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EMPOWER WOMEN?  
Evidence from Self Help Groups  
in India**

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# DOES MICROFINANCE EMPOWER WOMEN?<sup>1</sup>

Evidence from Self Help Groups in India

Ranjula Bali Swain and Fan Yang Wallentin<sup>2</sup>

August 24, 2007

## Abstract

Microfinance programs like the Self Help Bank Linkage Program in India have been increasingly promoted for their positive economic impact and the belief that they empower women. However, only a few studies rigorously examine the link between microfinance and women's empowerment. This paper contributes by arguing that women empowerment takes place when women challenge the existing social norms and culture, to effectively improve their well being. It empirically validates this hypothesis by using quasi-experimental household sample data collected for five states in India for 2000 and 2003. A general structural model is estimated by employing appropriate techniques to treat the ordinal variables in order to estimate the impact of the Self Help Group (SHG) on women empowerment for 2000 and 2003. The results strongly demonstrate that on average, there is a significant increase in the women empowerment of the SHG members group. No such significant change is observed however, for the members of the control group. The elegance of the result lies in the fact that the group of SHG participants show clear evidence of a significant and higher empowerment, while allowing for the possibility that some members might have been more empowered than others.

**JEL-Classifications:** G21, J16, C33

**Keywords:** Microfinance; Women empowerment; Ordinal variables; General structural model and Robust maximum likelihood estimation.

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## 1. INTRODUCTION

Albert Einstein once said, “The significant problems we face cannot be solved by the same level of thinking that created them”.<sup>3</sup> He might not have been talking about women empowerment, but the quote is just as relevant in explaining the approach this paper takes in exploring it. Within the South Asian context, women empowerment is viewed as a process in which women challenge the existing norms and culture, to effectively improve their well being. Using this interpretation, the paper investigates the impact of microfinance on empowering women, using 2000 and 2003 household survey data on Self Help Group bank linkage program<sup>4</sup> in India.

In recent years, governmental and nongovernmental organizations in developing countries have introduced microfinance programs offering financial services to low income households, specifically targeting women. This was based on the promise that women in poor households are more likely to be credit constrained, and hence less able to undertake income-earning activities. Access to credit has received even greater attention in the context of poverty reduction and women’s empowerment objectives. With the aim to meet the Millennium Development Goals<sup>5</sup> and microfinance programs’ role in supporting it, there has been an increasing expectation on their impact on women empowerment. However, only a few studies have successfully investigated this impact in a rigorous manner (Pitt et. al, 2006).

For the most part, empirical research on microfinance’s effect on women’s empowerment has been conceptually ungrounded and tends to estimate an over-extended definition of

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<sup>3</sup> Cited from Albert Einstein: The Human Side, edited by Helen Dukas and Banesh Hoffman, 1954.

<sup>4</sup> In the early 1990s the National Bank for Agriculture and Rural Development (NABARD) started on a new nation-wide microfinance initiative linking banks, non-governmental organisations (NGOs) and informal local groups (self-help groups or SHGs). This SHG bank linkage program is expected to become a dominant form of financial access for the rural women.

<sup>5</sup> The Millennium Development Goals (MDGs) were agreed at the United Nations Summit in September 2000 by nearly 190 countries. MDG goal 3 aims at promoting gender equality and empowering women.

empowerment or a truncated aspect of it (Goetz and Gupta, 1996, Hashemi et. al, 1996). A number of these studies also suffer from possible bias due to endogeneity of decisions involved in program participation and the unobserved households, individual, and area characteristics. Measuring women empowerment is another problem, as it cannot be directly observed and has multiple facets. Past studies on women empowerment have also suffered from treating ordinal variables as continuous variable and treating the latent variable of women empowerment as observed.

This paper contributes by arguing that women empowerment takes place when women challenge the existing norms and culture, to effectively improve their well being. Since women empowerment is unobservable it is measured as a latent variable. In contrast to previous studies, the measurement model does not treat the latent variable as observed. Moreover, it employs appropriate techniques to treat the ordinal variables in the structural equation models. The general structural model estimates the mean women empowerment for 2000 and 2003, to measure the impact of the SHG program on women empowerment. The empirical analysis is based on data collected by the author in 2003 from five different states of India. Using quasi-experimental sampling design 1000 households (both SHGs and non-SHG) were surveyed and their responses were recorded for the years 2003 and 2000 (by recall).

The results are especially robust thus indicating that on average there is a significant increase in the women empowerment of the SHG members group. No significant change is observed on average for the members of the control group. The elegance of the result lies in the fact that even though the degree of change and the pace of empowering women is likely to vary, nevertheless the results clearly show that the group of SHG members experience a significant and higher empowerment.

