

**Women's Self-Help Group Participation and Domestic Violence:
Impact Evaluation with Consideration of Dowry in Andhra Pradesh, India**

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Abstract

Forming Self-Help Groups (SHGs) has been a vehicle for delivering microfinance and other social services to poor women in rural India. This paper explored the impact of women's participation in a SHG on their experience of physical abuse by husbands. We have found that, while around 2.5 years of SHG participation reduced the frequency of domestic violence, longer-term SHG participation increased domestic violence. We conjecture that the decline during the shorter period is attributable to women empowerment achieved by social activities of the SHGs and the increase in the longer period can be attributed to an improved access to microfinance services. This study furthermore examined if the impact was heterogeneous depending on dowry practice, and has revealed that the impact of SHG participation on the frequency of domestic violence was more salient among those who got married with dowry.

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1. Introduction

Forming Self-Help Groups (SHGs) has been a vehicle for delivering microfinance and other social services to poor women in rural India. The introduction of women's SHGs dates back to around 1980 (Deshmukh-Ranadive, 2004). National and state governments of India, in cooperation with international organizations and NGOs, have used SHGs as a fundamental instrument for poverty alleviation and women empowerment (Galab and Rao, 2003). The number of SHGs increased rapidly and by 2010 approximately 5.3 million SHGs, of which one fourth were concentrated in the state of Andhra Pradesh,¹ had been organized (National Bank for Agriculture and Rural Development 2010). In the process of forming SHGs and implementing poverty alleviation programs, the government initiatives have emphasized social mobilization and inclusiveness of poor women in rural areas, and a participatory approach has been employed to identify poor women and involve them in the programs. Although the growth of SHG activities slowed down after the Microfinance Crisis in 2010², 7.3 million SHGs were still active as of 2017 (National Bank for Agriculture and Rural Development 2017).

The purpose of developing SHGs is to encourage women, especially in disadvantaged social and economic categories, to voluntarily participate in social activities and to enhance their

¹ In June 2014, Telangana became independent from Andhra Pradesh as the 29th state of India. When our surveys were undertaken, these two states comprised of one state, Andhra Pradesh.

² In AP state, SHG model as well as Micro Finance Institutions(MFIs) model prevail for serving the poor. However, the environment in which MFIs model have grown up could almost have been expressly designed to promote over-lending. Finally, the number of people having debt stress increased and some of them committed suicide. As a result, AP government enacted "Andhra Pradesh Microfinance Institutions (regulation of money lending) Act, 2010" in 2010 (Bellman & Arlene 2010).

capacity to manage social and economic issues, such as children's education, health problems and improvement in their standard of living. The development of SHGs has been closely related to microfinance services, including small-scale credit. Through SHG, women can participate in the training program. And illiterate women are able to communicate and negotiate with other people and also sign their names on contracts. Moreover, SHG members can receive bookkeeping training and develop entrepreneurial capacity. Rural banks, after monitoring SHGs' activities, may decide to provide SHG members with credit and thus SHG participation improves access to financial services. Through these group activities, it has been recognized that SHGs in reality have contributed to reducing poverty and empowering women (Dev et al. 2012).

Along with the implementation of the SHG activities, a number of impact evaluation studies have been conducted, yet most impact studies rely on either with/without (between SHG participants and non-participants) or before/after comparisons (Puhazhendi and Satyasai 2000, Puhazhendi and Badatya 2002, Tankha 2012). More rigorous impact evaluation has been scant. A few exceptions are Swain and Varghese (2009) and Deininger and Liu (2013a, 2013b). Swain and Varghese (2009), by using data collected in five Indian states,³ utilized variations in the duration after participation in a SHG for the identification of its effects. They found that, while short-term participation did not create any significant effect on their livelihood such as income and consumption expenditures, longer-term participation contributed to asset accumulation. Deininger and Liu (2013a, 2013b) examined the impact of SHG programs in Andhra Pradesh. They combined

³ Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Orissa, and Maharashtra.

a double difference methodology with a propensity score matching technique, and showed that by participating in a SHG women empowerment and improvement in food intake through consumption smoothing were materialized even in the short run. They, moreover, found that consumption and asset levels were increased in the long run.

The number of rigorous impact evaluation has been growing, nonetheless studies on the SHG activities are still insufficient. Particularly, how SHG participation influences domestic violence has remained as an importance research question.⁴ Domestic violence is defined as a pattern of abusive behavior in an intimate relationship—such as marriage, family, dating, or cohabitation—that is used by one partner to gain or maintain power and control over another (The United States Department of Justice 2017)⁵. Domestic violence includes physical, sexual, emotional, economic, or psychological actions or threats of actions that influence another person. In India, physical abuse by husbands against wives has been a serious social problem. National Family Health Survey (2009) reports that approximately one third of Indian women experience physical abuse by husbands. Hence, this paper focuses on the impact of women's SHG participation on their experience of physical abuse by husbands.

⁴ Participating in a SHG has a direct link to microfinance services. A growing number of studies have investigated the relationship between microfinance and domestic violence (Goetz and Gupta 1996, Schuler, Hashemi, Riley, and Akhter 1996, Schuler, Hashemi and Badal 1998, Murshid 2016). Group-based credit programs targeting women have a potential of reducing domestic violence by making women's lives more visible to public. In addition, microfinance can bring new income earned by women to participant households and thus improve their livelihood, which would result in a decline of physical abuse by husbands. On the other hand, actual credit uptake may cause conflict between wives and husbands, when for example they experience dispute over the use of the credit. Another line of literature moreover explores the causal effect of microfinance on women empowerment and finds that microfinance have some empowerment effects (Khandker 2003, Pitt et al. 2006, Garikipati 2008). The realization of women empowerment in some specific aspects in patriarchy society may cause a conflict between men and women.

⁵ The United States Department of Justice. (n.d.). Retrieved December 10, 2017, from The United States Department of Justice website: <https://www.justice.gov/ovw/domestic-violence>

In theory, SHG participation may decrease the frequency of domestic violence if SHG participation enhances new income generating activities and increases income, which in turn, by improving the household's living standard and also by improving women's position in the household, would reduce tension between a couple. However, some aspects of women empowerment such as strengthened autonomy, increased mobility, and more negotiation power vis-à-vis husbands may be perceived by husbands as a challenge to cultural norms based on men's authority (Kabeer 1999). If this is the case, the participation in a SHG may actually raise tension between a wife and a husband and may result in an increase in the frequency of domestic violence. Which effect is dominant is therefore an empirical question.

