ASSESSING EMPOWERMENT THROUGH GENERATION OF SOCIAL CAPITAL

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ABSTRACT

As women are an important part of the community, building their capabilities to manage communities should be enhanced. The basic objective of this paper is to estimate Women Empowerment Index and determine the effectiveness of joint liability microfinance programmes through Primary Agricultural Credit Societies in empowering rural women socially and economically in two blocks of Hooghly district of West Bengal. In this study, Principal Component Analysis (PCA) is used to estimate Women Empowerment Index. It is proved that social capital becomes an important component of Women Empowerment Index. In order to determine the effectiveness of joint liability microfinance programmes through Primary Agricultural Credit Societies in empowering rural women socially and economically we use the difference-in-difference estimator. Results reveal that there has been enhancement of empowerment of rural women in the two blocks both economically and socially belonging to Self-Help Groups formed under Primary Agricultural Credit Society during the concerned time periods if we compare them with the nonparticipants.

Key Words: Empowerment, social capital, joint liability loan contract system, Primary Agricultural Credit Societies.
JEL Classification: G14, G21

1. Introduction

As women are an important part of the community, building their capabilities to manage communities should be enhanced. Since the 1970s, many women's organizations worldwide have included credit and savings, both as a way of increasing women's incomes and to bring women together to address wider gender issues. Through their contribution to women's ability to earn an income, their programmes are assumed to initiate a series of virtuous spirals of economic empowerment, increased well-being for women and their families and wider social and political empowerment. Self-Help Groups (SHGs) would be used as an entry point for wider empowerment interventions. SHGs have been instrumental in empowerment by enabling women to work together in collective agency. Women networks do not usually obtain business or political favours as they command few economic resources. However, SHGs, when combined with savings and credit have enabled women to benefit economically by monetizing their contributions and in the process have empowered them to become agents of change. To maximize the contribution of microfinance to women's empowerment requires equality in access to all micro finance services and an adequate and non-discriminatory regulatory framework.

Different perception exists regarding the ability of microfinance to contribute to women empowerment. Empowerment is defined as the processes by which women take control and ownership of their lives through expansion of their choices. The core elements of empowerment have

been defined as agency (the ability to define one's goals and act upon them), awareness of gendered power structures, self-esteem and self-confidence (Kabeer 2001). Two vital processes have been identified as important for empowerment. The first is social mobilization and collective agency. Second, the process of social mobilization needs to be accompanied and complemented by economic security (UNDP 2001). There may be manifestations of empowerment in the broader social sphere as well like campaigns against social ills or more active participation in local institutions. The first report (2004-05) of the Committee on Empowerment of Women on the functioning of SHGs highlights a number of weaknesses in both the programmes. One of the constraints in providing hassle-free and adequate credit to SHGs is that banks do not follow consistent norms in grading SHGs while procedural requirements are cumbersome and vary to a large extent. There seems to be a duality in approach towards microfinance in India. One model looks upon it as an enabling tool to escalate the rate of economic growth. The other approach is concerned more with opportunities that the poor have access to improve the quality of their lives. Social intermediation facilitates creation of social capital, hastening access to social opportunities and coping with external shocks.

Social capital indicates connection with in the social network. Formal social networks through Self Help Group (SHGs) may be understood as the 'structural' elements of social capital. The content of these networks in social capital refers to norms of trust and reciprocity which operate within these structures. Social networks can thus be considered as a powerful means to foster the diffusion of information and knowledge, lowering uncertainty and transaction cost. Enforceable trust at the level of the social network is a reasonably effective way to promote intra-group bonds and minimize risk. Sympathetic relations between individuals are marked by social capital. Social capital must be balanced; as a public good, organizational social capital doesn't always provide immediate rewards to the individuals. Social capital has important implications for society and reduces the effects of individual's acting for their own benefit.The basic idea is that social capital can be used as a tool to alleviate poverty and inequalities, due to its ability to foster collective action and to solve coordination failures. Microfinance through SHGs has facilitated the formation of social capital, where people learn to work together for a common purpose in a group or organization (Putnam 2000). The ability to associate depends on the degree to which communities share norms and values and are able to subordinate individual interests to those of larger groups. Out of these shared values comes trust, with the potential for social, economic and political change. Like other forms of capital, social capital is productive, making possible the achievement of certain ends that in its absence would not be possible. Social capital as a means to intellectual capital is important because it supports a perspective that moves institutional theory from value appropriation to value creation. The microfinance programmes targeting women are often promoted as a component of packages to absorb the shock of structural adjustment programmes and globalization with macroeconomic and social policy prescriptions.