The paper is organised as follows. Section 2 gives a brief overview of the literature on impact of microfinance on women empowerment, followed by a section on the conceptual and theoretical framework. Section 4 describes the data, its characteristics and indicators of women empowerment. Under Section 5, we discuss the measurement problems, explain the treatment of the ordinal variables and present the measurement and the structural models. The next sub-section explains the estimation technique used in the paper. The final section presents the results and conclusions.

## **2. MICROFINANCE AND EMPOWERMENT**

A majority of microfinance programs target women with the explicit goal of empowering them. However, their underlying premises are different. Some argue that women are amongst the poorest and the most vulnerable of the underprivileged. Others believe that investing in women's capabilities empowers them to make choices, which is valuable in itself, and also contributes to greater economic growth and development. Another motivation is the evidence from literature that shows that an increase in woman's resources result in higher well-being of the family, especially children. Finally, an increasing number of microfinance institutions prefer women members as they believe that they are better and more reliable borrowers thereby contributing to their financial viability.<sup>6</sup> A more feminist point of view stresses that access to financial resources presents an opportunity for greater empowerment of women. Though many agree that women empowerment is an important development objective for microfinance programs, it is still unclear what women empowerment means.<sup>7</sup>

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<sup>6</sup> For further discussion on this refer to Armendariz de Aghion and Morduch (2005), pages 179 – 195.

<sup>7</sup> For a detailed survey of the literature on women empowerment and the impact of microfinance on women empowerment, refer to Bali Swain (2007).

In an insightful reflection on the measurement of women's empowerment, Kabeer (1999) explains that women's empowerment refers to the process by which those who have been denied the ability to make strategic life choices acquire such ability. This ability to exercise choice incorporates three inter-related dimensions: resources which include access to and future claims to both material and social resources; agency which includes the process of decision-making, negotiation, deception and manipulation; and achievements that are the well-being outcomes.

Given the complexity of defining women empowerment it is not surprising that only a few empirical studies have tried to examine the impact of microfinance on women empowerment. Most of these studies suffer from bias due to the endogenous nature of the program participation and unobserved household, individual and area characteristics. The unavailability of appropriate data that includes comparable control and treatment groups is a further constraint.

The interpretation of women empowerment and its measurement also varies across different studies. Most researchers construct an index/indicator of women empowerment. Ackerly (1995) creates an indicator, "Accounting Knowledge", to measure the probability that the changes associated with empowerment intervene. Goetz and Sen Gupta (1996) build an index of Managerial Control in order to classify the borrowers into five categories ranging from no control (no knowledge of the use of the loan or no contribution in terms of labour to the financed activity) to full control of the use of the loans (full control over the entire productive process, including marketing).

In another study, Hashemi, Schuler and Riley (1996) investigate the change in women empowerment with the help of an ethnographic study and quantitative survey. The analysis uses 1,300 women sample data to measure the effects of Grameen Bank and Bangladesh Rural Advancement Committee. They create an empowerment indicator build on the following eight criterions: mobility, economic security, ability to make small purchases, large purchases, involvement in major household decisions, and relative freedom from domination by the family, political and legal awareness, participation in public protests and political campaigns.

Measuring women empowerment by constructing indices is an inappropriate technique as it allows the use of arbitrary weights. Most researchers, for instance, will agree that impact of a women's decision to buy cooking oil for the family is different in nature from her participation in a decision to buy a piece of land. Both these decisions have different implications and magnitude of impact on her empowerment. As such giving equal weightage to both these decisions does not make sense. At the same time suggesting an arbitrary weight for these decisions is also inappropriate, as it is not for the researchers to decide the factor by which the latter decision contributes more to women empowerment.

In a comprehensive study, Pitt et al. (2006), use Item Response Theory (IRT), where the element of analysis is the whole pattern of a set of binary indicators that proxy for woman's autonomy, decision-making power, and participation in household and societal decision making. They find that credit programs lead to women taking a greater role in household decision making, having greater access to financial and economic resources, having greater access to financial and economic resources, having greater social networks, more bargaining power vis-à-vis their husbands and having greater freedom of mobility.



Additional services like training, awareness raising workshops and other activities over and above the minimalist (financial services only) microfinance approach are also an important determinant of the degree of its impact on the empowerment process of women. Holvoet (2005) finds in her study of women in rural Kenya that in direct bank-borrower minimal credit, women do not gain much in terms of decision-making power within the household. However, when loans are channelled through women's groups and are combined with more investment in social intermediation, substantial shifts in decision-making patterns are observed. This involves a remarkable shift in norm-following and male decision-making towards more bargaining and sole female decision-making within the household. She finds that the effects are even more striking when women have been members of a group for a longer period and especially when greater emphasis has been laid on genuine social intermediation. Social group intermediation had further gradually transformed groups into actors of local institutional change.