This study furthermore examines if the impact of SHG participation on domestic violence is heterogeneous depending on the conventional practice of dowry. In India, dowry has been practiced as an asset transfer from the bride's parents to the groom and/or groom's family at time of the marriage or after the marriage. Several past studies show that a negative correlation between the amount of dowry payment and domestic violence (Bloack and Rao 2002, Srinivasan 2007). However, to our knowledge, no study has ever considered dowry practices in the impact evaluation of SHG participation. Thus, our attempt will give us a new insight into the impact studies of SHG activities and will give us some policy implications for SHG models and microfinance programs in countries with similar cultural backgrounds and social norms as India (such as Nepal).

The following section begins with a brief explanation of women's self-help group

programs in Andhra Pradesh and depicts how our target program rolled out from one region of Andhra Pradesh to another. Section 3 explains how this program rollout is utilized for our identification of program impact. Section 4 presents the framework of intention-to-treat (ITT) analysis and gives analytical results. Then, Section 5 provides the empirical models for average treatment effect (ATE) analysis and shows estimation results. Lastly, Section 6 summarizes the main findings of this study and concludes our discussions.

2. Women's Self-Help Groups and Microfinance

2.1 Women's Self-Help Groups in Andhra Pradesh

SHGs were promoted by international agencies and Indian government agencies beginning in the late 1970s in Andhra Pradesh to reduce poverty. A SHG is a group of women who come together to work on social and economic issues that affect low-income households. The women in a SHG know each other before forming the group and are generally from similar socio-economic backgrounds. The Development of Women and Children in Rural Areas (DWCRA) program began promoting SHGs in Andhra Pradesh in 1982-83 with the assistance of UNICEF. The initial economic objective of these SHGs was to provide sources of income through the development of micro-enterprises for groups of women in rural areas. The DWCRA program provided subsidies, a revolving credit fund, and training. The social issues targeted by DWCRA included family well-being, child care, and literacy (Deshmukh-Ranadive 2004). In 1993, DWCRA and other self-help groups in Andhra Pradesh turned to microfinance services as one of

its main activities,⁶ providing savings and credit services administered by the group.⁷ Since 1995 the number of SHGs and state coverage has increased tremendously.

In 1996, a UNDP-assisted poverty reduction program in the region, the South Asia Poverty Alleviation Programme (SAPAP), was introduced in Andhra Pradesh in three drought-prone districts. This program also targeted women and the principal mechanism for social and economic development has been SHGs with microfinance services as the main economic activity. Again, the creation and promotion of SHGs was done by NGOs and state government agencies (Murthy et al. 2005). In addition to microfinance, skills-training and social organization⁸ activities were also developed.

In 2000, the Andhra Pradesh state government, with support from the World Bank, established a program to further promote and support SHGs. The Andhra Pradesh District Poverty Initiative Programme (DPIP) was a five-year poverty elimination program began in six of the poorest districts⁹ and in 2003-04 was expanded to all 22 state districts under the Rural Poverty Reduction Programme (RPRP). Self-Help Groups in Andhra Pradesh, whether formed under DWCRA, SAPAP, or the state government poverty reduction programs, all function in similar

⁶ The introduction of microfinance activity was intended to encourage bonding among the women in the SHGs. DWCRA in Andhra Pradesh utilized the slogan “Save a Rupee a day” (Mooij 2002).

⁷ There are other microfinance programs that are not based on group collateral such as savings and loan cooperatives, the most prominent one in Andhra Pradesh being CDF out of Warangal that promotes credit cooperatives in rural areas for the “informal” sector—farmers, agricultural workers, and artisans. Galab and Rao (2003) provide a comparative analysis of the DWCRA, SAPAP, and CDF programs.

⁸ Social organization included grouping the SHGs at village and mandal levels as well as forming resource, producer, and labor associations within villages.

⁹ Adilabad, Anantapur, Chittoor, Mahbubnagar, Srikakulam, and Vizianagaram.

manner: a group of women in a village or habitation either form themselves into a SHG or are encouraged to join a SHG by program promoters.

These SHGs consist of 15-20 women¹⁰ with a more or less homogenous socio-economic background, although they may come from different castes.¹¹ They know each other, have frequent interactions, and live in the same neighborhood. They meet periodically (once a week, every two weeks, or once a month) and each woman is expected to deposit a certain amount into the savings account. Those that have outstanding loans are expected to make a payment on those loans. During the first several months, one of the main activities of a SHG is to accumulate a modest savings account deposited at a local bank. After several months and when a reasonable amount has been deposited, these funds can be lent out among the SHG members. The SHG makes collective decisions as to who receives a loan, usually based on need, repayment capacity, and the amount of available funds. When a SHG has demonstrated its ability to accumulate savings and administer loans, it can apply for a group loan from several different sources, including commercial banks.¹² Other NGOs as well as banks and private financial institutions in Andhra Pradesh have also formed SHGs¹³ with the objective of providing microfinance services.

¹⁰ Some MFIs that utilize group collateral form smaller groups such as BASIX (4-6 persons), SHARE (5 persons), CDF (5 persons), and SKS (5 persons).

¹¹ Persons from scheduled caste, scheduled tribe, and backward caste make up the majority in SHGs.

¹² DWCRA groups can solicit loans from the District Rural Development Agency; the AP poverty reduction programs (DPIP and RPRP) groups have access to a Community Investment Fund.

¹³ NGOs such as SHARE and DHAN Foundation and for-profit financial institutions such as SKS Microfinance, BASIX, and SML (previously SHARE).

2.2 District Poverty Initiative Programme (DPIP)

The data set used for this study is a series of household surveys conducted by the Center for Economic and Social Studies (CESS), a research institution in Andhra Pradesh, with the objective of assessing the results of DPIP.¹⁴ As already mentioned, DPIP was implemented in six of poorest districts in Andhra Pradesh. The SHGs formed in each village were formed into Village Organizations (VO) and in turn the VOs are federated into Mandal Mahila Samakhyas (MMS) at the mandal level. VOs provide the individual SHGs with assistance in obtaining benefits from DPIP itself, from state government agencies, and from commercial banks. In addition, training of SHG members in basic accounting skills and management is provided through the VOs.

