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QUADERNI DEL DIPARTIMENTO
DI ECONOMIA POLITICA E STATISTICA

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Group-participation and Women Empowerment: Matching as an Evaluation Estimator A District-level Study in West Bengal, India

n. 675 – Maggio 2013

Group-participation and Women Empowerment: Matching as an Evaluation Estimator
A District-level Study in West Bengal, India

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April, 2013

Abstract

The paper aims at isolating the effect of group-participation on women empowerment using primary data on 1500 individual women collected during 2007-08 from two districts of West Bengal, India, namely Hooghly and South 24-Parganas. Since the impact evaluation exercise typically suffers from the problem of counterfactual, in the absence of biologically identical observations proxy has been constructed in terms of pairing of statistically identical observations by applying matching techniques based on propensity-scores. It is observed that mere inclusion in a SHG is not sufficient for any woman to enjoy the benefits of better connectivity with the social capital. Here both the duration of membership and the quality of participation matter. Moreover, in terms of a comparison of the probability of inclusion in the program with the proportion of actual inclusion for subjects with same p-scores, the extent of program mismatch has been assessed. This indicates a bias from the supply side where the more likely agents are being included in the absence of special effort to reach out the relatively more vulnerable ones.

JEL Classification: C21, H43, I38

Keywords: Women Empowerment, SHG-Microfinance, Propensity Score Matching, Quality of Participation, Program Out-reach

[1] Corresponding author; this work is a part of the first author's Ph.D. dissertation at the Department of Economia Politica, University of Siena. Gratitude to the thesis supervisor Prof. Francesca Bettio is sincerely acknowledged. Thanks also go to Prof. Ugo Pagano, Prof. Samuel Bowles and Prof. Vijay Verma of University of Siena, Prof. Dipankar Coondoo of Institute of Development Studies, Kolkata, Dr. Tushar Nandi of the Centre for Studies in Social Sciences Calcutta and Dr. Prasenjit Sarkhel of Kalyani University, India.

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1. Introduction

Advocates of group-approach claim that the very process of forming self-help groups (SHGs) is empowering and a critical mass is formed which can be harnessed to pull the households out of poverty traps. The enhanced empowerment is expected to contribute towards higher capabilities and so the ultimate success of a self-help program would lie on the extent to which the achievements of the social agents could be upgraded. The group-based approach enables poor women to accumulate capital by way of small savings and facilitates their access to formal credit facilities (Shylendra, 1998). The concept of joint liability embedded in the group-approach enables the members to overcome the problem of collateral security, a major barrier in obtaining credit from formal institutions and it also leads to peer monitoring, that improves the rate of loan recoveries. Finally, some of the basic characteristics of SHGs, like small size of memberships and homogeneity of composition, bring about cohesiveness and effective participation of members in the functioning of the group (Fernandez, 1994). The success of group approach in rural development for women has inspired promotion and formation of Women Self-help groups in all developing countries including India and the districts of West Bengal is no exception. If SHG participation is expected to be empowerment enhancing then one needs to address a few fundamental methodological issues related to (a) precise quantification of empowerment, (b) exact nature of group participation and (c) impact of group participation on women empowerment. Bhattacharya (2010), Bhattacharya & Banerjee (2012) and Bhattacharya, Banerjee & Bose (2013) have discussed methodology of constructing empowerment index where empowerment has been viewed as a process of capability enhancement. Quantifiable scores of latent capabilities were derived through a multiple-indicator-multiple-cause (MIMIC) model and by using those estimated capability scores an empowerment index has been constructed for each woman in the selected sample. Given these outcome values, in this paper we are interested in assessing the impact of SHG participation on women empowerment where the exact nature of SHG participation has been characterized in terms of (a) participants and non-participants, and among the participants a further distinction is made between (b) old member vis-à-vis new member and between (c) active member and passive member.

In evaluating the impact of any particular program one should pay heed to the possibility of selection bias. The ***selection bias problem*** refers to the difficulty in establishing unequivocally

that the observed changes in the socio-economic status of the SHG-members are induced by the program participation alone and not as a consequence of other possible causes due to economic, political, cultural or policy environment. This type of analysis is affected by the problem of ***counterfactual*** by its very nature. An ideal evaluation of the impact of a program requires a comparison of the outcome of an individual who participated in the SHG-program with the (hypothetical) outcome of the same individual when she does not participate. This comparison is expected to ensure that the difference is solely caused by the implementation of the program and not by the other characteristics of participants and other contextual factors. But we never observe a same individual, participating and not participating at the same point of time and this problem is usually solved through both random experiments and non-experimental techniques. Again with the implementation of the program there will be some intrinsic changes in the program area which may affect not only the participants but some of the non-participants as well. So, one need to ensure that the *comparison group* for the *treatment group* is not receiving any spill over benefit of program-implementation. This paper makes use of a particular type of non-experimental technique where each active participant is matched with one or more inactive or non-participants that are similar based on observable characteristics. Since the set of variables to match is considerably large, matching is done on the basis of the probability of participation as a function of observables (***propensity scores***).

The rest of the paper is structured in the following way. Section 2 provides a brief discussion of the present state of SHG program and women participation in India. Section 3 highlights the need of considering ***duration of membership*** and ***quality of participation*** as important dimensions in evaluating the impact of SHG participation in this particular context. Section 4 deals with methodology. Section 5 describes the sample design, introduces variables and explores data. The analysis has been reported in section 6 and finally section 7 concludes the paper with an overall assessment.

2. SHG, Social Capital and Microfinance in India

In India, SHGs represent a unique approach to financial intermediation. The approach combines access to low-cost financial services with a process of self-management and development of group-members. SHGs are formed and supported usually by NGOs and (increasingly) by government agencies and formal banking sector like regional rural banks (RRBs), cooperative banks (NABARD), etc. Most of the SHG members are found out to be women (Deshmukh-Ranadive, 2004).