Another issue that needs further investigation is whether without change in the macro environment<sup>8</sup>, does microfinance reinforce women's traditional roles or does it promote gender equality? A woman's practical needs are closely linked to the socially defined gender roles, responsibilities, and social structures, which contribute to a tension between meeting women's practical needs in the short-term and promoting long-term strategic change. By helping women meet their practical needs and increase their efficacy in their traditional roles, microfinance may in fact help women to gain respect and achieve more in their socially defined roles, which in turn may lead to increased esteem and self-confidence. Therefore as Cheston and Kuhn (2002) argue increased self-confidence does not automatically lead to

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<sup>8</sup> The overall economic, social, political and cultural environment.

empowerment, it may contribute decisively to a woman's ability and willingness to challenge the social injustices and discriminatory systems that they face. This implies that as women become financially better-off their self confidence and bargaining power within the household increases and this indirectly leads to their empowerment. Finally, given that empowerment is a process the impact of the microfinance program may take a long time before it is significantly reflected on the observable measures of women empowerment.

### **3. THEORETICAL FRAMEWORK**

This paper argues for a more coherent interpretation of women empowerment using Kabeer's notion of women empowerment within the South Asian context. It therefore defines women empowerment as the process in which women challenge the existing norms and culture of the society in which they live to effectively improve their well-being. A distinction is made between the outcomes that lead to greater efficiency within the existing norms, development of the community and outcomes that can be directly interpreted as women empowerment.

As argued in Bali Swain (2007) not all activities that lead to an increase in well-being of a woman are necessarily empowering in themselves. For instance, activities like improvement in nutrition of children, lead to greater efficiency in the woman's role in the household but it also falls within the existing role of the women within the prevailing norms of the society. When a woman is better able to perform such activities, it leads to an increase in her self-confidence and feeling of well being. This might create conditions leading to woman empowerment, but are not empowering on their own. Similarly, Community Driven Development activities, undertake under the initiatives of the SHGs – for instance, solving drinking water problems in the village, reduces the demand on a woman's time while leading to better health of all household members, particularly children. However, most of these

activities are for the welfare of the household (including women) or the community at large but are not directly empowering as they re-inforce the existing gender roles within the society. According to our definition, the truly empowering activities are those that reflect the changes that women have effectively made to better their lives by resisting the existing norms of the society. Thus, for instance, if a woman offers greater resistance to any form of abuse from her husband or family, we consider her more empowered as she is trying to improve her well-being by asserting herself. Table 1 in the Appendix gives a list of such women empowering activities that we have drawn from the focus group discussions that were conducted in addition to the survey data.

How does then microfinance lead to women empowerment? This is essentially through two mechanisms direct and indirect empowerment effects. The direct empowerment through microfinance takes place, when women become members of a group and/or when they are exposed to training or workshops leading to greater awareness creation.<sup>9</sup> Microfinance also leads to increase in women empowerment through indirect channels. In a collective decision making model, Browning and Chiappori (1998) show that if behaviour in the household is Pareto efficient, the household's objective function takes the form of a weighted sum of individual utilities. The individual weights can represent the bargaining power of the female members in the household relative to the male household members, in determining the intra household allocation of resources. In the literature it is assumed that by increasing the relative value of female time and her money income, the weight and hence the bargaining power of

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<sup>9</sup> By its very nature, microfinance is administered to individuals via groups. Belonging to a group leads to the creation of further social capital and a support structure (of other group members) that empowers women to improve her overall (not just economic) well-being. Furthermore, most microfinance programs encourage frequent group meetings, interaction with loan officer or bank officials, keeping of financial records – these activities encourage discussions on issues related to economic activities but also other household and village issues, mobility, increase in confidence and literacy, thereby empowering the women by improving their condition within the household, village and society. Moreover, several microfinance programs encourage awareness creation via training, workshops and informal interaction about the political, social and economic situation of women and thereby encourage them to improve their personal situations within the household and the society that they live in.

the female members can be increased within the household. This ‘weight’ may also be altered by social pressure. The weight parameter may thus reflect the women’s power within the household decision making and maybe one index of women empowerment.

Within our conceptual framework the empowerment level of women is determined by their behavioural reactions to situations that reflect their well-being and indirect empowerment that they attain due to participation in labour market or greater economic independence.