The basic objectives of this paper are as follows:

1. To estimate Women Empowerment Index using Principal Component Analysis
2. To investigate whether different elements of social capital play an influential role during the time of calculating Women Empowerment Index
3. The effectiveness of joint liability microfinance programmes through Primary Agricultural Credit Societies in empowering rural women socially and economically.

2. Few Overviews of Existing Literature:

In order to study the impact of microfinance on women empowerment through generating social capital, there is a need for appropriate indicators that can measure it. The UNDP report of 1995 introduced two main complementary indices – Gender-Related Development Index (GDI) and Gender

Empowerment Measure (GEM). Evidence from South Asian Studies suggests that within the family, the purchase of food and other items of household consumption and decisions related to children's health appear to fall within the women's arena. It has been well documented that an increase in women's resources results in increased well-being of the family, especially children (Mayoux, 1997, Kabeer, 2001: Hulme and Mosley, 1997). Women's access to credit contributes significantly to the magnitude of the economic contributions reported by women, to the likelihood of an increase in asset holdings in their own names to an increase in their exercise of purchasing power, and in their political and legal awareness. Access to credit is also associated with higher levels of mobility, political participation and involvement in 'major decision making' for particular credit organizations (Hashemi et al. 1996). One anthropological study of Grameen Bank indicated that inclusion of drop-outs and villages away from the 'key success areas' would substantially increase estimates of negative impact and reveal more cases of serious disempowerment (Khondkar, 1998). A proportion of the funds made available for this microcredit schemes were utilized by women, enabling them to meet the subsistence needs of their families during those difficult economic times (ESCAP, 2002). In Bangladesh, women showed a great deal of empowerment in their capacity to articulate their needs and in their receptivity to new ideas. The perception that microcredit is an empowering tool for women has in recent years come under close and in some instances negative scrutiny. Critics have charged that microcredit accessed by women has often been appropriated by other household members, leaving women burdened with the responsibility of repayment and the sanctions of default (Goetz and SenGupta, 1996). Social capital is described as circumstances in which individuals can benefit from group membership (Sobel, 2002). The role of concrete personal relations and of structures of such relations in generating trust and discouraging opportunities behaviours therefore fostering transactions and the economic performance is important (Granovetter, 1985). Trust is higher with stronger formal institutions for enforcing contracts (Zak and Knack, 1998). There is a positive and significant relationship between people's propensity to trust others and their attitude to behave trustworthy (Glaeser, Laibson and Sacerdote, 2002). Women's empowerment is about the process by which those who have been denied the ability to make strategic life choices acquire such ability (Kabeer, 1999). In spite of all government effort by adopting developmental programme since first five year plan and a multi-disciplinary approach with a special thrust on health, education and employment level of women since sixth five year plan, empowerment level of women did not increase to the expected level till 1998-99 (Chakrabarti and Biswas, 2008). But no paper has ever tried to investigate whether social capital plays any significant role to estimate the Women's Empowerment Index among the microfinance participants. This paper will try to do that on the basis of primary data.

3. Sample Size and Design

The sample is drawn from Hooghly district of West Bengal. Hooghly has been selected because it has the maximum number of self-help groups provided with bank loan which are formed by Primary Agricultural Credit Societies (PACS) and the amount of loan disbursed to these groups by the District Central Cooperative Bank is also the largest (Progress of SHG –Bank Linkage in India 2004-05, NABARD). The role of the Hooghly District Central Cooperative Bank Ltd. (HDCCB) in microfinance is also significant compared to the Cooperative Banks of other districts and has been considered as the role model for many districts and states. There were 8419 savings-linked SHGs out of which 8395 were under PACS of HDCCB as on 31.03.03. The total number of female SHGs was 8242. The total number of credit-linked SHGs was 5296 out of which 5087 were female SHGs. The amount of savings deposit mobilized by SHGs was Rs. 214.43 lakhs and the amount of loan disbursed was Rs. 666.67 lakhs. The repayment rate was 98%. (Annual Report of Hooghly District Central Cooperative Bank Ltd.). Out of the eighteen blocks in Hooghly, only two blocks have been selected for the survey randomly and these two sample blocks are (i) Chinsurah-Mogra and (ii) Tarakeshwar. Chinsurah-Mogra and Tarakeshwar are chosen because both are tribal based communities with a considerable

