

## **Financial Inclusion, Gender and Economic Impact on Poor Households**

***Abstract:** This primary research has examined the question: “In the context of gender dimension what is the evidence of the impact of the financial inclusion programs on poor households represented by women relative to that represented by men?”. We employ stratified random sampling methodology to encompass all the spheres of financial inclusion in India, and construct a comparison group using non-experimental data and econometric methods to solve the fundamental evaluation problem and for establishing ‘attribution’. The models of analysis are estimated with both panel least squares as well as generalized methods of moments using standard errors. The results indicate that the gender of the participating poor undoubtedly affects the outcomes of the financial inclusion programs.*

**Keywords:** Financial Inclusion, Programme evaluation, Panel data, Government Policy and Regulation, Economic Development and Financial Markets; Financial Inclusion; Institutions and Growth

### **1. Introduction**

This primary research has explored whether schemes that appear to be very similar on the surface may actually hide deeper differences that can help explain their diverging outcomes. The focus is on group intermediation, a feature that is overwhelmingly present in microfinance programs targeted at financial inclusion (FI) of women. While group intermediation clearly has paid off in terms of individual programs’ financial profitability, it has also increasingly propagated on equity and empowerment grounds. However, some of the literature has presented some mixed findings in contradiction to the established view point that financial intermediation programs aid in economic upliftment of the poor families owing to women participation (for example; Navajas et al, 2000; Mosley, 2001; Kabeer, 2001; and Montgomery and Weiss, 2011) which motivated for a detailed

analysis. This study draws mainly on insights from institutional and feminist economics and confronts them with empirical evidence from a comparative impact study of FI programs in different regions of India. Evaluations of the effects of FI programs on women's empowerment generated mixed results. While some are supportive of FI programs' ability to induce a process of economic, social and political empowerment, others are more skeptical and even point to a deterioration of women's overall well-being. Against this background, development scholars and practitioners have sought to distil some of the ingredients that might increase the likelihood of empowerment or at least reduce adverse effects.

We examine the significance of gender dimension in FI through microfinance in the economic up-liftment of poor households in India. Using household survey data from select states of India, we explore the importance of the borrower's gender in the context of the impact of financial programs. To find appropriate answers for the research question the study hypothesizes that there is significant change in the economic living of the poor households owing to the participation of women in the FI process through informal financial intermediaries like the self help groups (SHG) and other related FI programs. We investigate the level of impact of FI programs on the participating poor in the context of gender dimension particularly on five parameters of economic well-being namely; (i) changes in annual income (ii) changes in annual expenses towards food security (iii) changes in annual expenses towards living standards (non-food expenses of the household) (iv) changes in annual (economic) production levels and (v) changes in annual (income generating) asset creation levels. We report the impact in terms of figures that are *net of inflation effect*.

The significant contribution of this study to the literature can be appreciated from backdrop that though there is a fairly high degree of disagreement on the impact of FI programs on

the extremely poor and women which we opine are due to flaws in the impact assessments and about the concept of empowerment. This study establishes with appropriate impact assessment techniques and a large sample from different regions and appropriate study period that FI programs undoubtedly impact the economic lives of the women particularly in rural areas and greatly motivate them in securing food for the households and ensuring relatively improved standards of living particularly in the case of deprived sections of the society. It is not that only women who get impacted but poor irrespective of gender too get significantly impacted because of the FI programs. The remainder of the paper is organized as follows. In section 2, we provide the related literature review and present theoretical considerations for our conceptual framework for the analysis. section 3 outlines the FI scenario in India. Section 4 explains the research design and methodology describing the study area, control groups, data collection approach as well as the econometric approach employed for the analysis. In section 5, we present the results of the econometric analysis and offer a thorough discussion in comparison with comparable studies available in the literature. Section 6 concludes with some recommendations.

## **2. Literature Review**

### **2.1 Financial Development and Inclusive Growth**

The consensus is that finance promotes economic growth but the magnitude of impact differs. Financial inclusion is intended to connect people to banks with consequential benefits. Ensuring that the financial system plays its due role in promoting inclusive growth is one of the biggest challenges facing the emerging economies. We therefore advocate that financial development creates enabling conditions for growth through either a ‘supply-leading’ (financial development spurs growth) or a ‘demand-following’ (growth generates demand for financial products) channel. Access to safe, easy, and affordable credit and other financial services by the poor and vulnerable

groups, disadvantaged areas and lagging sectors is recognised as a pre-condition for accelerating growth and reducing income disparities and poverty. Access to a well-functioning financial system, by creating equal opportunities, enables economically and socially excluded people to integrate better into the economy and actively contribute to development and protects themselves against economic shocks.

Levine, (1998) and Beck, Demirguc-Kunt and Levine (2007) have noticed a positive effect of finance on poverty reduction. Economies with higher levels of financial development experience faster reduction of poverty. This has been explained by an extensive body of literature including Deininger and Squire (1998), Dollar and Kraay (2002), White and Anderson (2001), Ravallion (2001) and Bourguignon (2003). In an often cited cross-country study, Kraay (2004) proves that growth in average incomes explains 70 percent of the variation in poverty reduction (as measured by the headcount ratio) in the short run, and as much as 97 percent in the long run. Lopez and Servén (2004) suggest that for a given inequality intensity, the poorer the country is, the more vital is the growth component in explaining poverty reduction. Financial inclusion in developing economies is different from that of developed economies. In latter where inclusion is a minority, in former it could be a majority. Therefore, it is also mentioned in academia that a better way to analyze FI in developing economies is to actually see financial exclusion. The above rationale shows that it is not enough to assume that FI will happen on its own. Therefore, the onus has come on to the policymakers to provide the same.