#### **4. DATA**

The data used for the estimation of the impact of SHGs on women empowerment is a part of a larger study that investigates the impact of SHG bank linkage program on poverty, vulnerability and social development. The SHG program of the National Bank for Agriculture and Rural Development (Nabard) in India is the largest and fastest-growing microfinance program in the developing world. Implemented since 1996 on a national scale, it has reached an estimated 121.5 million people in March 2005, by mainly targeting women. It has disbursed more than Rs. 68 billion in cumulative bank loans up to March 2005, using a network of 41,082 bank branches and 4,323 Non Governmental Organisations (NGOs).

For the analysis in this article, only the household survey data is used. The household survey uses a quasi-experimental design to address the ‘problem of attribution’<sup>10</sup>. The data is

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<sup>10</sup> The “problem of attribution” refers to the difficulty in establishing unequivocally that the observed changes in the economic and social status of the members of the SHGs, are induced by the formation of SHGs and the related component of micro finance, and not as a consequence of other possible causes arising due to the changing economic, political, social, cultural or policy environment. To address this problem a quasi-experimental design is chosen where information is collected on the SHG households and a control group, which contains information on non-participating households of similar household characteristics. The difference in the results of these two groups would therefore reflect the real impact of SHG bank linkage program.

collected from two representative districts each for five different states<sup>11</sup> in India, for 2003. The data for the year 2000 is recall data. For our purpose the sampling strategy was to randomly choose the respondents from the SHG members at the district level. The members of the control group were chosen to reflect a comparable socio-economic group as the SHG respondents. These were selected from villages that were similar to the SHG villages in terms of the level of economic development, socio-cultural factors and infra-structural facilities, but did not have a SHG program in their village.

<b>Table 1. Sample Characteristics (mean values with standard deviations in the parenthesis)</b>		
	All SHGs	Control group
Age of respondent (yrs.)	34.5 (8.9)	33 (9.6)
Total value of land owned in July 2000 (Rs.)	24,263 (59,524)	37,987 (138,382)
Total value of land owned end of 2003 (Rs.)	34,172 (91,587)	51,274 (209,786)
Total value of assets in July 2000 (Rs.)	84,359 (138,089)	111,226 (313,003)
Total value of assets by end of 2003 (Rs.)	116,757 (192,398)	149,966 (326,497)
Percentage of respondents that are main earners of the household	19.6	15.5
Percentage of respondents that are earning	81.9	78.7
Percentage of respondents that are literate	33.12	39.36
Percentage of respondents engaged in farm activity and agricultural wage labour	57.32	54.2
Percentage of respondents with increase in household income since July 2000	65.7	46.4
Percentage of respondents with increase in own income since July 2000	64.02	39.36

\* Source: Author's data.

<sup>11</sup> These states (districts in parentheses) are Orissa (Koraput and Rayagada), Andhra Pradesh (Medak and Rangareddy), Tamil Nadu (Dharamapuri and Villupuram), Uttar Pradesh (Allahabad and Rae Bareli), Maharashtra (Gadchiroli and Chandrapur).

The sample data consists of 961 households.<sup>12</sup> The sample includes a group of SHGs members that have participated in the program (805) and a control group (156). Table 1 gives selected characteristics of the household sample for these two groups. The groups are also similar in terms of percentage of earners, literacy level and proportion of respondents engaged in farm activity. Both the SHG and the control group also show similar characteristics in terms of the average age of the respondent. However, the control group is slightly better off in terms of the total value of land owned and the average level of assets owned. Interestingly, about 64 percent of the SHG members reported an increase their own income over the survey period as compared to 39 percent of the control group respondents.

The household survey provides us with a longitudinal data on the various indicators of women empowerment for 2000 and 2003. As argued earlier in this paper, woman empowerment is interpreted as the process in which women challenge the existing norms and culture of the society in which they live to effectively improve their well-being. Women's empowerment therefore encompasses different spheres of a woman's life. Literature on intra-household bargaining finds that exogenous increases in female share of income maybe interpreted as providing the women more power within the household. Hence participation in the labour market and greater economic independence leads to empowerment. In our analysis this is proxied by the primary economic activity that the respondent is engaged in and the degree of respondent's control over her own independent savings. It is assumed that an economically active woman with her own independent savings has more economic power and thus a higher bargaining power within the household, thereby making her more empowered (Ashraf, Karlan and Yin, 2006) and likely to challenge the prevailing norms that restrict her ability to make choices.

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<sup>12</sup> Actual sample size used in the estimation was 961. For estimation our model as explained later in the paper, the data should meet the equal categories property, therefore those seven observations could not be included.