percentage of people lying below the poverty line. Chinsurah-Mogra has two PACS affiliated to Hooghly DCCB Ltd - Digsui Union Large Sized Primary Cooperative Agricultural Credit Society Ltd. and Talandu Sech 'O' Samabyay Unnayan Samiti Ltd. The former is the oldest. This is also another reason for choosing Chinsurah-Mogra. This society was formed on 5th March 1957 at Digsui catering to the needs of 13 villages – Digsui, Khalsi, Gannegarh, Bagri, Daharchakulai, Mamudpur, Kabirhati, Naksha, Fatehpur, Taragun, Champarui, Aashphal and Rajarambati. Since 1996, SHG loan is also being provided by the society. The latter was formed on 26.12.73. It covers two villages – Talandu and Bharatpur. SHG loan has been introduced in this society since 1998. In Tarakeshwar there are eighteen PACS out of which one is chosen randomly and it is known as Vivekananda Samabyay Krishi Unnayan Samiti Ltd. Incidentally it has the maximum number of savings-linked and credit-linked groups. This society was formed on 17th September 1977. It covers five villages – Kanaria, Mohonbati, Nacchhipur, Tullyan and Champadanga. SHG loans are also provided by this society since 1999. The loan disbursed through SHGs was utilized both for agricultural purpose as well as for other purposes like consumption, construction and repair, business etc. But the information on the amount of loan used for agricultural purpose out of the total SHG loan is not available. As for Digsui Union Large Sized Primary Cooperative Agricultural Credit Society Ltd. other loan included education and medical loan. Similarly, Talandu Sech 'O' Samabyay Unnayan Samiti Ltd. also disburses term loan and SHG loan. The different types of loan disbursed by Vivekananda Samabyay Krishi Unnayan Samiti Ltd. were salaried loan, pledge loan and SHG loan along with crop loan. The rate of recovery varied between 80% and 90% for all the three PACS.

The sample consists of one treatment group and one control group or reference group. For joint liability loan contract system, all the groups that were formed in 2004 (which is considered as the base period i.e. t^{th} period in our investigation) were used as the sample as not too many groups were formed during this year. All members of each group were included in the sample. The total number of groups formed during this year in the three PACS was 47. The survey was carried out twice in order to determine the impact of microfinance programme on the treatment group and to evaluate whether there has been any change among the members of self-help groups as compared to the control group. The first survey period was from August to November in 2005-06 and the second survey period was from September to December in 2008-09.[1] The periods were chosen to minimize the recall period of each respondent. The socio economic conditions were studied of the sample respondent with the help of a well framed detailed questionnaire in order to determine the contribution of microfinance in empowering rural women. In our sample, the rural households of the same villages had the option of either joining any of the self-help groups or stay away from them. Thus the sample has two categories:

1. Individuals who have taken membership of self-help group in the t^{th} period and plans to take credit in future when required from her respective group under joint liability loan contract. These individuals in our paper belong to Treatment Group.
2. Individuals, from almost identical socio-economic background who are not members of joint liability loan contract system not only in the t^{th} period but also in the end line period though they have the eligibility to join any of the groups. These sample respondents here treated as control group.

The total sample size is 376 out of which the treatment group has 276 individuals and the control group has 100 individuals.

