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Do NGOs Make a Difference: A Case Study of Rural Rajasthan

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Do NGOs Make A Difference?

A Case Study of Rural Rajasthan

An empirical analysis of effects of NGO interventions on health and education of women and girls in rural Rajasthan employs an original micro data set to address criticisms of NGO effectiveness. Isolating the effects of the NGO's programs from personal and household characteristics (caste, religion, income, wealth, landowning status, family composition and literacy) and from village fixed-effects, significant positive effects on women and girls of several indicators of health, knowledge about health, fertility and literacy rates are found. Substitution effects between governmental and NGO services are minimal. The paper also evaluates the cost-effectiveness of the NGO programs.

Keywords: Development, Health, Human Capital, Women, Asia, India

I. Introduction

For years it has been widely assumed that Non-governmental Organization (NGO) projects have significant positive effects on poor households in developing nations. However, a number of recent empirical studies have questioned the claims about effectiveness of NGO intervention in local communities.¹ Some of the criticism has addressed the issue of lack of appropriate evaluation of programs, particularly when it is performed at a distance by donor agencies that may not be sensitive to local needs.² The lack of evaluation of micro or village level programs often seems to be a result of the failure of local NGOs to engage in systematic self-evaluation.³ This is particularly unfortunate

since self-evaluation and effectiveness may be inter-twined, particularly when downward accountability that employs feedback from the program recipients both empowers them and improves the program.⁴

Many of these critiques have focused on programs for broad poverty alleviation or economic growth rather than on more targeted goals, such as improving female health or educational attainment. The latter are particularly important in parts of the world such as rural Rajasthan where there is widespread discrimination against women and girl children. Improving female health and literacy is widely regarded to be one of the most important means of reducing poverty in India,⁵ and there is evidence that NGOs may have advantages over governments in programs that target health and education.⁶

A distinction needs to be drawn, however, between NGOs that work through governments and those that operate independently. In both cases whether NGOs are merely providing substitutes for programs that governments would otherwise supply is a legitimate concern.⁷

This paper examines the effects of a local NGO, the Rajdadiji-Veerni Project, “the NGO”, that has worked largely independently of the Indian government to promote female health and literacy in a group of villages near Jodhpur in Western Rajasthan.⁸ This is an area that suffers from a lack of attention from the government in New Delhi and which is not well served by large international NGOs.⁹ At the time of the study, the Veerni Project was operating in 16 villages. Its programs included weekly visits from mobile medical clinics, health education classes, and primary level classes for children in arithmetic and reading conducted in each village. There were virtually no substitution effects between government programs and those of the NGO, since no government schools or health centers were in operation in any of the villages. Most girls were not allowed by

their families to go outside their own village for schooling in this very socially conservative region and most women could not afford medical services that were not locally available.

To assess the effects of the Veerni Project (Veerni means “empowerment” in Hindi) an original data set was constructed by means of a household survey in nine villages, distinguished from each other by degree of NGO intervention. Three villages in the sample had no help from the Veerni Project, three had had programs for 2-3 years, and three had received help from the NGO for 6-10 years at the time of the survey. The random samples of adult women and of adolescent girls provide a rich data source that includes information about personal and family socio-economic characteristics, education levels, and detailed medical information for each respondent. This permits analysis which isolates the net effects of the NGO interventions.

Two questions need to be answered in studying NGO effectiveness, the second conditional on the outcome of the first. (1) Is there evidence that the NGO has brought about significant changes in the well-being of the treated population? And, if so (2) What is the cost and the resulting cost-effectiveness of the NGO programs? This study finds significant positive effects of the NGO programs on some measures of health and knowledge about health for both adult women and adolescent girls, and positive effects on the literacy of adolescent girls. Consequently, the issue of the cost effectiveness of the programs will also be addressed in the second part of this paper.

II. The Analysis

A. The Research Design

The aim of the research is to isolate the effects of the Veerni Project on the well being of women and girls, controlling for a vector of personal characteristics (including age, birth-

order, marital status, reproductive history) family characteristics (income, wealth, caste, religion, education levels of other family members, family composition, number of male and female children or siblings) and environment (village fixed effects).

In the underlying model, standard assumptions are made about the household's utility functions, e.g. that utility is increased when wives and daughters are healthier, and that utility is derived from services provided by wives or daughters. Utility functions are permitted to be either unitary or cooperative. Since these are households in rural farming villages, the most appropriate model is a household-farm model.¹⁰ In this type of model the household is assumed to make interdependent decisions about production, labor allocation, and consumption. The main difference from "urban" household models is that the household's budget is treated as endogenous, since it depends upon production decisions that affect income from farming.¹¹ Although this leads to potentially serious problems in an econometric analysis that treats allocation of resources to education and health as dependent upon a set of exogenous variables, the cross-sectional analysis in this paper assumes simplified underlying objective functions in which production decisions are made in time periods preceding consumption decisions. The budget constraints include cash income, time inputs of family members, and endowments of productive inputs (chiefly land and farm animals).