According to our definition, behavioural changes in the women within the household to improve her own well-being are also crucial indicators of empowerment. This is especially important because, a growing body of literature has begun to question if microfinance reinforces traditional gender roles, as women tend to make choices that fall within the scope of the traditional up-bringing that are rewarded by the society. In the household survey respondents were asked questions on what they would do if they were (a) verbally abused; (b) physically battered; and (c) psychologically/emotionally abused within their family? In response to these questions the respondents make any one of the following ordinal choices to reflect their degree of resistance or submission, which is a more direct reflection of their empowerment status within the household. For instance, the respondent could choose to reply with any one of the following options: (a) resisted, (b) submitted herself, or (c) lodged a complaint in the group or took their help, (d) complained to relatives, (e) warned or (f) did nothing.

A woman's participation in the political space is also an important indicator of empowerment. The respondents are asked if they are aware that women had reservations in the local political institutions called panchayats. They are also interrogated on their involvement in the village level politics, for instance, standing for local elections as a candidate, voting etc. Information on these two indicators is used to proxy for the 'political activism' aspect of woman empowerment.

Other aspects of empowerment that are considered are the indicators of women's decision-making regarding their work, household matters as well as their mobility and participation in social networks. Although information on these two aspects of empowerment is available for 2003, the questions were not asked for 2000. Due to this data constraint it is expected that

there will be a downward bias in our estimate of the impact of the Self Help Group program over time.

## **5. EMPIRICAL ANALYSIS**

### **5.1 MEASUREMENT ISSUES**

Like cognitive skills and quality of life, women empowerment is a concept that cannot be measured directly. Some empirical microfinance impact studies use the index approach. Within the index approach responses to questions related to empowerment issues are weighted and summed in an aggregate score that represents the empowerment. For instance, each positive response might be given one point and the final empowerment index for the respondent could be the aggregate of all the points. Studies might use one weight or construct multiple scales for different indicators of women empowerment. However, such an approach is problematic because the weights are allocated arbitrarily without reference to theory or the characteristics of the sample data.

Factor analysis model is typically used for latent variable measurement but the standard factor analysis measurement model is inappropriate when the indicators are discrete as is the case with our data on empowerment. In order to determine whether or not credit program participation has an empowerment effect, Pitt et al. (2006), use a cross-section household sample of data with binary responses on attitudes by and towards women. Using the item response approach, they estimate a random effects binary response model. The latent factor of women empowerment is then an estimate of the random effect (factor) conditional on the fitted parameters and the data. Obtaining the empirical Bayesian prediction of the latent variables from this model, Pitt et al. estimate various structural models by OLS, fixed effects, and, causal models, by two-stage least squares with fixed effects.



Several studies including Pitt et al. (2006) and Frankenberg and Thomas (2001) make a case for using data on attitudes of and towards women within the household. Given that our data is self-reported, subjective and ordinal in nature, it is important to recognize that appropriate methodology is used to treat. Ordinal variables have categories as values, which cannot be treated like a continuous variable. For instance, consider that a respondent who is asked the following question: “What do you do if you are verbally abused in your family?” Her reply is one of the following categories: 1 if she resists; 2 if she submits herself, 3 if she complains in the group or takes their help, 4 if she complains to the relatives, 5 if she warns against such behaviour and 6 if she does nothing. In case of such a variable, a number allocated to the category has no meaning by itself. Moreover, considering the different categories of the responses to this question, it is difficult to know by how much more the respondent resists if she would have chosen category 4 over category 5. Secondly, even if the respondent chooses the same category, say category 4, we don’t know the magnitude of her resistance. Furthermore, even if two different respondents choose the same category 4, we cannot say that their magnitude of resistance to the verbal abuse is the same. This is why the ordinal variables need to be treated as ordinal variables and require special treatment. This is further discussed in the following section.

Another limitation of previous empirical studies has been the use of estimated latent scores as observed variables in order to establish the relationship between credit program and women empowerment. Finally most studies, in the past have analysed the household data by trying to establish the empowerment at the individual level. There is a need for studies to estimate a more general structural equation model which can estimate the change in women empowerment for the whole group.

## 5.2 TREATMENT OF ORDINAL VARIABLES

Ordinal variables in the data represent responses to a set of ordered categories. It is assumed that a person who selected a specific category has more of a character than if she/or he had selected a lower category. Therefore ordinal variables do not have origins nor units of measurements. Means, variances and covariances of ordinal variables have no meaning. The only information we have are counts of cases in each cell of a multiway contingency table. Moreover, longitudinal data tends to have measurement errors that are correlated over time due to specific factor, memory or other retests effects. It is important to consider models that adequately deal with correlated measurement errors. The use of ordinal variables in structural equation models and longitudinal studies requires specific techniques and procedures that differ from those employed for continuous variables.