4. Estimation of Women Empowerment Index Using Principal Component Analysis

It is insufficient to explain empowerment of women by using only single variable because such descriptive analyses are based on a uni-dimensional assumption that a variable obtains no other

relational and / or interrelation pattern with any other variable,. Therefore, it is necessary to apply multivariate method which aims to find meaningful method of measuring empowerment. The primary advantage of multivariate technique is their ability to accommodate multiple variables in an attempt to understand the complex relationships which is not possible with univariate and bivariate methods. For this reason, 'Factor Analysis' is chosen as the method to examine the multidimensional relationships among the variables in this study. Factor Analysis is a generic name given to a class of multivariate statistical method whose primary purpose is to define the underlying structure in a data matrix. It addresses the problem of analyzing the structure of the interrelationships among a large number of variables by defining a set of common underlying dimensions known as factors. In this study, Principal Component Analysis is preferred for model building because this method attempts to reach a set of factors which can account for all the common and unique variance in a set of variables (Garson, 2003). The goal of PCA is to summarize the interrelationships among a set of original variables in terms of a smaller set of orthogonal principal components that are linear combinations of the original variables. Therefore while choosing the variables we have kept in mind that all variables describe a common phenomenon. The primary application we are looking at in this paper is the empowerment analysis. PCA requires that the variables being examined be based on similar units of measurement. Therefore it is customary to standardize (normalize) the variables when each variable has mean zero and variance one, so that PCA indeed analyses the dependencies among the variables rather than the differences in measurement scales. In order to normalize the values we have to first identify the maximum and minimum values of each variable. To find out whether the rural women have been empowered through microfinance programme or not we have assigned values to the variables with the help of a four pointer scale, thereby examining how discrete data can be appropriately used with PCA. If there are several categories of a discrete variable, they may or may not have some natural ordering. If they do, the discrete data are referred to as ordinal. When we turn to the ordinal data, a simple and naïve plug-in strategy would be to use the discrete x's as if they were continuous in the PCA.

If x is a random vector of dimension p with finite p x p variance-covariance matrix $\mathbf{V[x] = \sum}$, then the principal component analysis solves the problem of finding the directions of the greatest variance of the linear combinations of x's. In other words, it seeks the orthogonal set of coefficient vectors $a_{1,\ldots\ldots}$, a_k , such that

$\mathbf{a_1 = arg\ max\ V\ [a^{/}\ x]}$

……

$\mathbf{a_k = arg\ max\ V\ [a^{/}\ x]}$ ……(1)

The linear combinations $\mathbf{a^{/}_k x}$ is referred to as the k-th principal component. The first principal component will have the greatest variance and extract the largest amount of information from the data; the second component will be orthogonal to the first one, and will have the greatest variance in the subspace orthogonal to the first component, and extract the greatest information in that subspace and so on. The solution to equation (1) is found by solving the Eigen problem for the covariance (or correlation) matrix ∑: find **λ's** and **a's** such that

$$\mathbf{\sum a = \lambda a} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

The solution of the Eigen problem (2) for the covariance or more commonly correlation matrix gives the set of principal component weights **'a'** also referred to as factor loadings, the linear combinations $a^{/}$ x and the Eigen values $\mathbf{\lambda_1 \geq \ldots\ldots\ldots\ldots\ldots \geq \lambda_p}$. The linear combination that corresponds to the largest Eigen value is the one that has the greatest variance.

Let us first identify the variables used to measure empowerment using PCA. To measure empowerment we have used 17 variables to understand whether there has been an increase in women's empowerment after joining self-help groups.

(i) Women's awareness about child care facilities (chcare): As women are responsible for rearing of children, therefore they will have to be aware of their children's nutritional status, vaccination at proper times etc. because greater is the awareness among the mothers better should be the health conditions of the children.