### **2.2 Gender Dimension in Economic Development**

Quite a good strand of empirical and theoretical literature (to cite a few: Thomas, 1990; Haddad, Hoddinott and Alderman, 1997; Rawlings and Rubio, 2005; Handa and Davis, 2006) suggests that women are more likely to use resources in ways that improve family well-being,

especially that of children. [Holvoet \(2005\)](#) compared the gender effects of two subsidized credit programmes in southern India, the Integrated Rural Development Programme (IRDP) and the Tamil Nadu Women's Development Programme (TNWDP) and finds that the decision-making influence of women only increases when transfers are made to women, and only for decisions about loans. [Swaminathan et al. \(2009\)](#) also examined credit transfers to men and women across four formal credit programmes, in addition to informal credit transfers (for example, through networks of friends, family and acquaintances), and suggested that recipient gender matters for employment-related outcomes as well as status and self-esteem. In Uganda, [Hoffmann \(2008\)](#) finds that when allocated a mosquito net, women are more likely to use nets not only for their children, but tend to cover a larger fraction of household members whereas men are more likely than women to use the net for themselves (although women also do so). [Hazarika and Guha-Khasnobis \(2008\)](#), studying all micro-credit transfers in rural Malawi in 1995, find that young girls', though not boys', long-term nutrition and the access to micro-credit of adult female household members are positively correlated. [Fletschner \(2008\)](#) analyses all credit to men versus women in rural Paraguay in 1999, using an observational cross sectional study and finds that household efficiency falls by an additional 11 percent.

Since 1970s, microcredit and microfinance have been the buzzing terms in the field of development ([Robinson 2001](#)). United Nations Capital Development Fund (2005) emphasizes that because of the interconnection of the financial power, poverty, and women, microfinance has an active role in improving economic equality. Microfinance in the recent past has emerged as a potential instrument for poverty alleviation and women empowerment. 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, 1996](#)). [Hashemi et al.](#)

(1996) observe that women's access to credit contributes significantly to the economic well-being of the family. Murthy et al's (no date) study of SAPAP Self Help Groups in Andhra Pradesh also reported an overall reduction in poverty, including reductions among the extreme poor. Poverty alleviation and women's empowerment are seen as inherently synergistic. Microfinance has the potential to transform communities by alleviating poverty and empowering women through whom it is routed (ISMW, 2009).

### **3. Overview of Financial Inclusion in India**

SHG-Bank Linkage Programme has been a major tool in achieving FI in India. There has been a steady progress under the SHG-Bank Linkage programme with a sizeable growth in the total number of SHGs savings linked with banks reaching 74.62 lakh by March 2011. Out of total, exclusive women SHGs were 60.98 lakhs and amongst them 12.94 lakhs were credit linked. The total number of SHGs having loans outstanding as on 31 March 2011 stood at 47.87 lakhs of which exclusive women SHGs were 39.83 lakh and covered 97 million. Total savings amount of SHGs with banks as on 31 March 2011 was to the tune of Rs. 7016 crores of which the share of exclusive women SHGs was Rs. 5298.64 crores. Total amount of loans outstanding against SHGs as on 31 March 2011 was Rs. 31221 crores of which total loans outstanding against women SHGs was Rs. 26123 crores. Basic banking 'no-frills' account, with 'nil' or very low minimum balance requirement as well as no charges for not maintaining such minimum balance, make such accounts accessible to vast sections of the population were introduced as per RBI directive in 2005. Banks have, up to June 2011 opened banking outlets in 1.07 lakh villages up from just 54,258 as on March 2010. Out of these, 22,870 villages have been covered through brick & mortar branches, 84,274 through BC outlets and 460 through other modes like mobile vans, etc. As on March 2012, 105.5 million No-frills accounts have been opened by banks with outstanding

balance of INR 93.3 billion. These figures, respectively, were 4.93 crore and Rs 4257.07 crore in March 2010.

#### 4. Research Design and Methodology

Research objective of this study is to determine whether and to what extent participation in Self Help Groups has an impact on the empowerment of women members. Given the great importance being given to the group approach while conceptualizing and implementing any programme for the rural poor, especially women, this study becomes both essential and relevant. The objective for this study is *to examine the significance of gender dimension in FI through microfinance in the economic up-liftment of poor households in Indian economy*. The research question formulated for understanding the objective is: Does participation in FI through microfinance programs increases the woman's influence over economic resources and participation in economic decision-making?

The study intends to hypothesize as follows:

H<sub>0</sub>: There is no change in the economic living of the poor households owing to the participation of women in the FI programs through microfinance programs.

H<sub>1</sub>: There is significant change in the economic living of the poor households owing to the participation of women in the FI programs through microfinance programs.

The impact of women participation in SHG based FI programs can be seen in two dimensions. The first is in poverty alleviation. This impact cannot be captured at one point of time in a conclusive manner. There has to be a sustained upward trend in moving away from poverty for the families of SHG members and the *process* of poverty alleviation should be studied. The second dimension of the impact of SHGs is the empowerment of the poor and of women in particular. An increase in incomes, livelihoods, or assets does not necessarily lead to

empowerment in the true sense. While in the case of conventional model of FI through No-Frill accounts the borrower avails the financial services (more particularly a loan) from the bank branch directly, under the microfinance models, the poor borrower avails loan from the SHG.

### **4.1 Data Collection Approach**

This study has brought field perspective to the impact evaluation. It is largely a primary study involving survey methods. Even though case research has some specific advantages as it can delve more deeply into motivations and actions than structured surveys (Yin, 1994). It was planned to undertake a questionnaire-based survey as it was useful to capture the quantitative data more accurately and can cover a larger sample size. *Primary data* aimed at capturing all the required information was collected with structured and unstructured questionnaires. These questionnaires were pre tested in select study area and then refined in order to suit all the needs of the study. Further, the required *secondary data* with regard to SHG-Bank Linkage programme was collected from the authentic sources like; Reserve Bank of India (RBI) publications, National Bank for Agriculture and Rural Development (NABARD) publications, Status Reports of Microfinance in India published by Microfinance India, etc. Approach for data collection included; scientific survey of households, survey of Self Help Groups, focus group discussions, and interviews. Field interviews with SHG members, SHG federations office bearers, other villagers and microfinance practitioners were used to provide rigor to the data. Informal interviews to allow “others” to interact freely and share information – including SHG federation office bearers, group members, and neighbors was encouraged in order to gain a broader perspective on the topic. Elite Interviews with the branch manager of lending banks / MFIs in the area were also conducted to gain the lenders perspectives. Key stakeholders are covered during the discussions.



## 4.2 Study Area and Period

The study area includes all the regions (*southern, western, northern, eastern and central regions of India*), in order to capture comprehensively impact of FI on economic empowerment of women. Since FI through the SHG-Bank Linkage programme is vogue in India since 1992, the period of two decades of existence is more than adequate to capture the relevant aspects intended to be covered in the study. However, in order to estimate the economic impact of women participation in FI process which has been rigorously pursued as a policy approach through microfinance and no-frill accounts by banks since 2005, this study has considered the period of 2007 to 2012 as the study period. Accordingly, a beneficiary who joined the FI programme either through the microfinance approach or through no-frill accounts approach of banks was considered for sampling.