In our analysis we adopt the terminology of K. G. Jöreskog (2002) to refer to an unobserved univariate continuous distribution that generate an observed ordinal distribution as a latent response distribution. This means that for each ordinal variable  $y$ , we assume that there is an underlying continuous variable  $y^*$ . This continuous variable  $y^*$  represents the attitude of the ordinal responses to  $y$  and is assumed to have a range from  $-\infty$  to  $+\infty$ . It is this underlying variable  $y^*$  that is used in structural equation modelling, and not the observed ordinal variable  $y$ . The underlying variable assigns a metric to the ordinal variable. The relationship between an underlying continuous variable  $y^*$  and an observed ordinal variable  $y$  is formalized as following

If  $y$  has  $m$  categories labelled  $1, 2, \dots, m$ , the connection between  $y$  and  $y^*$  is

$$y = i \Leftrightarrow \tau_{i-1} < y^* < \tau_i, \quad i = 1, 2, \dots, m,$$

where  $-\infty = \tau_0 < \tau_1 < \tau_2 < \dots < \tau_{m-1} < \tau_m = +\infty$

are *threshold* values as parameters defining the categories  $i$ . With  $m$  categories, there are  $m-1$  threshold parameters  $\tau_1, \tau_2, \dots, \tau_{m-1}$ . Since we have only ordinal information, the distribution of  $y^*$  is determined only up to a monotonic transformation. Next, we choose the distribution for  $y^*$ . Generally, we can choose any continuous distribution. In this analysis, we choose the standard normal distribution with density function  $\phi(u)$  and distribution function  $\Phi(u)$  for  $y^*$ . The probability of a response in category  $i$  is

$$\pi_i = P(z = i) = P(\tau_{i-1} < z^* < \tau_i) = \int_{\tau_{i-1}}^{\tau_i} \phi(u) du = \Phi(\tau_i) - \Phi(\tau_{i-1}), \quad \text{so that}$$

$$\tau_i = \Phi^{-1}(\pi_1 + \pi_2 + \dots + \pi_i), \quad i = 1, \dots, m-1,$$

where  $\Phi^{-1}$  is the inverse of the standard normal distribution function. The quantity  $(\pi_1 + \pi_2 + \dots + \pi_i)$  is the probability of a response in category  $i$  or lower. The  $\pi_i$ 's are unknown population quantities and can be estimated consistently by the corresponding percentage  $p_i$  of responses in category  $i$ . Then, estimates of the thresholds can be obtained by

$$\hat{\tau}_i = \Phi^{-1}(p_1 + p_2 + \dots + p_i), \quad i = 1, 2, \dots, m-1.$$

The quantity  $(p_1 + p_2 + \dots + p_i)$  is the proportion of cases in the sample responding in a given category  $i$  or lower. In fact,  $\hat{\tau}_i$  is the maximum likelihood estimator of  $\tau_i$  based on the univariate marginal sample data.

In order to estimate differences in means and variances of latent variables over time, one must ascertain that the latent variables are on the same scale in the two time periods. This implies that both the origin and the unit of measurement must be invariant or the same over time. If

the observed variables are continuous this can be achieved by anchoring each latent variable in one of its indicators (reference variable) and by assuming that the latent variable has mean zero in one time period. By choosing the same reference variable for both the time periods we can be certain that the latent variable is on the same scale over time. This will not be sufficient, however when observed variables are ordinal, since the latter do not have metric scales. For this reason, one must use the underlying variables instead of observed ordinal variables. The underlying variables can be put on the same scale by assuming *equal thresholds* (see Jöreskog, 2002) for the underlying variables of the same ordinal variable across time.

### 5.3 MODEL SPECIFICATION

The women empowerment model consists of three parts. The Measurement model for the years 2000 and 2003 and the general structural model.