A SHG is formed when members of a community, who have the same or similar problem, come together, meet, share experiences, have discussions, and thereby arrive at solutions. Grain Banks have been in existence for many years in India, where in areas of frequent drought, the community pools grain when it is available, so that it can be accessed as a loan in times of scarcity. One also finds here SHGs around watershed management, forest management etc. However, largely, the SHG is the conduit through which micro finance is routed to the poor. These are small groups of 10-20 persons, who come together with the intention of saving and rotating loans amongst the members. Once these groups stabilize, they are accorded formal support from the banking system so as to widen their lending capacities. An important dimension of SHGs is the peer pressure that members of a group exert amongst themselves, which acts as a substitute for formal collateral. This peer monitoring through trust, norm, network, solidarity and reciprocity act as social capital that can improve efficiency of society by facilitating coordinated action (Putnam, 1995). By replacing conventional collateral requirements social capital enhances credit worthiness of millions of clients, especially women. In fact, among the real and potential clients of micro-finance, women are seen as the most reliable in terms of repayment and utilization of loans (Ruben, 2007). The instrumentalist vision of micro-finance is based on the understanding that the entire household benefits when loans are given to women (Gayle and Meyer, 1993). Further, it is argued that micro-finance can empower women since it instills a perception of strength and confidence through augmentation of incomes and their participation within group activities. Along with that it also contributes other benefits such as greater sense of community, trust, reliance on each other in times of crisis, sharing of information, skill up-gradation, better decision making and bargaining power within family and in community and creation of support system (CIDA:1999). Microfinance self-help group program by nature and by objectives depend on creating virtuous spiral the base of which is creation and utilization of social capital (Mayoux; 2001). Hence, most of the groups formed are women-only SHGs.

Creation of social capital[2] plays a very vital role in creating collective consciousness amongst disempowered women. Economic empowerment focuses more on 'power to' which states that higher access to credit and savings and other economic resources such as business training, etc lead to better economic position of women leading further to better bargaining position at home and in community. Self-empowerment focuses on 'power within' i.e. development of self-

[2] Social capital is the expected collective social or economic benefits derived from the preferential treatment and cooperation between individuals and groups. Although different social sciences emphasize different aspects of social capital, they tend to share the core idea that social networks have valuable influence on the productivity of individuals and groups (Putnam 1995, Kolman 1996, Manlin 1996)).

esteem, confidence and leadership qualities. Social and political empowerment which concentrate on 'power with' and 'power over' state that social capital created through network helps them to bring out social mobilization, build alliances and act as a collective force to bring out changes in gender based social structure. It is assumed that social capital plays a crucial role in social empowerment of women which can be viewed in terms of higher level of concretization of women in enhancing awareness and knowledge, higher level of interactive activities leading to higher mobility, higher collective action and better decision making abilities and better social position in the family and neighborhood.

Durlauf and Fafchamps (2004) review this literature on social capital and extract the principal components, stressing the following three main underlying ideas: (1) social capital generates positive externalities, (2) these externalities are achieved through trust, and norms and values of reciprocity and their consequent effects on expectations and behaviour, (3) shared trust, norms and values arise from informal forms of organizations based on social networks and associations. This trend has been further enhanced by Common-pool resource management literature most notably by Ostrom (2000) for whom the concept of social capital mainly works as coordination norms and it is introduced to explain the existence of collective action inside the community. Ostrom's view goes further to argue that 'to create social capital in a self-conscious manner, individuals must spend time and energy working with one another to craft institutions – that is set of rules that will be used to allocate the benefit derived from an organized activity and to assign responsibility for paying the cost'.

Trust, shared norms and reciprocity create the contour for the success of a women self-help group. Since these are implicit in nature, they can manifest themselves only through some positive attributes of a group, like attendance and regularity of meetings within the group, both collectively and individually. This leads us to look at the quality of participation within a group since it is not enough to include women into group-activities, members need to enjoy a congenial space through active participation only in order to derive benefits of the enhanced social capital created through group-activities.

3. Nature of participation and its relevance

The success of group approach in rural development among women has encouraged the practice of looking into this type of networking as essentially good and desirable in rural community development, sometimes without acknowledging the importance of the pattern of participation in deriving the desirable effects. Government schemes designed for poverty alleviation among rural women through self-help groups gained popularity over time but the success rate is not

always very promising, indicating the presence of missing factors. These missing influences may be embedded in truly local dimensions but the possibility of the variations in the characteristics of participation in achieving success has never been explored as a relevant policy design. However, when properly analyzed, this difference turns out to be most influential, not only for the success of the groups but also for the very sustenance of the groups.

Our primary survey was carried out after a series of repeated meetings of very small focused discussion groups organised in villages where we discussed with individual women from both successful and failed groups. These interviews mostly took place through open-ended discussions with no fixed set of questions which made this conversation much more free-flowing. In some cases these discussions indicate that volunteering in groups appears to be far less attractive to women than was anticipated by the administrators. That should not be the case in a poor rural society which seems to be eager for civic engagement and this leads our attention to be judgmental on the "quality" of the groups by looking at the pattern of participation. The major concerns reported by the women are as follows:

a) **Irregularities in arranging/ attending meetings**: The women express disinterest in joining SHG because they do not think the institution is running with regularity, transparency and efficiency. This feature has been observed in several earlier studies in different parts of India (Dhanya and Purushothaman, 2008, Anand, 2002, Gaiha and Nandhi, 2007). As a pre-condition for proper functioning the frequency of meeting over a given time period may be taken as a proxy. Here the behaviour of the groups reveals sufficient variations. This lack of information and communication among group-members contributes negatively in the process of building up an active citizenry. Lack of communication can operate at two levels; in the first case even if some members are actively engaged, irregularities in the working of their groups cannot produce enough incentive for them to bind themselves together and in the second case, some women are group-members only by mere registration, whereas they do not feel the urge to participate properly and as a result they do not participate actively. Both regularity of group-meetings and regular attendance of members are important in categorising the pattern of participation. A member who is serious in attending the group-meetings regularly may loose interest in continuing group-activities if her group is not working efficiently or other members of the group are less serious in carrying out joint liabilities. Altogether this necessitates consideration of regularity both at the individual and collective level.

b) **Irregularities in keeping accounts**: Some groups collapsed due to the lack of trust; as the leader did not reveal the details of the account book to other members, making others feel that the leader was trying to cheat.

c) **Lack of transparency in loan repayment history**: In some cases, the leader keeping the records of income and expenditure behaved in such secretive ways that misunderstanding with regard to loan repayments eventually splintered the group.

d) **Lack of formal education**: In many cases, the team leader has received little more education than other group members, creating problems for the group in turn. Sometimes the husband of the team leader became the virtual leader of the group.

e) **Unequal treatment among group members**: These discussions lead us to acknowledge the entrenched caste, class, ethnic and religious hierarchies that lead to diversities among women. This has been observed earlier in a case-study on women SHGs in the district of Burdwan (Lahiri-Dutta and Samanta, 2006).The hierarchy of caste location often leads to increasing levels of intra-group discordance. This was exemplified by a member who said, 'we were never a group in the true sense. It was not surprising that we could not work together'.

f) **Differences in political allegiance**: The local political leaders often tried to 'choose' the group leader and in one such case, she had no time to create a dialogue among the members to facilitate networking.