The financial aspect of SHGs is to promote both savings and borrowing among their members. SHGs are not legal entities nor financial institutions, so the funds they collect are deposited in a local bank. While savings by each member is relatively small and the amount available for lending within the SHG is also small, the ultimate objective is to use these funds and the organizational infrastructure to leverage larger amounts of credit from local commercial banks, regional rural banks, and cooperative banks (Deshmukh-Ranadive 2004). The leveraging of bank credit by the SHG is done through the VO and the mandal-level MMS, which are legal entities.

Besides facilitating microfinance services, SHGs in Andhra Pradesh (and the VOs and MMSs) have another principal objective: to mobilize its members around social issues. These issues include education (particularly of girl children), day-care centers, health services, reduction

¹⁴ These evaluation surveys were financed by The World Bank.

of alcoholism (prevalent among men), and the elimination of girl-child marriage and domestic violence. These issues are addressed by demanding services from government agencies, such as education and health, and through social action campaigns in the villages.

The SHGs can also borrow funds, through their VO, from the Community Investment Fund (CIF) for different purposes: income-generating, productive physical infrastructure, and social development projects. Other services are also offered to some mandals by the poverty reduction program. One of them is life and health insurance program based in the community in order to improve preventive and ambulatory health care as well as hospitalization. Another program to improve food security is a rice credit line, initially offered only in drought-affected areas, that provides high-quality rice at lower prices than those available at local stores.

In summary, SHGs have two principal purposes and types of activities: one economic and the other social. The economic objective is to access microfinance services for low-income and low-asset households to invest in agriculture or micro-enterprises. This is done by garnering internal savings and utilizing them to leverage credit from financial institutions. The other objective is to provide and promote an organizational structure for these households to mobilize around social issues and to demand better services from state government. The purpose of the VOs and the MMSs is to facilitate SHG activities and provide them with organizational support and capacity building.

3. Empirical Methodology

3.1 Rollout of the District Poverty Initiative Programme (DPIP)

In the process of implementation, DPIP was rolled out from one group of mandals to another group of mandals. In the first group of mandals, the program was introduced in late 2000 and early 2001, whereas in the second group, it was introduced in late 2003 and early 2004. An impact and monitoring panel study of DPIP was undertaken by the Centre for Economic and Social Studies (CESS).¹⁵ For this study, the first group of mandals was called as program mandals and the second group control mandals. For these planned interventions, the simplest identification strategy to estimate the causal effects of SHG activities is to compare outcomes in the program group and the control group. However, there are several challenges in applying this methodology to DPIP because the selection of program mandals were not an intact randomized experiment (Deininger and Liu, 2013a) and thus some systematic differences between the program and control mandals were found. Deininger and Liu (2003a) by running logistic regressions showed that program-mandal households were more likely to have larger household size, more secure landownership, and a higher proportion of the very poor.

The main objective of this study is to explore the causal effects of participating in a SHG on the frequency of domestic violence. Yet, impact evaluation studies may involve two different types of selection biases: program placement bias and self-selection bias (Shimamura and

¹⁵ The Center for Economic and Social Studies (CESS) is a research center in Andhra Pradesh. The panel monitoring and evaluation study was financed by the World Bank.

Lastarria-Cornhiel 2010). In the case of DPIP, conducting impact evaluation by comparing outcomes between the program and control mandals is highly likely to suffer from program placement bias. Because the program mandals, for example, consist of a higher proportion of very poor households, differences in outcome variables can be attributed to these differences in underlying mandal-level characteristics. In addition, participation in a SHG is a household decision. Households with some specific attributes may join a SHG with a higher probability. Therefore, estimating program impact from the comparison of outcome variables between participant households and non-participant households tends to suffer from self-selection bias. The following sub-sections explain how our survey design and estimation strategy address these problems.

3.2 Surveys and Data

For this study, we utilize the data obtained from the household panel survey undertaken by the CESS for the monitoring and evaluation of the program. The first round of household survey was implemented in mid-2004 in three DPIP districts: Adilabad, Anantapur, and Srikakulam, representing different social and geographical regions of Andhra Pradesh: north coastal Andhra (Srikakulam), upland Telangana in the northwest (Adilabad), and southern Rayalaseema plains (Anantapur). The mandals selected for the survey included 15 program mandals and six control mandals. The sampling strategy of this panel survey was to randomly choose program mandals in the three districts, and in each selected mandal randomly choosing villages. In each selected village, stratified random sampling was carried out to select the households. First, based on the information

provided by the Society for Elimination of Rural Poverty (SERP), households were stratified into four economic class categories defined by monthly per capita consumer expenditures: poorest of the poor, poor, not so poor, and not poor. Then a total of 10 households were randomly selected: 4 households from the poorest of the poor, 3 from the poor, 2 from the not so poor and 1 from the not poor. A second survey was undertaken in mid-2006 to re-interview the 2004 survey households. A total of 2,639 households were interviewed in both 2004 and 2006.

Cluster randomized control trials at the mandal-level were intact. Hence, we implemented a supplementary survey in early 2007 on a random sub-sample from the DPIIP panel survey sample to collect more detailed information on microfinance activities and women's empowerment. By using the data set collected in 2004, we carefully examined mandal-level characteristics and chose treatment and control mandals (from the nearby areas in the same districts); these had similar attributes except for caste composition (Table A1 & Figure 1).¹⁶ Then, we conducted household interviews in the seven selected mandals, ending up with 415 households in 84 villages. A series of focus group discussions were also implemented to collect information on marriage practices including dowry practices and on micro-credit.

¹⁶ Table A1 shows a comparison of some household characteristics to confirm that both program mandals and control mandals surveyed had similar attributes. Most household characteristics are similar, although the proportion of each caste group is significantly different between the program and control mandals. Thus, in the multivariate regression analysis, we explicitly control for the effects attributable to each caste group by using a set of dummy variables that represent the caste group of each household.

3.3 Characteristics of Couples and Domestic Violence

Among the sampled 415 households, the number of couples is 443 of which 375 got married before the year 2000. Our impact study focuses on the couples who married before DPIIP was introduced. Comparison of their characteristics between the program and control mandals is shown in Table A1. In the program mandals, the age of husbands and wives were slightly younger, which are statistically significantly different at the 10 percent level. Nevertheless, none of their other attributes are statistically significantly different. With respect to dowry practice, 34 percent of the couples got married with dowry in the program mandals, whereas 43 percent got married with dowry in the control mandals. The difference in these figures is not statistically significant at any conventional level.