## 4.3 Approach to Sampling

We preferred to employ the stratified random sampling methodology to encompass all the spheres of FI in India. Efforts were made to cover all the different categories of FI approaches (i.e through microfinance methods as well as No-Frill account approach of banks) and also in terms of their *age, gender, social backwardness and other related traits*. For the purpose of analysis and in order to comprehend the impact on the socially backward groups, broadly three categories were made viz., SC/ST - including scheduled castes<sup>1</sup> and scheduled tribes<sup>2</sup>, OBC – including other backward classes<sup>3</sup> and GEN – including social groups other than SC/ST and OBC groups.

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<sup>1</sup> Scheduled Castes (SC) in India are the classes of sections of society that are very backward particularly socially and need efforts by the government to nurture and emancipate them in order to achieve social equity and economic growth. These classes of the society are notified by the Union (federal) Government of India.

<sup>2</sup> Scheduled Tribes (ST) in India are the most deprived sections of the society that are predominantly found in the forests and in the peripheries of the forest lands that are socially as well as economically very poor. These classes of the society are notified by the Union (federal) Government of India for the purpose of providing governmental support and ease of identification for different purposes of administration.

<sup>3</sup> Other Backward Classes (OBC) in India are backward classes of the society which are relatively backward when compared to the general classes and need attention of the government even though they are not so socially deprived when compared to SCs and STs. OBCs are also notified by the Union Government of India.

Preferably, self-help groups under microfinance who were involved FI involving members of the age group of 30-50 years were preferred. As NABARD provides the details of the progress of microfinance by region wise in India by classifying the entire country into six regions viz., northern region, northeastern region, eastern region, central region, western region and southern region, efforts were made to cover the sample of beneficiaries across different regions duly involving the *priority states*<sup>4</sup> under the SHG-Bank linkage programme. The sample states are considered based on the level of progress in terms of bank-linkage, poverty level, HDI<sup>5</sup> and GDI<sup>6</sup> (refer table-4.1).

**Table-4.1: Description of Sample States in terms of selection criteria**

(Amount in INR lakhs)

No.	Region/State	Loans			Poverty level	HDI	GDI	
		Accounts	Percentage to Total	Amount	Percentage to Total	2004-05	2006 Rank	2006 Rank
	Northern Region	149108	0.03	90314	0.028			
1	Rajasthan	90393	0.60	44540	49.31	17.5%	31	31
2	Himachal Pradesh	25116	0.16	15994	17.70	6.70%	15	13
	North Eastern Region	150021	0.03	69525	0.022			
3	Assam	111589	0.74	51470	0.74	15%	26	26
	Eastern Region	1105533	0.23	420255	0.13			
4	Bihar	194244	0.17	79603	0.18	32.5%	35	35
5	West Bengal	501284	0.45	149924	0.35	20.6%	22	24
	Central Region	358872	0.74	236539	0.075			
6	Madhya Pradesh	63289	0.17	37953	0.16	32.4%	33	33
7	Uttar Pradesh	214331	0.60	169100	0.71	25.5%	34	34
	Western Region	316821	0.06	124623	0.04			
8	Maharashtra	232835	0.73	104481	0.83	25.2%	11	10
	Southern Region	2706408	0.57	2180859	0.70			

<sup>4</sup> Priority States according to NABARD are the resources poor 13 states including Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Uttar Pradesh, Uttarakhand and West Bengal that are given with special focus under SHG-Bank Linkage Programme.

<sup>5</sup> The HDI represents a push for a broader definition of well-being and provides a composite measure of three basic dimensions of human development: health, education and income. India's HDI is 0.547, which gives the country a rank of 134 out of 187 countries with comparable data. The HDI of South Asia as a region increased from 0.356 in 1980 to 0.548 today, placing India below the regional average. HDI 2011 rank for India is 134.

<sup>6</sup> GDI is a gender-adjusted HDI measured in equally weighted components, same as the HDI, but devised in a way to highlight the gaps between men and women on each of these components. The three components are *income* at purchasing power parity, *education*, measured in terms of weighted average of adult literacy rate and enrolment ratio; and *health* in terms of life expectancy at birth.

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9	Karnataka	252613	0.09	224612	0.10	17.4%	25	25
10	Andhra Pradesh	1693792	0.62	1336912	0.61	11.1%	28	27
	India	4786763		3122116		27.5%	132	113

Source: Human Development Reports and Gender-related Development Index Reports of UNDP  
Status of Microfinance Report 2011, RBI database, NABARD database on SHG-Bank Linkage Programme

About 31% of our sample comes from priority states. However, FI both quantitatively and qualitatively is skewed in favour of the southern region in view of the active involvement of non-governmental organizations, banks and various government departments and organisations. As mentioned earlier, FI is also rigorously pursued by RBI by exhorting the banks to open No-Frill accounts to the poorer sections of the society by offering collateral free loans, overdraft facilities, remittances and payments under government sponsored schemes etc. To capture this impact, covering all the regions as explained above, a sample frame was constructed. About 44 % of the sample comes from the priority states. The sample was categorized (similar to that of SHG based FI) in terms of SC/ST, OBC and GEN categories to maintain homogeneity of classification and analysis. Further, a master sample frame (table-4.2) is developed by merging both the sample frame of SHG based FI and No-Frill account based FI. Since No-Frill account based FI took off in a rigorous manner from 2006 onwards about 7 % our sample comes from No-Frill account based FI and the remaining is from the well matured approach of SHG based FI. The sample represents active, women members all bank linked (with a bank loan) before March 2007. The size of the sample for the entire study is 1052 including 526 control group beneficiaries and 263 men-comparison group beneficiaries.