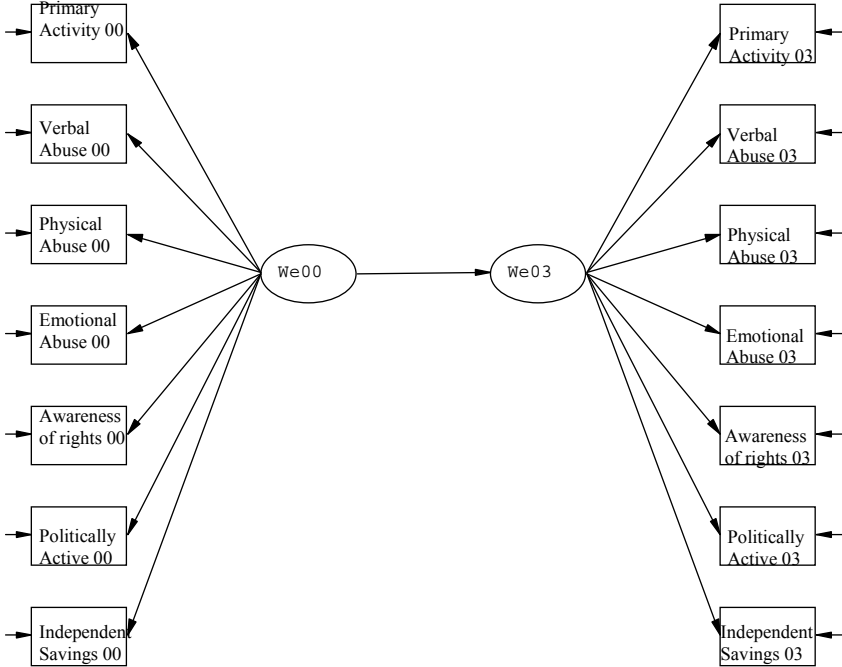
#### 5.3.1 MEASUREMENT MODEL

Figure 1 gives a graphical presentation of the women empowerment model. The squares in the figure indicate the observed variables whereas the ellipses represent the women empowerment latent variable. The measurement model is given by women empowerment at the year 2000 and 2003 (see Jöreskog and Sörbom, 1999).

$$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \\ x_7 \end{pmatrix} = \begin{pmatrix} \tau_1 \\ \tau_2 \\ \tau_3 \\ \tau_4 \\ \tau_5 \\ \tau_6 \\ \tau_7 \end{pmatrix} + \begin{pmatrix} 1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \\ \lambda_5 \\ \lambda_6 \\ \lambda_7 \end{pmatrix} (\xi) + \begin{pmatrix} \delta_1 \\ \delta_2 \\ \delta_3 \\ \delta_4 \\ \delta_5 \\ \delta_6 \\ \delta_7 \end{pmatrix} ; \quad \begin{pmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \\ y_5 \\ y_6 \\ y_7 \end{pmatrix} = \begin{pmatrix} \tau_1^{(y)} \\ \tau_2^{(y)} \\ \tau_3^{(y)} \\ \tau_4^{(y)} \\ \tau_5^{(y)} \\ \tau_6^{(y)} \\ \tau_7^{(y)} \end{pmatrix} + \begin{pmatrix} 1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \\ \lambda_5 \\ \lambda_6 \\ \lambda_7 \end{pmatrix} (\eta) + \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \\ \varepsilon_5 \\ \varepsilon_6 \\ \varepsilon_7 \end{pmatrix}$$

Where  $x$ 's are the measures of latent women empowerment  $\xi$  at year 2000 and  $y$ 's are the measures of latent women empowerment  $\eta$  at year 2003. The latent variable  $\xi$  denotes Women Empowerment at year 2000;  $\eta$  denotes Women Empowerment at year 2003.  $\alpha$  indicates the change in women empowerment over the time. And where  $\delta$  and  $\varepsilon$  are the measurement errors.

**Figure 1. Path Diagram for Women Empowerment Model**



**5.3.2 STRUCTURAL MODEL**

The structural model used for analyzing women empowerment is given by:

$$\eta = \alpha + B\eta + \Gamma\xi + \zeta$$

where  $\eta$  is the latent women empowerment of the respondent at year 2003 and  $\xi$  denotes the latent Women Empowerment in year 2000.  $\zeta$  indicates the error in the structural equation (see Jöreskog and Sörbom, 2001).

## 5.4 ESTIMATION METHOD

The Robust Maximum Likelihood (RML) (see Jöreskog, et. al 2001) method has been used for analyzing Women Empowerment data. The RML uses the following fit function

$$F(\theta) = \log \|\Sigma\| + \text{tr}(S\Sigma^{-1}) - \log(S) - k - (\bar{z} - \mu)' \Sigma^{-1} (\bar{z} - \mu)$$

Where  $\mathbf{z}$  is the vector of observed responses (containing both  $\mathbf{y}$  and  $\mathbf{x}$ ).  $\Sigma$  is the population covariance matrix and  $S$  is corresponding sample covariance matrix. Central to the development of the traditional maximum likelihood estimator is the assumption that the observations are derived from a population that follows a multivariate normal distribution. This assumption is not valid in our data because of ordinality. Therefore, RML is used to obtain the same fit function as traditional Maximum Likelihood in order to get the parameter estimates. While the asymptotic covariance matrix is used to estimate the correct standard errors and chi-squares under the non-normality (caused by ordinality).