Some household characteristics across the three sample districts, however, show important differences (Table A1). The average household size decreased from 5.05 in 2004 to 4.69 in 2006, and the dependency ratio also decreased from 0.69 in 2004 to 0.63 in 2006. Households in Adilabad are larger in size and have a higher dependency ratio. Female-headed households are not common with an overall average of 4.1 percent in 2004 and 3.5 percent in 2006. Ananthapur has the lowest proportion of female-headed households while Srikakulam has the highest.

Overall, about 30 percent of the sample households are landless, and those who do own land have approximately 4 acres. At the district level, Adilabad households have more land (over 6 acres) and a lower proportion of landlessness that decreases even more between 2004 and 2006.

On the other hand, Srikakulam has smaller landholdings (about 2.5 acres) that decreased between 2004 and 2007 and a higher percentage of landless households that increased slightly over the two years.

Average ages for husbands' and wives' are similar across all three districts, ranging from early to mid-40s for husbands and late 30s to early 40s for wives. A much higher percentage of male heads have formal education (43 percent in 2004 and 37 percent in 2006) than female heads and spouses (17 percent in 2004 and 16 percent in 2006). For those that do receive formal education, levels (highest grade attained) are similar for husbands and wives across all districts.

Incidence of informal education, on the other hand, is higher for women than men (most likely due to SHG training activities), while both increased from 2004 to 2006. Ananthapur has the highest incidence of informal education for both women and men and Srikakulam has the lowest. In addition, men in Shrikakulam households have higher incidence of informal education although women's rate almost reaches that of men in 2006. In Adilabad, both men and women greatly increased their participation in informal education between 2004 and 2006, and the percentage of men that obtained informal education actually surpassed the percentage of women. Informal education plays an important role in a population where a large percentage of the adult population, particularly women, does not have formal education.

The questionnaires were prepared for male and female respondents respectively and the interviews were administrated separately. Before the interview, the confidentiality of the information obtained from the surveys, particularly between couples, was emphasized. The

frequency of domestic violence was elicited by asking the question “Are you ill treated/beaten by your husband?” The answers were measured in the four level scales; 3: Always, 2: Sometimes, 1: Rarely, and 0: None. The information for 2001 was obtained by retrospectively asking the same question in the 2004 survey. The frequency of domestic violence in 2001 between the program and control mandals does not show any significant difference.

3.4 Identification Strategy

There are several challenges in conducting impact evaluation of SHG participation with the data available to us. First, the first survey was conducted in 2004, which was after the introduction of the DPIP, even in the control mandals. As a result, even in the 2004 survey some households in the control mandals were already a member of a SHG, resulting in contamination. For this reason, it is difficult to estimate the SHG participation effect. In addition, because there were some deficits in implementing the DPIP in a randomized matter, systematic differences might exist between the program and control mandals. As already mentioned, there are two major concerns for impact evaluation: one is program placement bias and the other is self-selection bias.

In this study, both biases are highly likely to be involved. For the program placement bias, by comparing underlying characteristics at the mandal levels, we confirm that the program mandals and control mandals in our sub-sample are similar in terms of at least some observable household socio-economic characteristics, inferring that trends are common between the program mandals and control mandals. For the self-selectin bias, then, we utilize program placement as an

instrumental variable.

By the time of the second round of survey in 2006, SHGs were present in nearly the entire state, including the control mandals, and other microfinance institutions were increasingly servicing rural areas. It was not possible, therefore, to have matching treatment and non-treatment areas for the 2006 survey and the 2007 sub-sample survey. However, most SHG participants in the control mandals had been members for less than 1 year, while the majority of SHG participants in the program mandals had been members for more than 2 years at the time of the first-round survey in 2004. Therefore, it is possible to compare the outcomes of longer-term participants in the program mandals to those of the shorter-term participants in the control mandals. For this reason, this study focuses on the effects of participating in a SHG for more than two and half years, which is the same approach employed by Deininger and Liu (2003a). With respect to the time duration, we consider the following three different time durations: 1) a shorter-term period between 2001 and 2004, 2) another shorter-term period between 2004 and 2006, and 3) an overall long-term period from 2001 through 2006. Note that about half of the households in the control mandals joined SHGs at the time of the second round survey in 2006. If short-term participation had any effect, our estimates would suffer from biases. However, as described in the previous section, SHG activities evolved sequentially and developed gradually. Thus, it is unlikely that short-term participation has any significant impact.

For the reason mentioned above, we consider participation in a mature SHG that has been active for more than two and half years. Table 1 shows how participation rates in SHGs for at least

two and half years have changed in the program mandals and control mandals. The DPIP program was introduced in the program mandals between late 2000 and early 2001 and the participation rate increased to 52.4 percent in 2004 and further increased to 65.9 percent in 2006. In the control mandals, DPIP was introduced between late 2003 and early 2004; the participation rate in 2001 was 5.9 percent and the participation rate increased to 55.9 percent in 2006.¹⁷ During the corresponding periods, DPIP credit use levels among SHG members also increased. The percent of households accessing DPIP credit increased to 36 percent in 2004 and 48 percent in 2006 (Table A2). Loan disbursement expanded very rapidly, and credit uptake in the program mandals was higher than that of the control mandals in 2004, whereas the credit uptake rate in the control mandals in 2007 was almost the same as in that of the program mandals.

In this study, we intend to conduct intention-to-treat (ITT) analysis and also average treatment effect (ATE) analysis. The basic idea of identifying the causal effect of participating in a SHG on domestic violence is to employ a double difference methodology. By taking a first difference of outcome variables over time, biases caused by any time-invariant unobserved characteristics can be eliminated. In the ITT analysis, if time-variant unobserved characteristics are correlated with program placement and with the time trend of the frequency of domestic violence, our estimates still tend to suffer from placement bias. Yet, by comparing many mandal and household characteristics we claim that any possibility of such bias is unlikely (Table A1). In

¹⁷ 5.9 percent of the households in the control mandals that used to be a member of the pilot program, i.e., DWCRA, and thereafter converted into a member of the DPIP program are considered as a participant in a SHG for more than two and half years in 2004.

the ATE analysis, furthermore, if time-variant unobserved household-level characteristics are associated with both household decisions about SHG participation and the time trend of the frequency of domestic violence, estimates obtained from running OLS regressions are highly likely to suffer from self-selection bias. For the problem of self-selection bias, we employ two stage least squared (2SLS) regression models by using program placement as an instrumental variable.