**Table-4.2: Master Sample Frame**

Beneficiary Category	Northern Region		North-Eastern Region		Eastern Region		Central Region		Western Region		Southern Region		India	
	NFAb	CGm	NFAb	CGm	NFAb	CGm	NFAb	CGm	NFAb	CGm	NFAb	CGm	NFAb	CGm
<i>Wmn</i>	7	7	7	7	34	34	22	22	13	13	180	180	263	263
SC/ST	2	2	2	2	10	10	7	7	5	5	56	56	82	82
OBC	4	4	3	3	13	13	8	8	5	5	69	69	102	102
Gen	1	1	2	2	11	11	7	7	3	3	55	55	79	79
<i>Men</i>	7	7	7	7	34	34	22	22	13	13	180	180	263	263
SC/ST	2	2	2	2	10	10	7	7	5	5	56	56	82	82

OBC	4	4	3	3	13	13	8	8	5	5	69	69	102	102
Gen	1	1	2	2	11	11	7	7	3	3	55	55	79	79
Sub-Total	14	14	14	14	68	68	44	44	26	26	360	360	526	526
Total	28		28		136		88		52		720		1052	

While *Questionnaire-1.A* designed with about 26 parameters was employed to collect the quantified data, questionnaire-1.B was used to collect the qualitative data from the program participants and non-participants during the field visits. *Questionnaire-2* was developed to deduce the expert opinion of microfinance practitioners [NGOs]. *Questionnaire-3* was used to bring forth the expert opinion of the linkage bankers. In the interest of space, the questionnaires are not provided with this paper, but would be made available on request.

#### 4.4 Use of Control Group for Establishing ‘Attribution’

The impact of developmental interventions is often coupled with the impacts due to other observable and unobservable interventions and therefore difficult to measure and identify. It is, as such, difficult to isolate the actual effect, which may be the result of many different external factors. It is also difficult to identify the causality. The selection of control groups is important for the issue of causality / “attribution” of impact. While collecting “before and after data” exclusive reliance is on survey data to establish a very good counterfactual.

##### *Criteria for a Good Counterfactual*

In impact evaluation we need to consider the treated person, household, village or association to have the same characteristics as the person, household, village or association and the only difference is the participation in the program. Because if there is no other reason for the differences between the two groups, if we see differences in the two groups, then it is due to stated intervention. Accordingly, standards similar to the ones in selecting the sample were adopted in selecting the control group based on information about income level, neighborhood factors, age, social class/caste, region and religion. Nearest neighbor matching method instead of

the propensity score is employed for selecting the most comparable control group / comparison group due to its advantages. Selection of comparable individuals (persons, researchers) is made based on matching as many relevant parameters as possible and the size of the control group is equivalent to that of the sample. It is ensured that the units in the treatment group are similar to those in the control group by observing that their expected value of the dependent variable is statistically identical BEFORE exposure to the treatment variable. With this approach, any baseline differences in the dependent variable between the treatment and control groups BEFORE exposure to the treatment have been eliminated. The upshot is that any differences in the mean level of the dependent variable between treatment and control groups AFTER exposure to treatment could be precisely attributed to the treatment variable. It is ensured to the possible extent that the attributions of the impact by the results of the study are not been affected with the choice of the methodology.

### **4.5 Attrition Issues**

In order to do away with the problem of possible differential attrition between treatment and comparison owing to differences between study participants (both treatment and comparison) due to those who were present at the pre-test and absent at the post-test, it was decided to consider only those participants who have been in the program of FI all through study period. The threat of differential attrition for treatment and comparison is nullified by carefully selecting such beneficiaries and non-beneficiaries of the program in designing the sample and the control group.

### **4.6 Comparison of Impact with that of Men**

To make the analysis more illustrative and comparative in terms of gender effects, it was decided to consider an equal size sample of men under FI. In selecting this men sample, standards similar to the ones in selecting the sample were adopted based on information about income level,

neighborhood factors, age, social class/caste, region and religion. Nearest neighbor matching method instead of the propensity score is employed for selecting the most comparable comparison group due to its advantages.

### **4.7 Econometric approach to Impact Evaluation**

Evaluation is considered as an intricate task and comprises a number of steps. The following discussion primarily focuses on the methodological aspects of evaluation, predominantly on econometric evaluation techniques. An ideal evaluation process could be viewed as a series of three steps. Firstly, the impacts of the programme on the individual should be estimated. Secondly, it needs to be determined whether the estimated impacts are large enough to yield net economic gains. Finally, evaluation should question whether the desired and acceptable outcomes have been achieved. About micro-econometric evaluation, analysts for instance, [Ashenfelter and Card \(1985\)](#) view social experiments as the only effective evaluation method. However, [Heckman and Hotz \(1989\)](#) and [Lechner \(1999\)](#), consider that it is possible to construct a comparison group using non-experimental data and econometric and statistical methods to solve the fundamental evaluation problem. This problem arises because we cannot observe individuals simultaneously with and without participation in a programme.

#### **Difference-in-differences estimator**

It has been claimed that controlling for selection on observable characteristics may not be sufficient since remaining unobservable differences may still lead to a biased estimation of treatment effects. These differences may arise from differences in the benefits which individuals expect from participation in a treatment, which might influence their decision to participate. These features are unobservable to a researcher and might cause a selection bias. To account for selection on unobservables, [Heckman et al. \(1999\)](#) suggest econometric selection models and

difference-in-differences (DID) estimators. Changes in the outcome variable  $Y$  for the treated individuals are contrasted with the corresponding changes for non-treated individuals (Heckman et al, 1998):

$$\Delta^{DID} = [Y_t^1 - Y_{t'}^0 | D = 1] - (Y_t^0 - Y_{t'}^0 | D = 0) \dots\dots\dots (4.14)$$

The DID estimator is based on the assumption of time-invariant linear selection effects. The critical identifying assumption of this method is that the biases are the same, on average, in different time periods before and after the period of participation in the programme, so that differencing the differences between participants and non-participants eliminates the bias (Heckman et al., 1998). If we condition the DID approach on observable characteristics  $X$ , the new estimator is given by

$$\Delta^{DID|x} = [Y_t^1 - Y_{t'}^0 | X, D = 1] - (Y_t^0 - Y_{t'}^0 | X, D = 0) \dots\dots\dots (4.15)$$

The identifying assumption of this method is

$$E(Y_t^1 - Y_{t'}^0 | X, D = 1) = E(Y_t^0 - Y_{t'}^0 | X, D = 0) \dots\dots\dots (4.16)$$

In other words, let  $P_i$  denotes the participation of  $i^{th}$  person in the FI program. This can take two possible values, namely  $P_i=1$  if the person participates in the program and  $P_i=0$  if she does not. If the  $i^{th}$  person does not participate, then its level of income is  $Y_{0i}$  which stands for person  $i$ 's participation in the program when  $P=0$ . If the person does participate in the program then its level of income is  $Y_{1i}$ .