## 6. RESULTS AND CONCLUSIONS

To investigate the impact of microfinance participation on women empowerment the data was analyzed over two sub-samples namely: SHGs members group and a control group comprised of non-SHG members. The results are presented under Table 2 and Table 3. The results indicate that the variances of the Women Empowerment in both groups have decreased over time. For the SHG group members it decreased dramatically from 7.57 to 1.66 (Table 2) whereas, for the control group it declined from 0.33 to 0.20 (Table 3). The result indicates that the population is more homogenous in 2003, as compared to 2000. This further implies that the wide variation in the level of women empowerment, especially within the SHG members group declined, as the disparity in the empowerment among the SHG members decreased.

The results from the general structural model confirm that the mean difference is highly significant for program group at 0.26 (Table 2) but statistically non-significant for the control group at 0.076<sup>13</sup> (see Table 3). This indicates that there is a significant increase in the level of Women Empowerment over time for the SHG members but no such change is observed for the members of the control group.

Given the results in Table 3, the difference in the means between the two time periods, may be interpreted by some as an increase of 26 percent in the level of women empowerment on average for the group of SHG members. However, this is not the case since the means of women empowerment for the year 2000 and 2003 can not be determined on an absolute scale. Note that although women empowerment measures for 2000 and 2003 are on the same scale, the origin of the scale is undetermined. We can only estimate the mean difference between the women empowerment between these two time periods. What we can do is to fix the origin of the Women Empowerment scale at the mean of women empowerment in 2000 and then estimate the mean of Women empowerment in 2003. By this identification condition the mean differences are equal the intercept term in the structural equation.

**Table 2: Estimated Mean and Covariance Matrix for Women Empowerment**

**SHG Members, Sample size 805**

	WE00	WE03	Mean (T-value)
WE00	7.57		0.00
WE03	2.04	1.66	0.26*** (17.73)

Note: \*\*\* reflects that the mean values is significant at 1 percent

<sup>13</sup> The result is non-significant at 1 percent and 5 percent level of significance.

**Table 3: Estimated Mean and Covariance Matrix for Women Empowerment**

**Control group, Sample size 156**

	WE00	WE03	Mean (T-value)
WE00	0.33		0.00
WE03	0.23	0.20	0.076 (1.71)

Our results clearly indicate the evidence for a general increase in women empowerment for SHG members over time. This however, does not imply that each and every woman who joined the SHG program was empowered to the same degree or they all progressed at the same pace. Some of the women members might have been more empowered than other members within the SHG program, prior to their participation in this programme. But on the average the SHG members were empowered over this time period. However, a similar empowerment process cannot be observed for the control group.

It is difficult to say which factors are more important for empowering women. The differences in pace of empowerment might be a result of various factors. Household and village characteristics, cultural and religious norms within the society, behavioural differences between the respondents and their family members, the kind of training and awareness programs that the women have been exposed to. All these factors together are responsible for the empowerment process.<sup>14</sup> The nature and types of activities and the kind of program that the women is exposed to, critically determines how empowering the impact of the SHG is on women. The minimalist microfinance approach is not sufficient. An important direction for future research, is a need to find which of these factors have a greater impact on empowering women.

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<sup>14</sup> See Kabeer (1999) and Holvoet (2005)



The structural model that we develop in this paper addresses the non-ordinal character of the key variables in our hypothesis. Using the RML approach, we empirically examined the relation between the SHG participation and women empowerment. The results, which are robust, strongly indicate that SHG members are empowered by participating in this microfinance program in the sense that they have a greater propensity to resist existing gender norms and culture that restricts their ability to develop and make choices.

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## APPENDIX

1.	Overcoming the resistance from husband and other members of the family to join the SHG.
2.	Increased participation in decision-making within the household to issues that were usually considered outside the domain of woman.
3.	Improved status and increase in respect within the household.
4.	Feeling fearless, open and confident
5.	All group members learn to sign their names and some have joined adult literacy programs
6.	Adopting family planning measures
7.	More mobile, can move out of the house and the village more frequently
8.	Talking to the male persons in their village, which they were not confident to do before because of cultural reasons
9.	They have more information about the government programs due to their exposure and can apply for them for their own betterment and the benefit of the community
10.	Actively participating in the decision to send their children to school
11.	Eradication of prostitution
12.	Some women can actively engage in the decision of their marriage with the elders in her household
13.	Awareness about politics and engaged in political participation (by way of voting ) or directly, by standing as a candidate in the local elections

Source: Bali Swain 2007.

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