4. Intention-to-treat (ITT) Analysis

4.1. DPIP and Domestic Violence

Table 2 shows that the SHG participation rate in total increased to 39.7 percent in 2004 and 63.2 percent in 2006. Table 2 also shows how the frequency of domestic violence changed over time along with the expansion of the DPIP program in the three districts and provides a comparison of the pattern of the time trends between SHG participants and non-participants. There seem to be no significant difference between the two groups in the frequency of domestic violence, yet this simple comparison does not give us any causal inference.

Table 2 furthermore compares the pattern of time trends in the frequency of domestic violence between the program and control mandals. In the program mandals, the frequency of domestic violence decreased by 0.220 between 2001 and 2004 and then increased by 0.238 between 2004 and 2006. In the control mandals, on the other hand, it declined by 0.020 between 2001 and 2004 and further decreased by 0.010 between 2004 and 2006. Using these figures, we first implement the ITT analysis. The estimates of the ITT analysis are -0.200 between 2001 and

2004 (significant at the 1 percent level) and 0.248 between 2004 and 2006 (significant at the 5 percent level). These estimates show that the presence of DPIP in the program mandals for approximately two and a half years reduced the frequency of domestic violence, but after another two and a half years, in total five years, the presence of DPIP in the program mandals resulted in an increase in the frequency of domestic violence.¹⁸ The longer-term effect of the longer-term presence of DPIP in the program mandals is 0.048, which is not statistically significant at any conventional levels.

4.2. DPIP and Domestic Violence with Consideration of Dowry

We next implement the ITT analyses with consideration of dowry, meaning that we implement one ITT analysis among those who got married without dowry before the year 2000 and another ITT analysis among those who got married with dowry before the year 2000. The SHG participation rate among those who married without dowry was 39.2 percent in 2004 and 61.2 percent in 2006, while it was 40.6 percent in 2004 and 66.7 percent in 2006 among those who married with dowry. The participation rates in SHGs among those who got married with dowry were slightly higher compared to those who got married without dowry.

Further ITT analyses reveal that, with the exception of a slight decrease in the frequency

¹⁸ The ITT estimate between 2004 and 2006 is obtained by a comparison between the program mandals where the DPIP had been present for approximately five years and the control mandals where the DPIP had been present for about two and half years. If the presence of DPIP for two and half years in the control mandals also reduced the frequency of domestic violence, our estimate is highly likely to be biased upward. Yet, it seems that such a reduction is unlikely to be materialized in the control mandals because the evolution of SHG activities in the control mandals was much faster and faster loan disbursement was also made in the control mandals.

of domestic violence between 2001 and 2004 (significant at the 10 percent level), no major significant ITT effects can be found among those who married without dowry (Table 3). In contrast, the ITT estimates are -0.292 (significant at the 1 percent level) and 0.433 (significant at the 5 percent level) among those who married with dowry. The ITT effects are more evident among those who got married with dowry before the year 2000. These ITT estimates are crude estimates because not all households residing in the program mandals joined a SHG. Therefore, further elaboration in our estimation methodologies is required so that we can have more precise estimates for the effects of actual participation in a SHG, although the average treatment effect can be underestimated if SHG participation has any spillover effect on non-participant neighbors in the same mandal.

5. Average Treatment Effect Analysis

5.1. Empirical Model

The average treatment effect of the SHG participation on the frequency of domestic violence is estimated by the 2SLS estimation methodology. The dependent variable of the first stage regression is SHG_i that takes the value of 1 when a wife in the household i participates in a SHG for more than two and half years as of 2004 and continued to be a member until 2006. Otherwise, SHG_i takes the value of 0. We use the program placement as an instrumental variable. The first stage linear probability model is shown below.

$$(1) \quad SHG_i = X_{1i}\beta_1^{SHG} + X_{2i}\beta_2^{SHG} + \gamma \cdot Z_i + \varepsilon_i^{SHG},$$

where X_{1i} denotes a vector of wife's and husband's attributes such as age and education level and X_{2i} denotes a vector of household characteristics including a set of dummy variables that represent the caste group the household i belongs to and the district the household i resides in. Z_i is the instrumental variable that takes the value of 1 when the household i resides in a program mandal and 0 when the household i resides in a control mandal. The valid instrument must satisfy two conditions; 1) it should be correlated with SHG_i and 2) should not be correlated with ε^{SHG} . The first condition will be tested later and the second condition is assumed to hold from the fact that the program and control mandals have balanced characteristics except caste attribute. β^{SHG} s and γ s are parameters to be estimated and the error term ε^{SHG} is assumed to be i.i.d.

The second stage regression model is shown below.

$$(2) \Delta DV_i = \delta \cdot SHG_i + X_{1i}\beta_1^{DV} + X_{2i}\beta_2^{DV} + \varepsilon_i^{DV},$$

where ΔDV_i is a change in the frequency of domestic violence over time and SHG_i is the predicted value from the first stage regression. The parameter of interest is δ , the average treatment effect of participating in a SHG on the change in the frequency of domestic violence. X_{1i} denotes a vector of wife's and husband's attributes and X_{2i} denotes a vector of household characteristics and include a set of caste and district dummy variables. β^{DV} s are parameters to be estimated and ε_i^{DV} is an i.i.d. error term.

5.2. Estimation Results

Before we show the estimation results, the summary statistics of the explanatory variables

ae presented in Table 4. The average wife's age is 38.0 years old and the average husband's age is 43.8 years old. As much as 83 percent of the wives received no formal education and only 9 percent achieved more than five years of formal education. The education levels of the husbands are better compared to wives. While 56 percent received no formal education, 21 percent completed more than five years of formal education. The average household size is 4.76 (1.56 in the log value). 34 percent of the households are landless. The average land size among the landholders is 2.90 acres (1.06 in the log value). The classification of the initial economic conditions are four categories: 37 percent of poorest of the poor, 31 percent of the poor, 21 percent of not-so-poor, and 12 percent of non-poor. Lastly, with respect to caste and ethnicity, 15 percent belong to scheduled caste, 19 percent are scheduled tribe, 52 percent are categorized into other backward caste groups, and 13 percent are other caste groups.