Such ruptures are not uncommon and in several cases members spoke about missing a 'real' cohesiveness in the group leading to its fracture. The range of problems included first the additional burden of keeping accounts, a task which the team leader may be ill-equipped to perform; and second, the subtler question of the leader being among equals, which goes entirely against the very concept of 'the group' as the recipient of the official support. The group leader often furthered her contacts with local political leaders and explored avenues for additional cash incomes. Keeping these issues into consideration, active participants turned out to be a proxy for quality and thus, the relevant treatment group to evaluate the incremental impact of joining the self-help groups, with all others being the control.

4. Methodology adopted

In the absence of a randomised experiment, under certain very strong conditions, the p-score technique can be used to recover the average effect of the program on those individuals entered

into program – or those individuals "treated" by the program, thus measuring the average effect of the treatment on the treated. This is done by removing unobservable individual effects and common macro effects. So, from the given sample the observations are culled into different groups in terms of pre-treatment characteristics where the observations in each group have same propensity to participate in the program at hand but some of them are participating and the others are not. If now the difference in outcome variable is noted for the two sub groups within the same group, where the sub-group classification is done in terms of the program participation, then the difference can be attributed to program participation. When the comparison cannot be carried out on the biologically same person a proxy is constructed whereby the comparison is proposed to be carried out on the statistically similar persons who are equally likely to participate in the program under consideration in terms of their pre-treatment characteristics.

$ATE = E[Y_i(1) - Y_i(0)]$, where ATE is the average treatment effect and it is the expected difference between $Y_i(1)$ and $Y_i(0)$, where $Y_i(1)$ is the value of the outcome variable when the ith individual participates in the program, i.e., getting the treatment and $Y_i(0)$ is the value of the outcome variable when the same individual is not participating. If all units of the population would have a finite *a priori* chance of getting included in the program then this ATE would be a very reliable method of evaluating the program-impact. However, in a SHG linked microfinance program only the relatively poor women would be targeted and, therefore, a portion of the population, those who are economically better placed, would not have much interest to participate. The presence of this participation constraint will lead to a typical non-random sample problem where a part of the population will have no chance of being included in the program *ex ante*. This truncation bias is a special kind of selection bias and to avoid this problem, generally, more emphasis is given to estimate the treatment effect on the treated (ATT), where $ATT = E[Y_i(1) - Y_i(0)|W_i = 1]$ and $W_i=1$ isolates those who are likely to participate in the program, That means the average value of the outcome variable will be compared across two groups, one containing those who are likely to participate and *participated* whereas the other formed of those who are also likely to participate but *did not participate*. Besides program participation the outcome variable may depend on a number of other covariates represented by the vector $\boldsymbol{x}$. So, to estimate ATT the first task is to *match* those observations from the sample who have equal chance (or probability) of participation in terms of $\boldsymbol{x}$. I.e., $ATT = E[Y_i(1) - Y_i(0)|\boldsymbol{x}, W_i = 1]$. This function is called the propensity score and is defined as $p(\boldsymbol{x}) \equiv P(W=1|\boldsymbol{x})$. The only problem with this method is its intrinsic data-hunger that makes it more appropriate for large data set.

The *matching* method has a long history in non-experimental statistical evaluation (Heckman, Ichimura and Todd, 1997, Rosenbaum and Rubin, 1985). The aim of the matching is simple. It is to select sufficient observable factors that any two individuals with the same value of these factors will display no systematic differences in their reaction to the policy reform (*balancedness property*). Consequently, if each individual undergoing the reform can be matched with an individual with the same matching variables that has not undergone the reform, the impact of the reform on the individual of that type can be measured through identification of the region of common support, which is the area of intersection between the probability distribution functions of the treatment and the control group. Thus, matching involves pairing treatment and comparison units that are similar in terms of their observable characteristics under the assumption of *ignorability of treatment*. Technically, the assumption is that conditional on pre-treatment characteristics (x), the non-treatment outcome is orthogonal to treatment status. Implication of this assumption is that once pre-treatment characteristics have been accounted for, the outcome of a non-treated agent can be used as a proxy for missing observation (or counterfactual), i.e., the non-treated outcome of a treated agent.

Since matching subjects on an n-dimensional vector of characteristics is typically unfeasible for large n, this method proposes to summarize pre-treatment characteristics of each subject into a single-index variable (*propensity score*) which makes the matching feasible. Matching can be done by following different methods. An estimation strategy requires estimating the propensity scores, estimating the response differences for pairs matched on the basis of the estimated propensity scores, and then averaging over all such pairs. Effectively, agents with similar p-scores are considered a match (Woolridge, 2002). Various matching estimators can be proposed for which asymptotic distributions are available (Becker & Ichino 2002). In this paper we have applied nearest neighbourhood and radius matching. In the case of nearest neighbourhood a single control is used for each treatment and $W(i,j) = 1$ for the nearest neighbours and 0 for all others; in case of radius matching multiple controls are used for each treatment, namely $|p_i - p_j| < r$ where r denotes the radius of comparison. Since the comparison can be carried out only over the *region of common support*, generally radius matching is statistically preferred to nearest neighbourhood matching[3].

We have decided to work with this technique, primary data have been collected during 2007-08 from 1500 adult women from six blocks spread over two districts of West Bengal, India.