The gain for  $i^{th}$  person who participates in the program ( $P=1$ ) is then:

$$\Delta = Y_{1i} - Y_{0i} \text{ given that } P_i=1 \dots\dots\dots (4.17)$$

Now, allowing for the determinants of income of a participant to be factored in while estimating the impact, let us consider for the  $i^{th}$  person in the sample, which is given by;

$$Y_i = a + bP_i + cX_i + e_i \dots\dots\dots (4.18)$$

where  $a$ ,  $b$  and  $c$  are parameters,  $X$  stands for the control variables, such as production levels, asset creation, expenses towards food security and living standards of the person, while  $e$  is a residual that includes other determinants of income and measurement errors. The estimated value of  $b$  gives you the impact of the FI program on the beneficiary.

We need to note here that if the  $i^{\text{th}}$  person participates in the FI program then  $P=1$  and so its impact on her income would be  $a + b + cXi + ei$ . If it does not participate, then  $P=0$  and so its impact on her income would be  $a + cXi + ei$ . The difference between the two is the net impact of the program, which is just  $b$ .

### Exogeneity Concerns

In using the ordinary least squares (OLS) regression, there is concern because the OLS estimates of the parameters will be biased even in large samples unless the right-hand side variables are exogenous. Because participation in the program was purposively targeted FI programs participation is not exogenous. This can affect the calculation of the program's impact as follows. The equation for years of participation is:

$$Si = a + bPi + cXi + ei \dots\dots\dots (4.19)$$

It is then possible to just subtract the difference between the income of participants and the comparison group before the program is introduced from the difference after the program. This is called the 'double difference' estimate, or 'difference in differences'. This will deal with the troublesome unobserved variables provided they do not vary over time. This can be explained by adding subscripts to the earlier equation so that the schooling after the program is introduced:

$$Y_{ia} = a + bP_i + cX_{ia} + e_{ia} \dots\dots\dots (4.20)$$

Before the program, in the baseline survey, the income level attainment is instead:

$$Y_{ib} = a + cX_{ib} + e_{ib} \dots\dots\dots (4.21)$$



(Of course  $P=0$  before the program is introduced.) The error terms include an additive time invariant effect, so we can write them as:

$$e_{it} = \eta_i + \mu_{it} \text{ (for } t=a,b) \dots\dots\dots (4.22)$$

where  $\eta_i$  is the time invariant effect, which is allowed to be correlated with  $P_i$ , and  $\mu_{it}$  is an error term that is not correlated with  $P_i$  (or  $X_i$ ).

Now, the  $i^{\text{th}}$  household in the equation for  $Y_{ia}$  is the same household as the  $i^{\text{th}}$  in the equation for  $Y_{ib}$ . We can then take the difference between the ‘after’ equation and the ‘before’ equation:

$$Y_{ia} - Y_{ib} = bP_i + c(X_{ia} - X_{ib}) + \mu_{ia} - \mu_{ib} \dots\dots\dots (4.23)$$

The above eqn (4.23) is an OLS and gives an unbiased estimate of the program’s impact. There can also be situations in which the changes over time in the outcome indicator are influenced by the initial conditions. Then one will also want to control for differences in initial conditions. This can be done by simply adding  $X_a$  and  $X_b$  in the regression separately, so that the regression takes the form:

$$Y_{ia} - Y_{ib} = bP_i + cX_{ia} + cX_{ib} + \mu_{ia} - \mu_{ib} \dots\dots\dots (4.24)$$

[Binswanger et al. \(1993\)](#) used this method to estimate the impacts of rural infrastructure on agricultural productivity in India, using district-level data. [Duflo \(2001\)](#) estimated the impact on schooling and earnings in Indonesia of building schools. [Frankenberg et al. \(2005\)](#) use a similar method to assess the impacts of providing basic health care services through midwives on children’s nutritional status (height-for-age), also in Indonesia. [Galiani et al. \(2005\)](#) used a *DD* design to study the impact of privatizing water services on child mortality in Argentina, exploiting the joint geographic (across municipalities) and Intertemporal variation in both child mortality and ownership of water services. [Jacoby \(2002\)](#) used a *DD* design to test whether intra-household resource allocation shifted in response to a school-feeding program, to neutralize the latter’s effect

on child nutrition. Another example can be found in [Pitt and Khandker \(1998\)](#) who assessed the impact of participation in Bangladesh's Gramin Bank (GB) on various indicators relevant to current and future living standards.

### **Endogeneity of FI program participation**

For gaining traction on the problem, one way of addressing the potential for endogeneity bias is to use instrumental variables. The instrumental variable works exclusively through the independent variable to affect the dependent variable which is called the "exclusion restriction". Accordingly, we estimate the impact duly addressing the issue of endogeneity as explained above. Selection of relevant variables is carefully made considering their prior use and reliability demonstrated for all of the measures. The key indicators (based on ex ante evaluations of the programme) are: *change in income levels, impact on food security, impact on standard of living, impact on production level, and impact on asset creation*. Since the extreme values (outliers) may distort the effects and reduce precision, the outliers are handled in accordance with the most established methods in the fields of economic research and econometric methods.

## **5. Results and Discussion on Findings**

Employing the above described econometric approach (eqn 4.23) and using the above explained variables of study, the econometric specification of the study is as under:

$$IN_{ia}-IN_{ib} = bP_i+c(FS_{ia}-FS_{ib})+c(LS_{ia}-LS_{ib})+c(PL_{ia}-PL_{ib})+c(AC_{ia}-AC_{ib})+ \mu_{ia} -\mu_{ib} \text{ (Eqn 5.1)}$$

Where,  $IN_{ia}-IN_{ib}$  represent the change in income levels,  $FS_{ia}-FS_{ib}$  represent the change in expenses towards to food security,  $LS_{ia}-LS_{ib}$  represent the change in expenses towards standards of living (non-food expenses),  $PL_{ia}-PL_{ib}$  indicates the change in economic production levels and

$AC_{ia} - AC_{ib}$  indicates the change in economic asset creation for the households.  $P_i$  represents the dummy for participation in the FI program and  $\mu_{ia} - \mu_{ib}$  stands for the error term. We have run eight regression models that are detailed with technical specifications as below: Regression (Reg) 5.1 and Reg 5.3 are run with least squares (NLS and ARMA) with Newey-West Heteroskedasticity consistent coefficient covariance with variance as the weight with maximum 500 iterations and estimated with HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth=5.0. Reg 5.2 and 5.4 are estimated with generalized methods of moments using standard errors & covariance computed using HAC weighting matrix (Bartlett kernel, Newey-West fixed bandwidth = 6.0) with maximum 500 iterations.