The estimation results of the first stage regression are presented in Table A3. We can confirm that being a program mandal indeed is associated with participation in a SHG for more than two and half years in 2004. The estimation results of the ATT analysis are shown in Table 5. Firstly, OLS does not show any statistically significant associations between SHG participation and changes in the frequency of domestic violence. By contrast, the ATT analysis with the instrumental variable reveals that participating in a SHG for slightly more than two and half years reduced the frequency of domestic violence (between 2001 and 2004 in Panel A) by 0.368, which is statistically significant at the 5 percent level. Then, SHG participation for almost 5 years increased the frequency of domestic violence (between 2004 and 2006 in Panel A) by 0.597, which

is statistically significant at the 5 percent level. The point estimate of the net effect of long-term participation in a SHG between 2001 and 2006 is 0.229, which is not statistically significant at any conventional levels.

The decline in the frequency of domestic violence in the shorter period can be attributed to several behavioral changes due to SHG participation for slightly more than two and half years. The increased income even in the shorter run might relax tension between a wife and a husband by improving financial conditions of the household, although any improvement in women's empowerment may fear husband's authority and raise tension between the wife and the husband. Yet, before the SHG activities become mature enough, particularly before access to credit improves significantly, women's empowerment could positively contribute to better relationship between a wife and a husband. The husband might expect that the likelihood of obtaining new loans from SHGs and/or commercial banks in the near future was higher by wife's joining a SHG. If so, the husband might refrain from beating his wife by expecting a future claim to better access to credit through wife's SHG participation even when women's autonomy (such as more likelihood of being involved in self-employed income generating activities and also more mobility) for example improves substantially in the short run. Nonetheless, after wife's obtaining new loans in reality, the husband may in reality claim the right to influence the use of the loans (Table A4). If this is the case, the tension between the wife and the husband would rise and result in more frequent domestic violence.

This study furthermore examines these tendencies about the effects of SHG participation

on the frequency of domestic violence by the status of dowry practices implemented before the year 2000. Firstly, Panel B in Table 5 shows no significant effect of wife's participating in a SHG among those who got married without dowry before 2000. Secondly, in contrast, Panel C in Table 5 reveals that the impact of SHG participation on the frequency of domestic violence was more salient among those who got married with dowry before 2000. Among such households, participating in a SHG for slightly more than two and half years decreased the frequency of domestic violence (between 2001 and 2004 in Panel C) by 0.587, which is statistically significant at the 5 percent level. SHG participation for approximately 5 years increased the frequency of domestic violence (between 2004 and 2006 in Panel C) by 0.930, which is statistically significant at the 5 percent level. The estimated net effect of participating in a SHG for a longer period between 2001 and 2006 is 0.343, which is not statistically significant at any conventional levels.

6. Conclusions

This paper explored the impact of SHG participation on the frequency of domestic violence. We have found that, while SHG participation reduced domestic violence in the short-run, i.e., around two and half years, longer-term participation, i.e., approximately 5 years, raised the frequency of domestic violence. We conjecture that, while the decline in the frequency of domestic violence during the shorter period is attributable to women empowerment due to their social action activities without substantial improvement of access to credit, the increase in the frequency of domestic violence in the long-run can be attributed to an improved access to microfinance services,

namely actual credit uptake from commercial banks.

This study furthermore examined if the impact was heterogeneous depending on dowry practice. We have found that the impact of SHG participation on the frequency of domestic violence was more salient among those who got married with dowry before the year 2000. Some past studies find a negative correlation between the amount of dowry payment and domestic violence, which is interpreted as higher amount of dowry is paid for securing the safety of a bride in a new household (Bloch & Rao 2002, Srivivasan 2007). In addition, Chan (2014) argues that dowry is paid for various purposes and one of them is interpretable as before death asset transfers from bride's parents to the bride. As these studies suggest, there seem to exist diverse motives to maintain dowry practices. In addition, Block & Rao (2002) find an association between the wealth level of bride's parents and domestic violence. They interpret such an association as evidence that husbands who once received dowry use domestic violence to threaten bride's parents to make further asset transfer from bride's family to his family.

Finally, it appears that poverty alleviation programs based on women's SHGs in India have dwindled since Microfinance Crisis in 2010. On the other hand, various alternative policy initiatives have been undertaken towards the achievement of financial inclusion. Pradhan Mantri Jan-Dhan Yojana, for example, encourages every individual to open a bank account. The implications drawn from this study suggest that any improvement of access to financial services by wives can have risk of having a side effect in the form of physical abuse by husbands in patriarchal society. Moreover, the magnitude of the side effect is much larger among those who

got married with dowry. These findings of this study provide a very crucial insight into the consequences of improvement of access to financial services and women empowerment with policy makers who are responsible for the achievement of financial inclusion and poverty alleviation.

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Table 1: Sampled Households and Self-Help Group (SHG) Participation Rates

Type of mandal	DPIP stating year	Number of mandals	Number of sampled households	Participation rates in mature SHGs (%)	
				2004	2006
Program Mandal	2000-2001	15	297	52.4	65.9
Control Mandal	2003-2004	6	118	5.9	55.9
All		21	415	39.7	63.2

Note: DPIP stands for District Poverty Initiative Program. Mature SHGs are defined as a group that has been active for at least two and half years since its formation.

Table 2: Intention-to-Treat (ITT) Effect Analysis of Domestic Violence

	SHG	Domestic Violence (Frequency)				Difference
	participation rate (%)	SHG participants	Non-participants	Program mandal	Control mandal	
Panel: Couples who got married before year 2000						
Obs.	375			273	102	
2001	0		0.480	0.502	0.422	0.080
2004	39.7	0.295	0.327	0.282	0.402	-0.120*
2006	63.2	0.477	0.500	0.520	0.392	0.128
ITT Analysis (DID)						
2001-2004				-0.220	-0.020	-0.200***
2004-2006				0.238	-0.010	0.248**
2001-2006				0.018	-0.029	0.048

Note: Frequency of domestic violence is measured by a four-level scale: 3 = Always; 2 = Sometimes; 1 = Rarely, and 0 = None.