[3] The point against neatest neighbor matching is that it may match control and treated with relatively large difference in p-scores , though being nearest. This is avoided in radius matching where r is actually a tolerance level on the difference in p-scores of treated and control in a matched pair. Relatively small r always excludes bad matches.

5. Sample Design and Data

The empirical analysis in this study draws on the primary data collected in the winter of 2007-2008 in two districts of West Bengal: Hooghly and South 24-Parganas. In choosing the districts attention has been paid to the historical presence of group-culture to understand the role of connectivity with social capital in enhancing women empowerment. In Hooghly cooperative culture is strongly grounded through the active existence of Primary Agricultural Credit Societies (PACS) at the block level and all kinds of lending agencies like commercial banks, land mortgage banks, non-agricultural credit societies have expanded exponentially in terms of their number of members and working capital over the period 2004-2005. All these agencies, taken together, have been reported to achieve a 12 % annual increase in the working capital in the year 2004-05. The other district selected is South 24-Parganas, which is specifically characterized by the absence of co-operative movement and all credit and non-credit societies have been reported to suffer from a substantial decline in working capital during the same period.

5.1 Sample Design: From each district information has been collected from three blocks with different economic status: advanced, moderate and backward, where the status was made contingent on the block characteristics like percentage of small and marginal farmers in population to reflect economic condition and percentage of population involved in co-operative societies in order to indicate the extent of group culture. Information was collected on 250 adult women (age within the range of 18-49) from each block, i.e., 1500 responses in all on different socio-cultural factors like marital status, relationship with head of the household, caste, religion, living condition, occupation, etc. which are expected to have strong influence on their educational attainment, health status and perceived autonomy that would culminate into their social location determined in terms of empowerment[4]. Finally, information was gathered on their SHG-status: the three categories defined are old member (with at least 5 years of membership), new member (less than 5 years of membership) and non-members. The SHG program has gained momentum as a government sponsored one working with the dual objective of poverty reduction and empowerment enhancement, hence it has become very difficult to find out non-member adult women. So, from each block information has been collected on 100 old members, 100 new members and 50 non-members. In all we have information on 600 old members, 600 new members and 300 non-members. Detailed information was collected on different qualitative

[4] Bhattacharya & Banerjee (2012) and Bhattacharya, Banerjee & Bose (2013) discusses at length the methodology of construction of an empowerment index for each individual agent, which is essentially capability enhancing in nature (the important capabilities considered are health, education and autonomy) and the technique applied is the MIMIC (multiple-indicator-multiple-cause) one that is competent to capture measurement errors through SEM (structural equation modeling).

aspects of the self-help-group (SHG) to assess the quality of participation and the level of involvement.

In case of involvement with SHGs, information was collected on both members as well as non-members. For members questions were asked regarding the length of membership, quality of participation and intensity of involvement, types of projects undertaken, status with respect to loan repayment and the possibility of group-switching. For non-members the main focus was placed to locate the root causes of non-participation. Their perception about an ideal group and its functioning was also noted.

5.2 Data: The outcome variable (Y_i) is specified as the women empowerment index (***WEMPI***) and the following variables have been taken as pre-treatment covariates (vector-***x***):

1. ***AGE***: age of the individual women (continuous variable),
2. ***MST***: Marital status of the individual woman (dummy variable, 1= married, 0= other),
3. ***CST***: Caste of the individual woman (dummy variable, 1= higher caste, 0= lower caste),
4. ***RLGN***: Religion of the individual woman (dummy variable, 1= Hindu, 0=other),
5. ***RLNHH***: Individual woman's relationship with the household head (dummy variable, 1=self or spouse, 0= others),
6. ***HSIZE***: Number of family-members of respondent (continuous variable),
7. ***HSC***: Housing condition of the individual woman (categorical variable, 1=very bad condition, 2=bad condition, 3=moderate condition, 4=good condition, 5=very good condition),
8. ***OCCUP***: Duration of being occupied of the individual member (categorical variable, 1=not working, 2=once in a while, 3=seasonally, 4=throughout the year),
9. ***MEDU***: Mother's education of the individual member (dummy variable, 1=educated, 0=non-educated)[5];

The study variable ***WEMPI*** is expected to be positively influenced by the covariates like social status of the woman (***MST, CST, RLGN***), her status within the household (***AGE, RLNHH,***

[5] We tried to include Father's education as a possible covariate but later it has been removed as removing it was necessary in order to satisfy the balancing property (to be discussed later). Own education has already been included in the construction of empowerment index (the outcome variable).

HSIZE), her economic status (***OCCUP***), her living condition (***HSC***) and presence of awareness in her upbringing reflected through ***MEDU***.[6]

5.3 Exploration: The summary statistics for *Y* and all the relevant *x*-variables are presented separately for non-member, member and the pooled sample for both the selected districts and the presence of mean differences across membership type is verified by applying Fisher's t-test (table-1a & 1b). In general the inter-group differences in average values are more pronounced for the mean compared to the median. Moreover, the mean-differences are statistically more powerful in the district of 24-parganas (S) where the history of group culture is relatively weak. Taking all categories together the mean value of the ***WEMPI*** in Hooghly is 3.289 and that in 24-Parganas (S) is 2.982, and the difference is statistically significant even at less than 1% level. Among the pre-treatment covariates the mean-difference between non-members and SHG-members is statistically significant for ***AGE***, ***MST***, ***RLNHH*** and ***OCCUP*** in both the chosen districts but with opposite sign. While in Hooghly participation is positively related to these factors in 24-Parganas (S) the association is negative. For some other covariates like ***CST***, ***RLGN*** and ***OCCUP*** while in Hooghly there is no significant difference, in 24-Parganas (S) the mean difference across groups is statistically significant.

So, the selected districts are revealing different patterns regarding pre-treatment conditions of SHG participation and their selection makes the combined sample more representative in nature. For both districts the average value of ***MEDU*** and the outcome variable ***WEMPI*** are not exhibiting any statistically significant difference across groups. Thus, the sample is not suggesting the presence of any obvious selection bias and different matching techniques may be applied on it to assess the impact of SHG participation on enhancing women empowerment.