(ii) Women's awareness about prenatal care (prenat): Prenatal care is important both for the mother and the child. Women should be aware of their health conditions for a better future.
(iii) Place of child's birth (chborn): Birth of a child should take place either in a primary health centre or in a hospital which is important both for the child and the mother.
(iv) Meal with family (mealfml): Whether the female counterpart has the right to have her food with the rest of the family or does she have to survive with the leftovers is an indicator of women empowerment.
(v) Right to take decisions about fertility (fert): Illiterate women often do not have the right to take decisions about fertility; decisions are imposed on them by the male counterpart.
(vi) Right to make small or large purchases independently (purchs): Since the female counterpart of the household did not have any economic independence before joining the group, therefore they did not have any right to make purchases on their own, they had to take their husband's permission or the husband makes the purchase according to his own will.
(vii) Right to take decision about child's education (chedu): Whether the child will go to school or not depends on the husband's decision because the expense has to be borne by the father as women did not have any earnings.
(viii) Initiative to mobilize other women to stop illegal activity (illigact): Illegal activities such as alcoholism, domestic violence are common among rural families thus causing harm to the female members of the family and depriving them of their own rights.
(ix) Mobility (mobility): Whether the women have the right to move freely without their husband's permission is important for women empowerment because this variable takes care of the social independence of rural women.
(x) Right to attend meetings (attmeet): Rural women are usually conservative and thus they are compelled to take their husband's permission for every action. Whether they have the right to attend meetings of self-help groups which is compulsory is again an indicator of social independence of rural women and thus have been included.
(xi) Literacy (literate): Rural women are usually illiterate and this acts as an obstacle to women empowerment.
(xii) Use of birth control measures (brthctrl): It is often observed that as rural women are unaware of the different birth control measures, they give birth too many children which increases the dependency ratio and reduces monthly per capita consumption expenditure thereby accentuating poverty.
(xiii) Decision about use of loan (useloan): What is to be done with the loan taken through joint liability loan contract system is usually decided by the male member of the household. Right to take decision about the usage of loan by the female member at par with the husband is an indicator of empowerment.
(xiv) Employment opportunity (employ): As the basic motive of joint liability loan contract system is to help members of self-help groups to undertake economic activity to generate income to alleviate poverty thereby empowering rural women through economic independence, this variable can be an important component to estimate economic empowerment.
(xv) Savings habit (save): Mostly rural households are unable to save because of abject poverty. Even if they can save, the amount is so small such as Rs. 5 or Rs. 10 that cannot be deposited in any financial institution. The ability to save such small amounts has been possible only because of joint liability loan contract system which induces savings habit among rural women and in turn provides credit to them. This acts as an indicator of economic empowerment.
(xvi) Right to decide about the source of loan (loansrc): Since the rural households usually borrowed from moneylenders in spite of exorbitant interest rates charged by them because of lack of access to financial institutions for credit, this variable effectively measures empowerment to understand whether the female counterpart of the household who is a member of self-help group has the right to take decision about the source of loan i.e. from the group where the interest rate is very less.

(xvii) Borrowing (borrow): This variable is used to understand whether there has been a change in the source of borrowing after joining self-help group.

Since our main objective is to study whether there has been any enhancement of empowerment of rural women through participation in microfinance operated by PACS we have to make a comparative study of the treatment group with the control group. But all 17 variables have not been considered for the control group for both t^{th} and $(t+1)^{th}$ period because there are some variables which are relevant only for the treatment group. The four variables which have not been included for the control group analysis in the t^{th} period are 'attmeet', 'loansrc', 'borrow' and 'useloan'. These variables have been excluded because the non-members do not have to attend any meeting (which is relevant for a self-help group) and they have not borrowed from any other source in our study because repayment is a problem for them as they either lie below the poverty line or lie just above the poverty line both in t^{th} and $(t+1)^{th}$ period. In the $(t+1)^{th}$ period the same variables are excluded for the control group for the same reason. Out of 17 variables only 'useloan' variable has been omitted for the treatment group analysis in the t^{th} period because no one has taken loan in the t^{th} period. The group members are eligible for loan only after six months of formation of the group provided savings are regular and they meet regularly which is constantly monitored by the SHG coordinator. But all the variables are relevant for the treatment group in $(t+1)^{th}$ period because by then they have enjoyed the benefits of joint liability loan contract system.