**Table-5.1: Results of Panel Regressions for Income analysis**

Dependent Variable: Change in Income Levels

Independent Variables	Women Beneficiaries		Men Beneficiaries	
	Reg 5.1	Reg 5.2	Reg 5.3	Reg 5.4
	OLS Estimation	GMM Estimation	OLS Estimation	GMM Estimation
Change in Food Security	1.03*** 3.63 [0.0003]	1.03*** 3.63 [0.0003]	0.90*** 2.42 [0.0157]	0.90*** 2.42 [0.0157]
Change in Living Standards	0.28*** 4.73 [0.0000]	0.28*** 4.73 [0.0000]	0.66*** 5.71 [0.0000]	0.66*** 5.71 [0.0000]
Change in Production levels	0.26*** 3.86 [0.0001]	0.26*** 3.86 [0.0001]	0.07 0.86 [0.3883]	0.07 0.86 [0.3883]
Change in Asset Creation	0.31 4.62 [0.0000]	0.31*** 4.62 [0.0000]	0.37*** 3.53 [0.0005]	0.37*** 3.53 [0.0005]
Participation in FI (FI program)	4830*** 7.92 [0.0000]	4830*** 7.92 [0.0000]	4018*** 4.09 [0.0000]	4018*** 4.09 [0.0000]
R <sup>2</sup>	0.461	0.461	0.250	0.250
Adj. R <sup>2</sup>	0.456	0.456	0.243	0.243
Durbin-Watson stat	1.205	1.205	1.042	1.042
Obs	450	450	450	450

Note: \*, \*\*, \*\*\* indicate significant at 10%, 5% and 1% respectively

The table reports (the results of OLS estimations and GMM estimations) the estimated coefficients, t-values and p-values (in parenthesis) as well as goodness-of-fit statistics. The models are estimated by employing robust standard errors.

**Robustness Checks**

The conditional exogeneity relation is key to determining the critical core variables, i.e., those variables whose coefficients should make economic sense and be robust. The regression coefficients were consistently estimated by ordinary or generalized least squares under standard conditions. The efficiency of the estimators used in the robustness check was improved by using generalized least squares (GLS) instead of OLS. Durbin Watson statistic was calculated for different regressions detailed above to ensure absence of autocorrelation. The variance inflation factors are ascertained to assure ourselves about the absence of multi-collinearity in the case of OLS regressions.

**Analysis of Impact on Income levels**

Table 5.1 presents the pooled regression results of estimating the impact of FI programs in the case of women as well as men participants. On the expected lines the increase in production levels has positively and significantly (at 1% level of significance) contributed for the increase in income levels of the women participants. However, it is interesting to note that this is not significant in the case of men beneficiaries. Further, most important outcome of the analysis is that participation in the FI programs has impacted very significantly (at 1% level of significance) and positively in increasing the income levels of the participants. The coefficient of participation is 4830 in the case of women and 4018 in the case of men which denotes the change due to participation in the FI programs. We notice that there has been a significant change in the economic parameters of the participants (table 5.2). All the figures are reported net of inflation effect so as to capture the real impact.

**Table-5.2: Changes (Increases) in Economic Parameters of the Survey Participants (amount in INR)**

<b>Economic Parameters</b>	<b>Women beneficiaries</b>	<b>Men beneficiaries</b>
Change in Income level	[6482.93] 11525.22	[7227.48] 12848.00

Change in Food Security	[958.03]	1703.01	[1066.06]	1895.21
Change in Living Standards	[1568.24]	2787.98	[2203.33]	3916.44
Change in Production levels	[3302.81]	5870.22	[5025.77]	8933.33
Change in Asset Creation	[3578.82]	6360.88	[4703.19]	5630.88

Note: The reported figures are in INR. The figures in parenthesis are net of inflation effect

In order to quantify the actual impact essentially due to the participation in FI programs is presented for easy comprehension in table-5.3. While the change in income level has been to the extent of INR 11523.55 during the period of participation, the impact particularly due to participation in FI programs is to the extent of INR 10430.22 in the case of women participants. However, in the case of men participants, the change was INR 12860.28 during the period of participation and the impact mainly due to participation in FI programs is to the extent of INR 8787.55. We have provided the relevant figures net of inflation figures for comprehension of the impact.

**Table-5.3: Summary of results of Change in Income analysis**

	Women	Men
Income level before participation	9720	18677
Income level after participation	16202	25904
Change/increase in income level during the period	6482	7227
Change in Income level due to impact of FI programs	4830	4018
The percentage of total change during the period	66.68%	38.69%
The percentage of total change in terms of CAGR	10.76%	6.76%
The percentage of change due to impact of FI programs	60.36%	26.46%
The percentage of change due to impact of FI programs (CAGR)	8.40%	3.97%

Note: The reported figures are in INR and are net of inflation effect

Our results suggest that FI programs have greater impact on women than on men even though the income levels of men are quite higher than that of women. The impact among women is to the extent of 9.91% as against 4.81% on the case of women. Even though the percentage total change during the period was 66.68% (CAGR 10.76%) for women and 38.69% (CAGR 6.76%) for men, the percentage of change due to impact of FI programs for men was 60.36% (CAGR 8.40%) and 26.46% (CAGR 3.97%) for men. The results are comparable to that of [Miriam and](#)

Love (2009), who in their World Bank study employed difference-in-difference strategy to examine the effects of providing financial services to low-income clients and found that average income went up by about 7 percent as the employment increased by 1.4 percent. Martha Alter Chen and Donald Snodgrass (1999) too found that average expenditure on food in SEWA Bank borrower households was 21% higher than in control households. However, Montgomery and Weiss (2011) in their Pakistan study employed difference in difference with controls, exploiting the staggered introduction of bank services across villages covering 1454 Khushhali Bank clients with an equal number of randomly selected non-clients from the same villages or settlements observed that there was no evidence of effects on income growth. On the other hand, Pitt *et al.*, 2006 in their retrospective panel study in Bangladesh covering 2,074 households observed that credit to women significantly increases women’s purchasing power and role in finance and borrowing, ability to oversee household projects.