[6] Our choice of covariates is highly influenced by the existing literature on the effect of various socio-economic factors in shaping women empowerment and accordingly the causality has been presumed. (Kamal and Junaid, 2008 for marital status, Singh and Pandey, 2007 for caste, Elizabeth Weiss Ozorak, 1996 for religion, Sara Noreen, 2011 for age, Esther Duflo, 2011 for relationship with household head, Thapa, 2010 for household size, Parveen, Ahsan and Chaudhury, 2004 for occupational status, Esther Duflo, *op. cit.* for mother's education).

Table 1a: Descriptive Statistcs for the Selected Sample in Hooghly

Variable	Group	Count	Mean	Median	SD	CV	t-value	p-value
AGE	Non-member	150	28.960	26.000	10.283	0.355	5.188	0.000
	SHG-member	600	33.580	33.000	9.619	0.286		
	All	750	32.656	30.000	9.922	0.304		
MST	Non-member	150	0.707	1.000	0.457	0.646	4.018	0.0001
	SHG-member	600	0.847	1.000	0.361	0.426		
	All	750	0.819	1.000	0.386	0.471		
CST	Non-member	150	0.673	1.000	0.471	0.699	-1.321	0.1869
	SHG-member	600	0.615	1.000	0.487	0.792		
	All	750	0.627	1.000	0.484	0.772		
RLGN	Non-member	150	0.833	1.000	0.374	0.449	-1.601	0.1097
	SHG-member	600	0.773	1.000	0.419	0.542		
	All	750	0.785	1.000	0.411	0.523		
RLNHH	Non-member	150	0.707	1.000	0.457	0.646	3.721	0.0002
	SHG-member	600	0.838	1.000	0.368	0.440		
	All	750	0.812	1.000	0.391	0.481		
HSIZE	Non-member	150	5.140	5.000	2.259	0.439	-0.691	0.4895
	SHG-member	600	4.998	4.000	2.241	0.448		
	All	750	5.027	5.000	2.243	0.446		
HSC	Non-member	150	2.6000	2.000	1.198	0.461	0.416	0.6777
	SHG-member	600	2.645	2.000	1.182	0.447		
	All	750	2.636	2.000	1.185	0.450		
OCCUP	Non-member	150	1.433	1.000	0.999	0.697	2.898	0.0039
	SHG-member	600	1.742	1.000	1.203	0.691		
	All	750	1.680	1.000	1.171	0.697		
MEDU	Non-member	150	0.453	0.000	0.499	1.102	-3.126	0.0018
	SHG-member	600	0.318	0.000	0.466	1.465		
	All	750	0.345	0.000	0.476	1.378		
WEMPI	Non-member	150	3.335	3.223	0.933	0.280	0.673	0.5009
	SHG-member	600	3.278	3.192	0.936	0.285		
	All	750	3.289	3.192	0.935	0.284		

Source: Primary survey data

Table 1b: Descriptive Statistcs for the Selected Sample in 24-Pargana (S)

Variable	Group	Count	Mean	Median	SD	CV	t-value	p-value
AGE	Non-member	150	30.553	28.000	9.988	0.327	-2.733	0.0064
	SHG-member	600	32.918	30.000	9.347	0.284		
	All	750	32.445	30.000	9.519	0.293		
MST	Non-member	150	0.807	1.000	0.396	0.491	-4.131	0.0000
	SHG-member	600	0.920	1.000	0.272	0.295		
	All	750	0.897	1.000	0.304	0.338		
CST	Non-member	150	0.407	0.000	0.493	1.212	2.011	0.0447
	SHG-member	600	0.320	0.000	0.467	1.459		
	All	750	0.337	0.000	0.473	1.403		
RLGN	Non-member	150	0.700	1.000	0.460	0.657	-3.843	0.0001
	SHG-member	600	0.837	1.000	0.370	0.442		
	All	750	0.809	1.000	0.393	0.486		
RLNHH	Non-member	150	0.767	1.000	0.424	0.554	-1.797	0.0727
	SHG-member	600	0.830	1.000	0.376	0.453		
	All	750	0.817	1.000	0.387	0.473		
HSIZE	Non-member	150	4.487	4.000	2.200	0.490	-1.549	0.1219
	SHG-member	600	4.785	4.000	2.087	0.436		
	All	750	4.725	4.000	2.112	0.447		
HSC	Non-member	150	2.520	2.000	1.151	0.457	-2.025	0.0432
	SHG-member	600	2.722	3.000	1.075	0.395		
	All	750	2.681	3.000	1.093	0.408		
OCCUP	Non-member	150	1.680	1.000	1.089	0.648	-4.438	0.0000
	SHG-member	600	2.228	1.000	1.412	0.634		
	All	750	2.119	1.000	1.370	0.647		
MEDU	Non-member	150	0.280	0.000	0.451	1.609	-3.194	0.0015
	SHG-member	600	0.422	0.000	0.494	1.172		
	All	750	0.393	0.000	0.489	1.243		
WEMPI	Non-member	150	2.977	3.060	0.545	0.183	0.924	0.9010
	SHG-member	600	2.983	3.030	0.552	0.185		
	All	750	2.982	3.039	0.550	0.185		

Source: Primary survey data

6. Impact of SHG Participation on WEMPI

We are interested in investigating the effect of participation vis-à-vis non-participation on WEMPI. As a first attempt simple OLS regression is run on ***WEMPI*** with all pre-participation covariates and a membership dummy for both the districts (table 2).