Running the PCA in the software package SPSS, we have identified the Eigen Values which is more than one. The number of Eigen values above one varies from data to data. In our study there are four data sets –two for control group, one for t^{th} period and the other for $(t+1)^{th}$ period and similarly two for the treatment group, one for t^{th} period and the other for $(t+1)^{th}$ period. In case of control group for the t^{th} period there are four Eigen values – 5.055, 1.253, 1.245, and 1.157. Incidentally, the four components explain 72.58% variance of the variables included in the analysis. The variable 'mealfml' has been ignored during the analysis because this variable's communality is less than .5 which implies that it does not have sufficient explanation. For this analysis we have used 'Orthogonal Rotations' as our objective is to reduce a larger number of variables to a smaller set of uncorrelated variables. In practice, the objective of all methods of rotation is to simplify the rows and columns of the factor matrix to facilitate interpretation. By simplifying the rows, we mean making as many values in each row as close to zero as possible (i.e., maximizing a variable's loading on a single factor). By simplifying the columns we mean making as many values in each column as close to zero as possible (i.e., making the number of high loadings as few as possible). Three major orthogonal approaches have been developed – Quartimax, Varimax and Equimax. The Varimax method has been used in this analysis. Varimax criterion centres on simplifying the columns of factor matrix. This method maximizes the sum of variances of required loadings of the factor matrix. With the Varimax rotational approach, there tend to be some high loadings (i.e., close to -1 or +1) indicating a clear positive or negative association between the variables and the factor and some loadings near 0 in each column of the matrix indicating a clear lack of association. This structure is fundamentally simple. For example, Table 1 shows the Rotational Component Matrix of control group in the t^{th} period.

To calculate the weights of the different variables we have multiplied the 1^{st} Eigen value with 1^{st} Extracted Component Column, 2^{nd} Eigen value with 2^{nd} Extracted Component Column, 3^{rd} Eigen value with 3^{rd} Extracted Component Column, and the 4^{th} Eigen value with 4^{th} Extracted Component Column and then summed them up to obtain the weight. We have considered absolute values (irrespective of sign, negative values are treated as positive). For example, for the first variable 'chcare' we have 5.055*.934+1.253*.015+1.245*.003+1.157*.031= 4.78. In the same way the weights of the other variables are also calculated. Similarly the weights of the different variables for the control group in $(t+1)^{th}$ period are estimated. The Eigen values for the control group in $(t+1)^{th}$ period are 5.175, 1.412, 1.255 and 1.146. There are six Eigen values whose values more than one for the treatment group in the t^{th} period- 3.296, 2.033, 1.309, 1.162, 1.083 and 1.045. For treatment group in the $(t+1)^{th}$ there

are five Eigen values having values more than one. They are 4.6, 2.678, 2.081, 1.594 and 1.182. The weights of all the variables for the control group and the treatment group in both t^{th} and $(t+1)^{th}$ periods are given in Tables 2 and 3 in the appendix respectively.

The right to move freely without their husband's permission to attend meetings and interaction with other group members and officials of PACS has increased their confidence and awareness. Increased awareness has helped them to use birth control measures effectively and thereby take decisions regarding fertility. The ability to save and borrow has enhanced their importance in the family. This has increased their right to make small household purchases without their husband's consent. Rural women are able to send their children to school and spend for their children's education. Literacy among rural women has increased due to awareness through microfinance programme.

There is significant economic and social independence among women of these two blocks. All these variables focus on social capital as these have enabled empowerment of women which is a collective action through social networks i.e. SHGs. These SHGs foster the sharing of information and knowledge; increases the concern for one another, enhances the ability to work together for a common purpose thereby acting as a representative of social capital.
The following formula is used to determine the Women Empowerment Index:

$$\mathbf{WEI = \sum X_i (\sum |L_{ij}| . E_j) / \sum (\sum | L_{ij} | . E_j)}$$

Where WEI is the women empowerment index, X_i is i_{th} variable, L_{ij} is the factor loading of the i_{th} variable on the j_{th} factor, E_j is the Eigen value of the j_{th} factor. Thus Table 4 reflects the women empowerment index of control and treatment groups both in t^{th} and $(t+1)^{th}$ periods.

Now in order to determine the effectiveness of joint liability microfinance programmes through Primary Agricultural Credit Societies in empowering rural women socially and economically we use the difference-in-difference method.