Cluster adjusted standard errors are in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3: Intention-to-Treat (ITT) Effect Analysis of Domestic Violence with Consideration of Dowry

	SHG participation rate (%)	Domestic Violence (Frequency)				Difference
		SHG participants	Non-participants	Program mandal	Control mandal	
Panel A: Couples who got married before year 2000 without dowry						
Obs.	237			179	58	
2001	0		0.506	0.542	0.397	0.145
2004	39.2	0.366	0.292	0.324	0.310	0.014
2006	61.2	0.476	0.500	0.520	0.379	0.140
ITT Analysis (DID)						
2001-2004				-0.218	-0.086	-0.132*
2004-2006				0.196	0.069	0.127
2001-2006				-0.022	-0.017	-0.005
Panel B: Couples who got married before year 2000 with dowry						
Obs.	138			94	44	
2001	0		0.435	0.426	0.455	-0.029
2004	40.6	0.179	0.390	0.202	0.523	-0.321***
2006	66.7	0.478	0.500	0.521	0.409	0.112
ITT Analysis (DID)						
2001-2004				-0.223	0.068	-0.292***
2004-2006				0.319	-0.114	0.433**
2001-2006				0.096	-0.045	0.141

Note: Frequency of domestic violence is measured by a four-level scale: 3 = Always; 2 = Sometimes; 1 = Rarely; and 0 = None.

Cluster adjusted standard errors are in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Summary Statistics of Explanatory Variables

	Mean	Standard Deviation	Min.	Max.
Obs. 375				
<i>Characteristics of couples</i>				
Wife's Age	38.0	11.2	19	70
Wife's Education: No education (=1)	0.83	0.38	0	1
Wife's Education: Class1~5 (=1)	0.08	0.27	0	1
Wife's Education: Above Class5 (=1)	0.09	0.29	0	1
Husband's Age	43.8	12.1	22	85
Husband's Education: No education (=1)	0.56	0.50	0	1
Husband's Education: Class1~5 (=1)	0.23	0.42	0	1
Husband's Education: Above Class5 (=1)	0.21	0.40	0	1
<i>Characteristics of Households</i>				
log(household size)	1.56	0.36	0.69	2.56
Landless (=1)	0.34	0.47	0	1
log (land size in acres)	1.06	0.89	-2.30	3.42
<i>Economic Status in 2000</i>				
Poorest of the poor (=1)	0.37	0.48	0	1
Poor (=1)	0.31	0.46	0	1
Not so poor (=1)	0.21	0.41	0	1
Non-poor (=1)	0.12	0.32	0	1
<i>Caste</i>				
Scheduled Caste (=1)	0.15	0.36	0	1
Scheduled Tribe (=1)	0.19	0.39	0	1
Other Backward Caste (=1)	0.52	0.50	0	1
Other Caste (=1)	0.13	0.34	0	1

Table 5: Average Treatment Effect (ATE) Analysis on Domestic Violence

Dependent Variable:	OLS			2SLS		
Change in the frequency of domestic violence	2001-2004	2004-2006	2001-2006	2001-2004	2004-2006	2001-2006
PANEL A: All Households						
Participation in mature SHGs in 2004(=1)	-0.107* (0.058)	0.043 (0.108)	-0.064 (0.110)	-0.368** (0.172)	0.597** (0.303)	0.229 (0.269)
<i>Control variables</i>	Included	Included	Included	Included	Included	Included
Number of observations	375	375	375	375	375	375
PANEL B: Households without dowry payment before 2000						
Participation in mature SHGs in 2004(=1)	-0.106 (0.084)	-0.071 (0.113)	-0.176 (0.123)	-0.126 (0.241)	0.459 (0.374)	0.333 (0.415)
<i>Control variables</i>	Included	Included	Included	Included	Included	Included
Number of observations	237	237	237	237	237	237
PANEL C: Households with dowry payment before 2000						
Participation in mature SHGs in 2004(=1)	-0.122 (0.074)	0.25 (0.195)	0.128 (0.178)	-0.587** (0.265)	0.930** (0.450)	0.343 (0.318)
<i>Control variables</i>	Included	Included	Included	Included	Included	Included
Number of observations	138	138	138	138	138	138

Note: Dependent variable is a change in frequency of domestic violence. Frequency of domestic violence is measured by a four-level scale: 3 = Always; 2 = Sometimes; 1 = Rarely; and 0 = None.

Cluster adjusted standard errors are in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

**Table A1: Comparison of Household Socio-economic Characteristics
between Program and Control Mandals**

Variables	Program mandals	Control mandals	Difference
Number of observations	273	102	
<i>Characteristics of couples</i>			
Wife's Age	37.4	39.7	-2.26*
Wife's Education - No education (=1)	0.83	0.83	0.00
Wife's Education - Class1~5 (=1)	0.08	0.09	-0.01
Wife's Education - Above Class5 (=1)	0.10	0.08	0.02
Husband's Age	43.2	45.5	-2.32*
Husband's Education - No education (=1)	0.58	0.53	0.05
Husband's Education - Class1~5 (=1)	0.23	0.25	-0.02
Husband's Education - Above Class5 (=1)	0.20	0.23	-0.03
<i>Characteristics of Households</i>			
Household size	5.14	4.88	0.26
Landless (=1)	0.33	0.37	-0.04
Land size in acres	3.36	2.59	0.77
Dowry (=1)	0.34	0.43	-0.09
Frequency of domestic violence in 2001	0.50	0.42	0.08
<i>Caste</i>			
Scheduled Caste (=1)	0.12	0.25	-0.14***
Scheduled Tribe (=1)	0.25	0.05	0.20***
Other Backward Caste (=1)	0.55	0.44	0.11*
Other Caste (=1)	0.09	0.25	-0.17***

Note: t-test results are shown; * significant at 10%; ** significant at 5%; *** significant at 1%.

Frequency of domestic violence is measured by a four-level scale: 3 = Always; 2 = Sometimes; 1 = Rarely; and 0 = None.

Table A2: Participation in Self-Help Groups and Credit Uptake

Type of mandal	Participation rates in SHGs (%)		DPIP credit use levels among SHG members(%)		
	2004	2006	2004	2006	2007
Program Mandal	58.6	65.9	43.1	52.8	51.1
Control Mandal	40.2	55.9	9.8	36.8	43.9
All	53.6	63.2	36.3	48.9	49.4

Note: DPIP stands for District Poverty Initiative Program.