Table 2: OLS estimates with participation dummy

Study Variable: WEMPI

District	**AGE**	**MST**	**CST**	**RLGN**	**RLNHH**	**HSIZE**	**HSC**
Hooghly	-0.037***	0.706***	0.260***	-0.767***	-0.249***	-0.005	0.066***
24-Pgs	-0.001	0.149*	0.078*	-0.017	-0.128**	-0.037***	0.041**
District	**OCCUP**	**MEDU**	**D-var**	**Const**	**R2**	**F**	**DF**
Hooghly	0.095***	0.051	-0.008	4.253***	0.396	48.54***	739
24-Pgs	0.005	0.000	0.009	3.027***	0.034	2.60***	739

Source: Calculated from Primary Survey Data; *** significant at less than 1% level; ** significant at less than 5% level; * significant at less than 10% level;

In general the regression explains much better in Hooghly than in 24-Pargana(S) where the pre-treatment variables are mostly significant with the exception of MEDU and HSIZE. However, the treatment effect (coefficient of the membership Dummy) is statistically insignificant in both the districts. This indicates two possibilities: firstly, participation alone may not be adequate to improve WEMPI; secondly, with 600 members (old & new taken together) and 150 non-members there may be some dummy balancing problem. So, WEMPI for old members and that for new members should separately compared with the WEMPI of non-members to assess the impact of SHG-participation. Additionally, the effect of (a) duration of participation (attempted to be isolated by making a distinction between old member and new member) and (b) quality of participation (attempted to be captured in terms of both the cohesiveness and vibrancy of the group as well as the extent of active involvement in group activities of the respondent in terms of her participation in the decision making process)[7] needs to be estimated.

[7] The quality of participation has been assessed in terms of a number of questions related to the (i) frequency of group meeting, (ii) the regularity of attendance on the part of the respondent member, (iii) presence of group-project(s), (iv) involvement of the member in the decision making process of the group relating to (a) inclusion of new member, (b) exclusion of existing member, (c) project selection, (d) assessment of project-worth, (e) share of repayment responsibility, etc. Response to all these questions have been collected in a categorical scale and subsequently transformed into an index following a practice akin to that of the human development index with the value lying between 0 and 1. If the value exceeds the mean value of the SHG-members then the participation is denoted as *active* and *passive* otherwise.

So, computing the p-scores of each sample unit in terms of pre-treatment characteristics we have to define the treatment and the control groups according to alternative research questions. Here we would separately carry out comparison between the WEMPI of old members with that of non-members and WEMPI of new members with that of non-members. Under the *ignorability of treatment* assumption, in each case we have to check the *balancedness* of the sample between treated and controlled to estimate the ATT and its statistical significance. Alternative matching techniques will be applied and the region of common support would be derived accordingly.

6.1 Estimation of p-score: A logistic regression model was constructed for the purpose of estimating the propensity score for each individual woman. The group-treatment variable served as the criterion variable for the model and the covariates were considered as possible predictor variables. The result of the logistic regression model is presented in Table 3.

Table 3: Results for the Logistic Regression

Variable	Hooghly		24-Parganas (S)	
	β-coefficient	t-value	β-coefficient	t-value
AGE	0.008	1.78	0.01	1.27
MST	0.24	1.96**	0.56	2.00**
CST	-0.82	-4.82**	-0.05	-2.34**
RLGN	-0.78	-3.84**	0.55	2.85**
RLNHH	0.35	1.34	0.25	1.54
FSIZE	-0.009	-0.28	-0.03	-0.87
HSC	-0.07	-1.13	0.10	1.39
OCCUP	0.32	4.24**	0.11	2.01**
MEDU	0.34	2.02**	0.57	1.46

Source: Primary survey data; ** significant at less than 5% level

;

The logistic regression model developed was used to estimate a probability of each 750 individual woman of the two survey districts. Each probability value represents the probability that the corresponding individual would be a member of the treatment group (i.e. SHG-member/ old-member/ active participant, who is assigned a value of one in the treatment variable). But the propensity score methods only work over the *region of common support*. This restriction implies that the test of balancing property is performed only on the observations whose propensity score belongs to the intersection of the supports of the propensity score of treated and controls. The region of common support for this study has been derived to be [0.23, 0. 86] for the district of Hooghly and [0.22, 0.83] for the district of South 24-Parganas. Four

individual women in Hooghly and two in South 24-Parganas have been identified to have a propensity score outside the region of common support. Hence the matching had been operated on 746 women in Hooghly and 748 women in South 24-Parganas.

6.2 Estimation of ATT by matching p-scores: For each district five different sets are matched as (i) non-member vis-à-vis old member, (ii) non-member vis-à-vis new member, (iii) new member vis-à-vis old member, (iv) passive member vis-à-vis active member and (v) non-member vis-à-vis passive member. Table 4 reports the retained elements in the region of common support for each set in each district.

Table 4: Size of comparison set for each treatment for each District

Type of Treatment	Hooghly			24-Parganas (S)		
	Control Group	Treatment Group	Total	Control Group	Treatment Group	Total
old member vis-à-vis non-member	145	300	445	148	300	448
new member vis-à-vis non-member	147	299	446	146	300	446
old member vis-à-vis new member	296	300	596	296	300	596
active member vis-à-vis passive member	250	346	596	142	458	600
passive member vis-à-vis non-member	147	254	401	139	142	281

Source: Primary survey data; STATA 12;

The average treatment effect on the treated (ATT) has been estimated in each case by applying both Nearest Neighbour and Radial matching (with radius 0.01) scheme where the latter matched larger number of observations from the control group with the observations in the treatment group and yielded statistically stronger ATT values (table 5). For radial matching a significant effect of the duration of membership is observed on the outcome variable ***WEMPI*** in both the districts under consideration and for both the matching schemes in the district Hooghly active participation leads to improvement in women empowerment rather than mere passive participation.

Table 5: Treatment Effect of Participation for each District

Type of Treatment	Statistic	Hooghly		24-Parganas (S)	
		Matching Scheme		Matching Scheme	
		Nearest Neighbour	Radial (radius=0.01)	Nearest Neighbour	Radial (radius=0.01)
old member vis-à-vis non-member	ATT	0.02	0.02	0.03	0.06
	t-value	0.160	0.25	0.48	0.99
new member vis-à-vis non-member	ATT	0.204	0.16	0.04	0.03
	t-value	1.68	1.70	0.59	0.41
old member vis-à-vis new member	ATT	0.115	0.169	0.100	0.113
	t-value	1.18	2.35**	1.45	2.77**
active member vis-à-vis passive member	ATT	0.14	0.11	0.11	0.04
	t-value	2.21**	2.62**	1.75	1.91
passive member vis-à-vis non-member	ATT	0.08	0.05	0.01	0.01
	t-value	0.65	0.45	1.10	1.16

Source: Primary survey data; ** significant at less than 5% level; STATA 12;