5. Assessment of Empowerment Using Difference-In-Difference Method

Pooled cross section can be very useful for evaluating the impact of a certain event or policy. In our survey the data arises from a natural experiment. A natural experiment occurs when some exogenous event like any change in government policy can possibly change the socio-economic environment of the individuals or households. This natural experiment always has a control group which is not affected by the policy changes and a treatment group which is thought to be affected by the policy changes. In order to control for systematic differences between the control and treatment group we need two years data, one just before the implementation of the policy and one after the change. To collect the longitudinal data we attempt to follow the same households or individuals across time. Let the two time periods be denoted as t^{th} period and $(t+1)^{th}$ time period. These years are not adjacent i.e. t^{th} period corresponds to 2004 and $(t+1)^{th}$ to 2008 in which year the actual impact have been measured. Thus our sample is usefully broken down into four groups, (i) the control group before the change, (ii) the control group after the change, (iii) the treatment group before the change and (iv) the treatment group after the change. In this '*before versus after*' comparison the time gap here taken is four years. We can call 'C' as control group and 'T' as the treatment group. DT is here treated as dummy variable and equal to 1 for those in the treatment group 'T' and 'zero' for control group. We here also consider D2 as the dummy variable for the second time period. So the equation of our interest is

$$WEI_{it} = \alpha_0 + \alpha_1 D2 + \alpha_2 DT + \alpha_3 D2DT + u_{it} \quad \text{.....(3)}$$

Here α_3 measures the effect of the policy. Without other factors, in the regression $\widehat{\alpha_3}$ is the difference-in difference estimator. It is also called average treatment effect because it measures the effect of the 'treatment' or policy on WEI_{it}. In the model $\widehat{\alpha_3}$ represents $\{(\overline{WEI_{2T}} - \overline{WEI_{1T}}) -$

$(\overline{\mathrm{WEI}_{2C}} - \overline{\mathrm{WEI}_{1C}})\}$ where the bar denotes average, the first subscript denotes the year, and the second subscript denotes the group.

Table 5 represents the regression results of the model. From Table 5, it is clear that $\widehat{\alpha_3}$ i.e., the parameter estimate of D2DT is highly significant in the model. Thus it can be stated that there has been empowerment of rural women both economically and socially belonging to joint liability loan contract system during the concerned time periods.

The microfinance programmes have reached out to women belonging to marginalized sections. Power of individual women members and their female fetus or infant or children to firstly survive and then have control over their labour, mobility, resources, reproduction and decision-making has indeed improved since group formation. The degree of power exercised by members on these issues is significantly higher than that of non-members. Women's access to savings and credit has given them a greater economic role in decision-making through their decision about savings and credit thereby optimizing their own and household's welfare. Access to savings and credit and women's say in economic decisions of the households enabled them to increase expenditure on the well-being of their children. Women's control over decision-making is also seen as benefitting men through preventing leakage of household income for unproductive and harmful activities. The available evidence does point to a considerable potential of microfinance for empowerment- women's demand for credit and savings facilities is high, savings propensity as well as the loan repayment rates are quite high. Decision on the use of loan also shows remarkable result. Evidence indicates that women spend much of their income on household well-being including children's education and their health. Even where women do not directly control incomes, perceptions of their contributions to the household have changed. Increased confidence and awareness through interaction with SHG coordinators and other officials of PACS and other groups during meetings have improved their role in decision-making within the household. As most studies focus on voluntary organization as proxy for measuring social capital, the role of SHGs perfectly match the situation. SHGs are social networks; they also foster the diffusion of information and knowledge in different aspects of life through interacting with organization like local panchayat or among the group members mainly in group meetings. The ability of SHGs to enhance empowerment of women is closely related to the problem of trust. Trust acts like a lubricant among the members of SHGs thereby empowering rural women. Informal self-enforcement of contracts is possible through social capital. Since social capital can be described as circumstances in which individuals can benefit from group membership, the application of social capital to assess empowerment of rural women through SHGs is appropriate and adequate.