### Income Analysis of SC/ST Categories

Participation of SC/ST women in FI programs has significantly contributed to the increase of net household incomes. The analysis of net household incomes for both pre-FI and post-FI stages, revealed a significant growth of (CAGR) 12.01 per cent and an average INR 7771 increase in net household income. When compared to the control groups, there has been an increase of INR 5349 in the case of women beneficiaries under FI programs. However, amongst the control groups of the same category the increase was to the extent of (CAGR) 4.52 per cent with an average INR 2498 increase in net household increase.

**Table-5.4: Results of Panel Regressions for Income Analysis of SC/ST categories**

Dependent Variable: Change in Income Levels

Independent Variables	Women Beneficiaries		Men Beneficiaries	
	Reg 9.1	Reg 9.2	Reg 9.3	Reg 9.4
	OLS Estimation	GMM Estimation	OLS Estimation	GMM Estimation
<b>Change in Food Security</b>	0.54***	0.54***	1.89**	1.89**
	2.99	2.99	2.53	2.53

	[0.0032]	[0.0032]	[0.0124]	[0.0124]
<b>Change in Living Standards</b>	0.03	0.03	-0.18	-0.18
	0.21	0.21	-0.66	-0.66
	[0.8332]	[0.8332]	[0.5095]	[0.5095]
<b>Change in Production levels</b>	0.14*	0.14*	0.02	0.02
	1.68	1.68	0.12	0.12
	[0.0948]	[0.0948]	[0.9029]	[0.9029]
<b>Change in Asset Creation</b>	0.26**	0.26**	0.40	0.40
	2.33	2.33	1.51	1.51
	[0.0212]	[0.0212]	[0.1312]	[0.1312]
<b>Participation in FI program)</b>	4844***	4844***	3857**	3857**
	5.86	5.86	2.48	2.48
	[0.0000]	[0.0000]	[0.0139]	[0.0139]
<b>R<sup>2</sup></b>	0.466	0.461	0.288	0.288
<b>Adj. R<sup>2</sup></b>	0.450	0.450	0.267	0.267
<b>Obs</b>	140	140	140	140

Note:\*, \*\*, \*\*\* indicate significant at 10%, 5% and 1% respectively

The table reports (the results of OLS estimations and GMM estimations) the estimated coefficients, t-values and p-values (in parenthesis) as well as goodness-of-fit statistics. The models are estimated by employing robust standard errors.

Table 5.4 presents the pooled regression results of estimating the impact of FI programs on the annual income in the case of women as well as men participants of SC/ST categories. On the expected lines the increase in production levels has positively and significantly (at 10% level of significance) contributed for the increase in income levels of the SC/ST women participants. However, it is interesting to note that this is not significant in the case of men beneficiaries. Interesting observation to be noticed is that while increase in living standards is not significant in the case of SC/ST women, it is negative in the case of SC/ST men participants. Another observation from the above results which draws our attention is that while increase in asset creation is positively significant at 5% level for SC/ST women, it is not found to be significant in the case of SC/ST men participants. Further, most important outcome of the analysis is that participation in the FI programs has impacted very significantly (at 1% level of significance) and positively in increasing the income levels of the participants. The coefficient of participation is 4844 in the case of SC/ST women and 3857 in the case of SC/ST men which denotes the change due to participation in the FI programs.

**Table 5.5: Summary of results of Change in Income analysis for SC/ST categories**

	Women	Men
Income level before participation	10179	15271
Income level after participation	17950	22334
Change/increase in income level during the period	7771	7063
Change in Income level due to impact of FI programs	4844	3857
The percentage of total change during the period	76.3%	46.25%
The percentage of total change in terms of CAGR	12.01%	7.90%
The percentage of change due to impact of FI programs	47.58%	25.25%
The percentage of change due to impact of FI programs (CAGR)	8.10%	4.61%

Note: The reported figures are in INR and are net of inflation effect

### Income Analysis of OBC Categories

Participation of OBC women in FI programs has considerably contributed to the increase of net household incomes. The analysis of net household incomes for both pre-FI and post-FI stages, revealed a substantial growth of (CAGR) 15.34 per cent and an average INR 9467 increase in net household income. When compared to the control groups, there has been an increase of INR 5573 in the case of women beneficiaries under FI programs. However, amongst the control groups of the same category the increase was to the extent of (CAGR) 7.39 per cent with an average INR 3895 increase in net household increase. Further, in the case of OBC men participating in FI programs, the increase in income was to the extent of (CAGR) 8.97 per cent and the increasing difference in household income in the case of men beneficiaries as against women beneficiary was on an average of INR 8515.

**Table-5.6: Results of Panel Regressions for Income Analysis of OBC categories**

Dependent Variable: Change in Income Levels

Independent Variables	Women Beneficiaries		Men Beneficiaries	
	Reg 5.1	Reg 5.2	Reg 5.3	Reg 5.4
	OLS Estimation	GMM Estimation	OLS Estimation	GMM Estimation
Change in Food Security	2.54***	2.48***	0.21	0.21
	6.35	6.25	0.31	0.31
	[0.0000]	[0.0000]	[0.7556]	[0.7556]
Change in Living Standards	-0.01	-0.04	0.66**	0.66**
	-0.15	-0.35	2.03	2.03
	[0.8757]	[0.7207]	[0.0432]	[0.0432]
Change in	0.17**	0.18***	0.37**	0.37**



<b>Production levels</b>	2.41 [0.0166]	2.62 [0.0094]	2.51 [0.0128]	2.51 [0.0128]
<b>Change in Asset Creation</b>	0.25*** 2.41 [0.0020]	0.24*** 3.25 [0.0014]	0.71*** 2.99 [0.0031]	0.71*** 2.99 [0.0031]
<b>Participation in FI program</b>	5135*** 7.82 [0.0000]	5283*** 8.37 [0.0000]	4269** 2.43 [0.0158]	4269** 2.48 [0.0139]
<b>R<sup>2</sup></b>	0.455	0.461	0.414	0.414
<b>Adj. R<sup>2</sup></b>	0.442	0.450	0.400	0.400
<b>Obs</b>	172	140	140	140

Note:\*, \*\*, \*\*\* indicate significant at 10%, 5% and 1% respectively

The table reports (the results of OLS estimations and GMM estimations) the estimated coefficients, t-values and p-values (in parenthesis) as well as goodness-of-fit statistics. The models are estimated by employing robust standard errors.