6.3: Regression Results: It will be interesting to compare these p-score based results with standard OLS estimates to assess the improvement, if any. Table 6 presents the regression results for two districts for each specific type of treatment. In general, for all regressions Hooghly is suggesting statistically much stronger relations compared to 24-Parganas (S) in terms of the relevant F-statistics. While in Hooghly for all variants of regression models ***AGE*** and ***RLGN*** have adverse effect on ***WEMPI*** and MST and ***OCCUP*** have favourable influence in case of 24-Parganas (S) the single most important factor turned out to be ***HSIZE***. Membership *per se* does not have much influence on women empowerment as comparison between non-member vis-à-vis old member and that between non-member and new member failed to suggest any statistically significant difference in terms of the coefficient of the relevant dummy variables[8]. Significant effect is produced by the duration of membership in both the districts, which was produced by radius matching in case of p-score based comparison. However, quality of participation is important in Hooghly only, which is again consistent with the p-score based results. To explore whether duration of membership and the quality of participation have any mutually reinforcing effect on WEMPI an interaction dummy has been defined where the variable assumes a value equal to unity when the subject is both a old member and an active

[8] Treatments 1 & 2;

member. When the regression is run the coefficient of the dummy variable turns out to be statistically significant with correct sign in Hooghly but the effect is much weaker in 24-Parganas (S).

In fact, in general, Hooghly experiences greater effectiveness of the SHG program in enhancing women empowerment compared to 24-Parganas (S) as here the institution of social capital has stronger footing as well as longer history. Hooghly is a district, which has a strong history of cooperation (all cooperative credit and non-credit societies increased exponentially both in terms of number of members and working capital) and as a result SHG-promotion became very popular in this district. On the contrary, despite the huge effort from both government and non-governmental agencies, SHGs have been reported to fail to produce the desirable outcome in South 24-Parganas; all credit and non-credit societies have been reported to suffer from a decline in working capital in this district. This has been reflected also in the ATT-based results. The positive ATTs derived in both the districts confirm the empowerment-enhancing potential of Self-help groups. But active participation consistently yields empowerment only in certain district-level local conditions captured by the strength of cooperative culture. The difference in statistical significance (for Hooghly significant and for South 24-Parganas insignificant) between two districts reflects that.

Table 6: OLS Regression Estimates of the effect of SHG-participation on Women Empowerment
Study Variable: WEMPI

Type of treatment (D-var)	Old member = 1 Non-member = 0		New member = 1 Non-member = 0		Old member = 1 New member = 0		Active member = 1 Passive member = 0		Passive member = 1 Non-member = 0		Old & Active =1 Otherwise = 0	
Variable	Hooghly	24-Pgs	Hooghly	24-Pgs	Hooghly	24-Pgs	Hooghly	24-Pgs	Hooghly	24-Pgs	Hooghly	24-Pgs
AGE	-0.031***	-0.002	-0.043***	-0.002	-0.038***	-0.001	-0.038***	0.000	-0.039***	-0.005	-0.038***	-0.001
MST	0.888***	0.145	0.544***	0.226**	0.682***	0.089	0.684***	0.084	0.762***	0.140	0.691***	0.147*
CST	0.138	0.102*	0.155**	0.065	0.359***	0.068	0.411***	0.072	0.102	0.050	0.257***	0.077*
RLGN	-0.748***	.-0.001	-0.940***	-0.013	-0.731***	0.022	-0.681***	-0.006	-0.917***	-0.031	-0.785***	-0.011
RLNHH	-0.309**	-0.075	-0.140	-0.145	-0.301***	-0.155**	-0.309***	-0.162**	-0.214	-0.023	-0.243**	-0.129**
HSIZE	-0.012	-0.035**	0.008	-0.038***	-0.009	-0.039***	-0.012	-0.038***	-0.002	-0.031*	-0.004	-0.037***
HSC	0.062**	0.061**	0.058*	0.029	0.082***	0.034	0.082***	0.036	0.046	0.087***	0.070***	0.039**
OCCUP	0.099***	0.009	0.077**	0.011	0.080***	-0.004	0.077***	-0.003	0.062	0.008	0.079***	0.003
MEDU	0.021	-0.063	-0.004	0.011	0.101	0.025	0.086	0.029	0.007	-0.154**	0.039	-0.008
D-var	**-0.0004**	**0.058**	**-0.085**	**-0.047**	**0.137****	**0.097****	**0.159****	**0.038**	**-0.096**	**-0.013**	**0.174*****	**0.087***
Const.	4.092***	2.947***	4.664***	3.047***	4.181***	3.033***	4.068***	3.062***	4.571***	2.993***	4.268***	3.028***
R^2	0.312	0.046	0.499	0.038	0.411	0.041	0.411	0.034	0.449	0.064	0.403	0.039
F	19.95***	2.13**	43.73***	1.73*	41.04***	2.49***	41.18***	2.08**	27.19***	2.04**	49.87***	2.97***
DF	439	439	439	439	589	589	589	589	334	298	739	739

Source: Calculated from Primary Survey Data;
*** significant at less than 1% level;
** significant at less than 5% level;
* significant at less than 10% level;

6.4 Correspondence between target and out-reach: Before rounding up the discussion it would be interesting to study the pattern of correspondence between the probability of inclusion of a particular subject with given pre-participation characteristics in a project (reflected by the distribution of p-score generated for the control group) and the probability with which one is included in that project (reflected by the distribution of p-score generated for the treatment group). If the relative frequency of those with low probability of inclusion is even lower in the treatment group compared to the control group, then the efficiency of project implementation should be questioned and there would be the problem of mis-targeting. This possibility would be examined for both length of membership and the quality of participation (table 7).