6. Conclusion

Microfinance programmes have generally targeted women as clients. Under the joint liability micro-credit contract there is a strong link between participation and generation of social capital which plays an important role to enhance empowerment of the rural women. The empowered women now become more confident, more assertive, more likely to participate in family and community decisions and better able to confront systemic gender inequities. Improvements in health care, nutritional advice and education can be sustained only when households have increased earnings and greater control over financial resources. As microfinance programmes approach financial sustainability, they can reach far beyond the limits of scarce donor resources. The upliftment of the women in a society has been recognized as a major factor to accelerate the developmental process, which is possible through empowering the women more and more. Because people have unconditional freedom of choice and action in turn enable them to better influence the course of their lives and the decisions which affect them (Sen 1985, 1999). In spite of the different governmental efforts since First Five Year Plan and a multidisciplinary approach, empowerment level of women did not increase to the expected level till 1998-99. But the microfinance programme was able to influence empowerment of

women positively among the members of joint liability loan contract system even though it failed to reduce the level of poverty among the members of SHGs in the two blocks of Hooghly district.

END NOTES

1. So to do the impact study, we consider the time gap of four years.
2. The variables 'illgact' and 'brthctrl' are excluded in 2004 because these variables have communalities less than .5 and thus do not have sufficient explanation. The variable 'useloan' has been excluded because all use of loan have been accommodated in the $(t+1)^{th}$ period. The variables 'mealfml', 'illgact' and 'save' have been excluded in 2008 because these variables have communalities less than .5 and thus do not have sufficient explanation.
3. The variable 'mealfml' has been ignored in 2004 because it has communality less than .50, thus does not have sufficient explanation. But in 2008 this variable along with 'save' variable have communality greater than .50, yet they have been excluded because factor loading for these two variables are not significant based on sample size.

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Appendix:
TABLE 1: Rotational Component Matrix of Control Group in t^{th} period

Variables	Components			
	1	2	3	4
Chcare	.934	.015	.003	.031
Prenat	.910	.073	-.086	-.030
Chborn	.951	.149	-.110	-.072
Fert	.959	.132	-.094	-.037
Purchs	-.080	-.083	-.322	-.761
Chedu	.672	-.213	-.037	.077
Illgact	-.130	.002	.701	-.059
Mobility	-.055	-.762	.133	.160
Literate	-.064	-.050	.712	.063
Brthctrl	.960	.128	-.093	-.020
Employ	-.103	-.057	-.335	.731
Save	.063	.769	.083	.190

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 5 iterations

TABLE 2: Weights of Variables for the Treatment Group in t^{th} (2004) and $(t+1)^{th}$ (2008) periods[2]

VARIABLES	WEIGHTS (2004)	WEIGHTS(2008)
chcare	3.16	2.78
prenat	3.32	3.01
chborn	3.10	2.93
mealfml	1.17	-
fert	2.09	3.97
purchs	1.4	3.78
chedu	2.17	3.88
illgact	-	-
mobility	1.47	3.5
literate	0.53	1.35
brthctrl	-	1.27
employ	0.92	1.14
save	1.08	-
useloan	-	3.14
loansrc	2.25	1.8
borrow	2.25	1.93
attmeet	0.82	3.57
Total Weight	25.73	38.05

Source: Calculated on the basis of data collected from the field survey.

TABLE 3: Weights of Variables for the Control Group in t^{th} (2004) and $(t+1)^{th}$ (2008) periods[3]

VARIABLES	WEIGHTS (2004)	WEIGHTS(2008)
chcare	4.78	4.78
prenat	4.55	4.89
chborn	4.77	4.98
mealfml	-	-
fert	4.85	4.98
purchs	1.79	0.91
chedu	3.17	3.29
illgact	0.15	0.18
mobility	0.88	0.92
literate	0.57	0.19
brthctrl	4.87	4.98
employ	0.16	1.26
save	1.61	-
Total Weight	32.15	33.15

Source: Calculated on the basis of data collected from the field survey.

TABLE 4: Women Empowerment Index of Treatment and Control Group in t^{th} (2004) and $(t+1)^{th}$ (2008) periods

SAMPLE	WEI (2004)	WEI(2008)
TREATMENT GROUP	0.45	0.76
CONTROL GROUP	0.52	0.57

TABLE 5: Regression Results of the model represented by Equation (3)

Variables	Outcome Variable WEI_{it}
Constant	.519*
D2	4.795E-02
DT	-6.681E-02*
D2DT	.264*
Adjusted R^2	.277

Note: * significant at 1% and 5% level