Table 5.6 presents the regression results of estimating the impact of FI programs on the annual income in the case of women as well as men participants of OBC categories. On the expected lines the increase in food security production levels has positively and significantly (at 10% level of significance) contributed for the increase in income levels of the OBC women participants. However, it is interesting to note that this is not significant in the case of OBC men beneficiaries. Interesting observation to be noticed is that while increase in living standards has negative sign not significant in the case of OBC women, it is positive and significant at 5% level in the case of OBC men participants.

**Table–5.7: Summary of results of Change in Income analysis for OBC categories**

	<b>Women</b>	<b>Men</b>
Income level before participation	9095	17623
Income level after participation	18563	27078
Change/increase in income level during the period	9468	9455
Change in Income level due to impact of FI programs	5283	4269
The percentage of total change during the period	104%	53%
The percentage of total change in terms of CAGR	15.34%	8.97%
The percentage of change due to impact of FI programs	58%	24%
The percentage of change due to impact of FI programs (CAGR)	9.59%	4.43%

Note: The reported figures are in INR and are net of inflation effect

### Income Analysis of General Categories

Participation of GEN women in FI programs has noticeably contributed to the increase of net household incomes. The analysis of net household incomes for both pre-FI and post-FI stages, revealed a considerable growth of (CAGR) 16.23 per cent and an average INR 11255 increase in net household income. When compared to the control groups, there has been an increase of INR 7303 in the case of women beneficiaries under FI programs. However, amongst the control groups of the same category the increase was to the extent of (CAGR) 6.86 per cent with an average INR 3953 increase in net household increase. Further, in the case of GEN men participating in FI programs, the increase in income was to the extent of (CAGR) 8.89 per cent and the increasing difference in household income in the case of men beneficiaries as against women beneficiary was on an average of INR 3976.

**Table-5.8: Results of Panel Regressions for Income Analysis of GEN categories**

Dependent Variable: Change in Income Levels

Independent Variables	Women Beneficiaries		Men Beneficiaries	
	Reg 5.1	Reg 5.2	Reg 5.3	Reg 5.4
	OLS Estimation	GMM Estimation	OLS Estimation	GMM Estimation
Change in Food Security	-0.04	-0.04	-0.47	-0.47
	-0.19	-0.19	-1.26	-1.26
	[0.8431]	[0.8431]	[0.2085]	[0.2085]
Change in Living Standards	0.71***	0.71***	0.53***	0.53***
	5.23	5.23	3.14	3.14
	[0.0000]	[0.0000]	[0.0021]	[0.0021]
Change in Production levels	0.29***	0.29***	0.28**	0.28**
	3.56	3.56	2.13	2.13
	[0.0005]	[0.0005]	[0.0349]	[0.0349]
Change in Asset Creation	0.11	0.11	0.61***	0.61***
	0.78	0.78	3.92	3.92
	[0.4346]	[0.4346]	[0.0031]	[0.0031]
Participation in FI program	6659***	6659***	6178***	6178***
	6.02	6.02	5.32	5.32
	[0.0000]	[0.0000]	[0.0000]	[0.0000]
R <sup>2</sup>	0.567	0.567	0.514	0.514
Adj. R <sup>2</sup>	0.554	0.554	0.499	0.499
Obs	138	138	138	138

Note: \*, \*\*, \*\*\* indicate significant at 10%, 5% and 1% respectively

The table reports (the results of OLS estimations and GMM estimations) the estimated coefficients, t-values and p-values (in parenthesis) as well as goodness-of-fit statistics. The models are estimated by employing robust standard errors.

Table 5.8 presents the regression results of estimating the impact of FI programs on the annual income in the case of women as well as men participants of GEN categories. Contrary to our expectations the increase in food security levels has negatively (coefficient value -0.047) affecting the increase in income levels of the both OBC men and women participants. However, it is interesting to note that this is not significant in the case of OBC men beneficiaries. Another noticeable observation is that while change in asset creation is not significant (coefficient value 0.11) in the case of GEN women, it is significant (coefficient value 0.61) at 1% level in the case of GEN men participants. The coefficient of participation is 6659 in the case of OBC women and 6178 in the case of GEN men, which denotes the change due to participation in the FI programs.

**Table 5.9: Summary of results of Change in Income analysis for GEN categories**

	<b>Women</b>	<b>Men</b>
Income level before participation	10032	18405
Income level after participation	21287	28181
Change/increase in income level during the period	11255	9776
Change in Income level due to impact of FI programs	6659	6178
The percentage of total change during the period	112%	53%
The percentage of total change in terms of CAGR	16.24%	8.89%
The percentage of change due to impact of FI programs	66%	34%
The percentage of change due to impact of FI programs (CAGR)	10.72%	5.96%

Note: The reported figures are in INR and are net of inflation effect

## 6. Conclusion

The study has evidenced that while the percentage of total change in annual income during the period in terms of CAGR for women is 10.76 percent and 6.76 percent for men, the percentage of change in annual income due to impact of FI programs in terms of CAGR is 8.40 percent for women and 3.97 percent for men. The significance of gender dimension of impact of FI programs could be observed from the fact that there has been strong impact in terms of the change in

income of the poor particularly women. The impact is so leaned positively towards women is noticed from the fact that income growth (CAGR) net of inflation effect was of the order of 8.40 percent as against 3.97 percent for men participants. Besides, one noticeable finding of this analysis is that GEN category women are largely impacted by the FI programs mostly because of their awareness levels and access to instruments of economic progress. However, in the case of impact on living standards, women of SC/ST categories have been largely impacted (CAGR change of 4.35 percent as against CAGR change of 1.76 for men).

The findings have established that women use the resources in such ways that improve that family well-being and contribute to significant increase in savings levels of the households. Further, these significant increases are largely attributed to the decision making influence of women, thus establishing our hypothesis that gender matters in the impact of the programmes for the poor. This study has indeed rightly identified disparity in the impact levels in the gender dimension perspective, which are very much useful in shaping the policies in the domain.

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