Table 7: Difference between expected and realized pattern of SHG participation

Propensity score	old member vis-à-vis new member					
	Hooghly (%)			24-Parganas (S) (%)		
	Control Group	Treatment Group	Gap	Control Group	Treatment Group	Gap
<0.20	31.63	17.17	-14.46	0.00	0.00	0.00
0.20- 0.40	27.21	17.17	-10.04	22.30	13.10	-9.20
0.40- 0.60	24.83	28.62	+3.79	66.89	63.45	-3.44
0.60- 0.80	15.99	36.03	+20.04	10.81	23.10	+12.29
0.80- 1.00	0.34	1.01	+0.67	0.00	0.35	+0.35
	active member vis-à-vis passive member					
	Control Group	Treatment Group	Gap	Control Group	Treatment Group	Gap
<0.20	0.00	0.00	0.00	0.00	0.00	0.00
0.20- 0.40	9.20	4.91	-4.29	0.00	0.00	0.00
0.40- 0.60	55.20	40.75	-14.45	2.82	1.75	-1.07
0.60- 0.80	34.80	52.89	18.09	76.76	60.48	-16.28
0.80- 1.00	0.80	1.45	0.65	20.42	37.77	17.35

Source: Primary survey data; Software: STATA 12

It appears from table-5 that the inclusion of those with low p-score is lower in the treatment group compared to their expected share of representation suggested by the p-score of the control group. This phenomenon is counter balanced by the more than proportional representation of the high p-score subjects in the treatment set. Since, in designing the sample, collecting data, defining pre-treatment characteristics and specifying the estimation methods adequate care has been taken to handle the problem of self-selection, hence, this mismatch may be attributed to the supply side biases involved with inappropriate program implementation. Inclusion in a SHG provides access to social capital to women and favourably contributes to their capability enhancing empowerment. However, the successful group formation depends on local history of cooperation and group culture which in its turn is contingent on strong

foundation of trust commitment, transparency and reciprocity at the community level. If SHG-microfinance program grows like a mushroom to fulfil administrative targets taken up at the governmental level then quality of group cohesion is bound to be compromised and target over-shooting would only be expected.

6.5 Discussion: Every public program faces the challenge of reaching intended beneficiaries. Documented deficiencies in many social transfer mechanisms have led governments, non-government organizations and donor institutions to embrace institutions which use innovative methods of transferring resources to poor households. Some of these (such as Grameen Bank in Bangladesh and Micro-finance SHGs in India) provide credit to poor households for micro-enterprises, some (like social funds in Peru) subsidize investments in social and physical infrastructure and others (such as Employment Guarantee Schemes in India) provide opportunities for employment on local infrastructure projects during periods of food scarcity. Central to evaluating the success of these programs is an assessment of how well they target the poor and the vulnerable section of the society.

While many of the programs mentioned above have transformed the lives of millions of households, there is some concern that they may not be adequately serving the very poor. These households may be inadequately informed, educated or nourished to take advantage of these programs, they may not possess required documents (like identity proof, etc.), they may be socially ostracized, or agency problems may lead bureaucrats to direct resources to other groups. There is also empirical evidence from a variety of social programs in both developed and developing countries that information sets differ among those eligible for the program and that participation rates are sensitive to program design.

In spite of the phenomenal growth in the number of SHGs and total loans advanced to them, there is little systematic evidence on their internal functioning. Statistics on Indian SHGs have emerged because the organizations promoting these groups provide their donors an account of the number of new groups created and because commercial banks are required to report their lending to the Reserve Bank. In neither case information is available on the details regarding the mechanism adopted for group formation and/or selection of group-members from a population. We, therefore, know little about group demographics, about whether groups, once formed, continue to function effectively or how many members leave groups that they initially join.[9]

[9] The problem of attrition and exclusion in Self-help groups in India has been studied by Banland, Somanathan and Vandewalle (2008) in selected regions of northern Orissa and Chattisgarh and observed that about one-fifth

The difference between the desired probability of inclusion of a potential member with given pre-participation characteristics in a SHG and with which one is actually included reflects the need of an introspection on the selection procedure adopted to enhance women empowerment through SHG-led microfinance institutions. More importantly, the finding that the relative frequency of those with low (desired) probability of inclusion has been even lower in the treatment group compared to the control group gives an impression that the SHG-program may fail to produce desirable effects in presence of implementation biases. A program that not only fosters group formation but also supports more mature groups through federation and access to credit can produce significant economic benefits in the long term. But unless adequate care is taken in selecting group members and sufficient social space is ensured for active participation of all to retain trust and transparency, the program may fail and the failure may be attributed to the inefficiency at the level of both targeting as well as implementation.

7. Concluding Remarks

The paper aims at isolating the effect of group-participation on women empowerment using primary data on 1500 individual women collected during 2007-08 from two districts of West Bengal, India, namely Hooghly and South 24-Parganas. Since the impact evaluation exercise typically suffers from the problem of counterfactual, in the absence of biologically identical observations a proxy has been constructed in terms of pairing of statistically identical observations by applying matching techniques based on propensity-scores. The sample has been divided into a number of sub-samples where the observations in each sub-sample would have same chance of program-participation. Now the average treatment effect on the treated (ATT) has been compared in terms of the outcome variable, i.e., a women empowerment index, between the treatment group and the control group. It is observed that (i) empowerment index in Hooghly is distinctly higher than that in 24-Parganas (S) for both SHG members and non-members, (ii) in both districts no statistically significant difference in ATT between member and non-member has been found for both old members and new members, taken separately as treatment groups keeing non-members as control, (iii) however, some significant difference in outcome is observed between old and new members in both the districts under radial matching, (iv) besides duration of membership the quality of participation turned out to be the most important deciding factor for the success of the SHG-microfinance program in Hooghly where the enhancement in the women empowerment index is the highest for the group of members

of those joining an SHG network during a specific reference period (1998-2006) have left it by the end of the period.

who have active involvement in terms of the quality of participation. This indicates the presence of a district-specific difference in the quality of individual participation. Here the selected districts are markedly different in terms of their history of social networking, and, hence, a possible explanation can be advanced in terms of difference in traditions of solidarity and/or access to social capital which is likely to impinge on the quality of participation. Finally, the adequacy of program implementation initiatives taken from the provider's side has been examined by comparing the *ex-ante* probability of inclusion with the *ex-post* proportion of included. In general, for both the districts it is observed that the *actual* proportion of inclusion of the low *p-score* agents are even lower for all types of treatments considered. This indicates a bias from the supply side where the more likely agents are getting self-selected in the absence of special effort to reach out the relatively more vulnerable ones.

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