Table A3: Associated Factors with Participation in Mature Self-Help Groups

Dependent Variable: SHG participation (=1)	Linear Probability Models		
	All couples	Couples who got married before year 2000 without dowry	Couples who got married before year 2000 with dowry
<i>Characteristics of couples</i>			
Wife's Age	0.054** (0.025)	0.080** (0.029)	-0.004 (0.058)
Wife's Age squared ×10 ⁻³	-0.497 (0.337)	-0.733* (0.352)	0.194 (0.781)
Wife's Education Class1~5 (=1)	-0.041 (0.080)	-0.031 (0.122)	-0.091 (0.101)
Wife's Education Above Class5 (=1)	-0.120* (0.060)	-0.096 (0.155)	-0.142 (0.088)
Age (Husband)	-0.044** (0.021)	-0.062** (0.028)	-0.003 (0.051)
Husband's Age squared ×10 ⁻³	0.336 (0.249)	0.481 (0.285)	-0.103 (0.581)
Husband's Education Class1~5 (=1)	0.003 (0.029)	-0.041 (0.038)	0.079 (0.092)
Husband's Education Above Class5 (=1)	0.041 (0.081)	0.112 (0.129)	-0.054 (0.101)
<i>Characteristics of households</i>			
log (household size)	-0.019 (0.088)	0.001 (0.086)	-0.152 (0.151)
Landless (=1)	-0.045 (0.043)	-0.011 (0.055)	-0.095 (0.108)
log (land size in acres)	-0.001 (0.031)	0.048 (0.035)	-0.062 (0.046)
<i>Economic Status in 2000 (Reference group is non-poor)</i>			
Poorest of the poor (=1)	0.060 (0.064)	0.143 (0.083)	-0.112 (0.116)
Poor (=1)	0.041 (0.065)	0.069 (0.071)	-0.024 (0.122)
Not so poor (=1)	0.077 (0.074)	0.087 (0.106)	0.010 (0.120)
<i>Caste (Reference group is other caste)</i>			
Scheduled Caste (=1)	0.032 (0.074)	-0.038 (0.099)	0.040 (0.113)

Scheduled Tribe (=1)	0.211*	0.219*	0.208
	(0.104)	(0.121)	(0.143)
Other Backward Caste (=1)	0.006	-0.001	-0.045
	(0.066)	(0.072)	(0.112)
<i>Mandal</i>			
Program Mandal (=1)	0.432***	0.388***	0.497***
	(0.067)	(0.071)	(0.083)
<i>District</i>			
Ananthapur (=1)	-0.012	-0.055	0.032
	(0.073)	(0.073)	(0.122)
Adilabad (=1)	0.068	0.018	0.101
	(0.089)	(0.078)	(0.164)
R-square	0.249	0.267	0.309
Number of observation	375	237	138

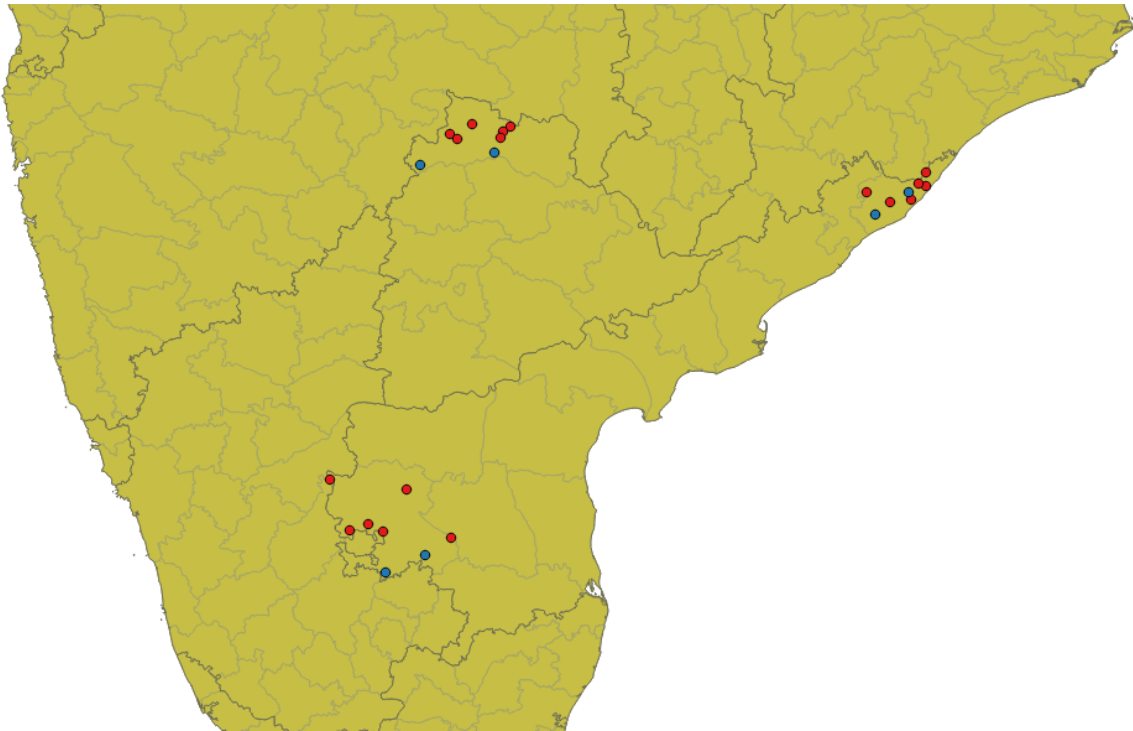
Note: Dependent variable is a dummy variable that takes the value of 1 if the household is a participant household in a SHG.

Cluster adjusted standard errors are in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A4: The Relationship between Domestic violence and Credit Sources of Women

SHG Participants(n=248)							SHG Non-Participants(n=127)	
	Credit from DPIP				Credit from other sources	No Credit	Credit from other sources	No Credit
	Women only	Jointly	Husband only	Others				
Obs.							27	100
2001	0.34	0.60	0.40	0.5	0.59	0.48	0.37	0.46
2004	0.21	0.42	0.13	0.5	0.31	0.28	0.19	0.39
2006	0.48	0.46	0.37	0.75	0.66	0.42	0.52	0.52
2001-2004	-0.14	-0.18	-0.27	0	-0.28	-0.19	-0.19	-0.07
2004-2006	0.28	0.05	0.23	0.25	0.34	0.14	0.33	0.13
2001-2006	0.14	-0.14	-0.03	0.25	0.06	-0.06	0.15	0.06

Figure 1: Location of Program and Control Mandals in Andhra Pradesh



Note: In program mandals (in red), District Poverty Initiative Program (DPIP) started in the late 2000 or early 2001, whereas DPIP started in 2003 or 2004 in control mandals (in blue).