercept	-3.710***	(0.591)
Equation 3 : athrho		
Intercept	-0.392***	(0.105)
Equation 4 : Insigma		
Intercept	9.945***	(0.034)
Equation 3 : athrho		
Intercept	-0.392	(0.105)
Equation 4 : Insigma		
Intercept	9.945	(0.033)
<i>annualincomeown</i> outliers were removed		

In this way, we can track not only current differences in decision making ability between SHG members and non-members but also changes over time. For group members, we also asked them to report their decision making ability before they joined the SHG so as to be able to compare current decision making ability with pre-SHG decision making ability.

Thus, not only can we compare group members with non-group members, we can also compare group members before and after joining the SHG. Evidence in this section is strictly supportive (no identification).

4.3.1 Before and after SHG for members

Table 15 compares the decision making ability of women before and after joining the self help group. The column head indicates the domestic category in which the the women were asked to reveal their decision making ability. All numbers indicate the percentage of women who gave the mentioned answer.

Table 15: Change in Decision making ability of women since joining SHG

Time	Food and Daily Expense	Finance	Child Education	Women Education	Child Health	Women Health
Before SHG (Say in all matters)	50.37	30.39	29.90	23.74	37.82	27.93
Now (Say in all matters)	64.9	44.76	37.03	30.99	53.02	39.84
Before SHG (No Say)	9.74	24.20	9.70	7.24	11.50	9.38
Now (No Say)	6.18	21.16	5.35	3.22	7.80	5.08

It is clear that in all fields there has been an improvement in the decision making ability of women since joining the SHG.

4.3.2 Comparing the change in decision making ability of members and non-members

In this subsection we look at SHG members who have only been a member for less than 3 years and non members and compare how much they believe their decision making ability has changed over the last 6 months. Obviously, these restrictions lower the number of observations we have which impacts the standard errors. So, though these preliminary results must be taken with a pinch of salt, it is heartening to see that being in a self help group tends to lead to an improvement in the decision making ability of women in several categories. The regressions are all ordered logit where the dependent variable indicates the difference between their decision making ability at present and 6 months before. Tables 16, 17, 18 and 19 present the results.

Table 16: ologit: Change in decision making: food and daily expenses

Variable	Coefficient	(Std. Err.)
Dependent variable - change in decision making ability for food and daily expenses over last 6 months		
ingroup	2.279**	(1.170)
diffageatmarriage	0.081	(0.086)
age	0.072	(0.106)
agesq	0.000	(0.001)

Other controls like education, religion,
education of husband, location dummies suppressed

Table 17: ologit : Change in decision making: finance

Variable	Coefficient	(Std. Err.)
Dependent variable - change in decision making ability for finance over last 6 months		
ingroup	2.425***	(0.955)
age	-0.072	(0.106)
agesq	0.001	(0.001)

Other controls like education, religion,
education of husband, location dummies suppressed

Table 18: ologit : Change in decision making: family assets

Variable	Coefficient	(Std. Err.)
Dependent variable - change in decision making ability for family assets over last 6 months		
ingroup	1.570**	(0.852)
age	0.028	(0.095)
agesq	0.000	(0.001)

Other controls like education, religion,
education of husband, location dummies suppressed

Table 19: ologit : Change in decision making: Child Health

Variable	Coefficient	(Std. Err.)
Dependent variable - change in decision making ability for child healthcare over last 6 months		
ingroup	1.319*	(0.813)
age	0.188	(0.110)
agesq	-0.002	(0.001)

Other controls like education, religion,
education of husband, location dummies suppressed

5 Conclusion

We use a novel data set from a primary survey in India to shed some more light on the returns to joining an SHG. In particular, we show that joining an SHG can increase the level of social insurance enjoyed by the individual as compared to non members. We also provide supportive evidence about the impact of joining an SHG on income and on the decision making ability of women. While showing strong causal effects is difficult in cross sectional data⁷, we hope that by using propensity score matching and the treatment effects model, we have diminished the endogeneity problem somewhat. At the very least, our results provide good supportive evidence on the positive impact of micro-finance organizations. We hope to use the data collected for this paper to explore other interesting aspects of microfinance. One question of particular interest is the impact of the pre-loan intra group lending on the ‘success’ rate of the group. We hope to study this question in our future research.

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⁷Without a randomized/natural experiment.

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A Appendix

Table 20: Description of Variables

Variable	Description
amountwithdrawinEmergency	Amount that can be withdrawn in an emergency
annualincomeown	Own annual income
annualincomehusband	Husband's annual income
age	Age of the respondent
agesq	Square of Age
completedyearsofeducation	Completed years of education
diffageatmarriage	Difference in age with husband at the time of marriage
bplcard	Dummy =1 if household have a BPL card
earningmember	Number of earning members in the household
memberofhh	Number of members in the household
ingroup	Dummy=1 if SHG member
i.groupcategory	Dummy for group category = SC/ST/OBC
i.numericblock	Dummy for numeric block
i.religion	Dummy for religion

Table 21: Descriptive Statistics on Loans

Variable	Mean	Standard Deviation	Min	Max	N
Last Loan Size (in Rs.)	22990.99	40794.98	100	750000	520
Second Last Loan Size (in Rs.)	16593.83	19735.78	1000	300000	483
Third Last Loan Size (in Rs.)	14389.12	11428.7	100	50000	359
Monthly Repayment Amount for Last Loan (in Rs.)	698.10	734.64	20	10000	508
Monthly Repayment Amount for Second Last Loan (in Rs.)	580.33	642.85	20	9000	491
Monthly Repayment Amount for Third Last Loan (in Rs.)	551.84	736.5	50	11234	359
Increase in Income in Last six months for the last loan (in Rs.)	2674.35	5060.26	0	50000	402
Increase in Income in Last one year for the second last loan (in Rs.)	3712.09	6734.26	0	100000	397
Increase in Income in Last six months for the second last loan (in Rs.)	2033.19	2667.08	0	20000	370
Increase in Income in Last one year for the third last loan (in Rs.)	2831.87	3145.27	0	25000	361
Increase in Income in Last six months for the third last loan (in Rs.)	1948.17	2389.52	0	25000	260
Increase in Income in Last one year for the last loan (in Rs.)	2791.25	2632.5	0	15000	256
Last Loan spent for specific purpose	0.66	0.47	0	1	564
Second Last Loan spent for specific purpose	0.61	0.49	0	1	564
Third Last Loan spent for specific purpose	0.47	0.5	0	1	564
Internal Group Loan Size (in Rs.)	1916.22	5276.11	0	50000	111

Table 22: Balance Conservative estimates: Propensity Score

Variable	Treated	Control	t
age	38.98	39.08	-0.15
agesq	1615.8	1625.7	-0.18
agecub	71081	71969	-0.22
2.groupcategory	.13814	.15289	-0.65
3.groupcategory	.15876	.1556	0.14
4.groupcategory	.20825	.2238	-0.59
religion	.34845	.32747	0.69
diffageatmarriage	6.7031	6.9261	-1.07
completedyearsofeducation	3.299	3.2262	0.29
3.numericblock	.26598	.26286	0.11
4.numericblock	.24124	.24105	0.01
5.numericblock	.23299	.20793	0.94
bplcard	1.28	1.29	-0.42

The International Growth Centre (IGC) aims to promote sustainable growth in developing countries by providing demand-led policy advice based on frontier research.

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