Costs to the household of a member receiving health care and education can include both direct costs and opportunity costs of time. The NGO programs involve no direct costs to households because the health care and schooling provided locally require no user fees. Travel time to receive services within these small villages is negligible. The most important cost remaining is the time spent by girls attending school.

Estimating equations are of general form:

Dependent Variable = f (NGO effects, personal characteristics, family characteristics, village fixed effects)

Probit estimating equations were used when the dependent variable was a dummy (1/0) variable.

Probits are of general form:

$$p(i) = \beta(1) + \beta(2)x(i2) + \dots + \beta(k)x(ik) + u(i)$$

where $p(i)$ is interpreted as the probability of woman or girl (i) having a particular characteristic.

OLS regressions were estimated for continuous dependent variables. They are of general form:

$$Y(i) = a + B_1X_1(i) + \dots + B_kX_k(i) + \mu(i)$$

where $Y(i)$ is the value of woman or girl (i)'s characteristic (such as number of children she has born, her BMI, or haematocrit level).

Unfortunately, data were not collected until years after the NGO interventions had commenced. Therefore, the difference in difference methodology can not be employed in this study.

B. The Data

In order to assess the effectiveness of the Veerni Project on women's health, fertility, literacy, and knowledge about health and disease prevention, a new data set was compiled. It consists of stratified random samples of approximately 1000 adult women and approximately 900 adolescent girls, collected in a subset of nine villages.¹² Three villages that had experienced 6-10 year (long-term) NGO intervention, three that had benefitted from 2-3 year (short-term) NGO intervention, and three that had no Veerni Project intervention were randomly chosen from among the larger sets of

villages clustered in the region, and individual households within villages were also chosen randomly.¹³ The same proportion of women and girls (compared to village populations) were surveyed in each of the villages. It is important to note that all women and girls living in Veerni Villages are eligible to participate in the NGO's programs, and serious attempts are made to assure universal access.

The villages are very similar in climate and in socio-economic level. All are poor farming villages located in an arid climate with a chronic water shortage. No pipelines connect the villages with external water sources, so usable water is limited to what can be collected in local ponds or *nardis*. The data were collected in the Spring of 2004, with the same households reinterviewed in the Fall of 2005 in order to obtain more information about male literacy, specifically, education levels of husbands and fathers.

Separate samples were constructed for adult females (over age 18) and for adolescent girls (10-18 years of age). Information was obtained from personal interviews, health histories, and medical examinations conducted at the time of the interviews. Professional medical laboratory analysis of the blood work was used to obtain the haemoglobin and haematocrit levels. For the adolescent girls, all respondents are either eldest or only daughters in a family. This should provide a lower bound estimate of access to schooling since eldest daughters are the least likely to be allowed to go to school, given their usefulness in caring for younger siblings and in farm and house work.

This study can be described as "quasi-experimental". Although the existence of a group of similar villages that differ primarily by degree of NGO intervention provides something akin to a natural experiment, there may be some degree of selection bias in how villages became or did not become part of the Veerni Project. In the early 1990s, a group of villages with a high level of need

were identified and the Project was initiated. Over time as more money was raised, villages were added, partly on the basis of convenience of location, since the mobile medical unit and social workers visit several villages in the same day in order to provide weekly contact in each of the 16 Veerni villages. The large number of control variables used in the estimating equations should, however, adjust for any differences in factors that might be correlated with extent of NGO assistance. Village fixed effects are also included.

In 2004, at the time of the main data collection, there were no observable significant differences among the three sets of villages with respect to average monthly household incomes, family size, number of sons per family, literacy rates of adult women, or proportion of villagers who were members of the two lowest castes (dalit and scheduled tribal). There was a slightly higher proportion of land owning families in the control villages that had not received NGO help.¹⁴ The following table of descriptive statistics gives a picture of the socio-economic and demographic characteristics of the girls and women in the villages.

C. The Variables

The following variables were used in the empirical analysis.

1. Village fixed-effects: Dummy variables identify village of residence. Eight (n-1) variables are included in the estimating equations.

2. Veerni (NGO) fixed-effects: Three dummy variables are used to measure the effect of the Veerni Project: No Veerni presence, long-term presence, and short-term presence of the Veerni project. In most estimating equations, the base category is “No Veerni Presence” and attempts are made to distinguish between the effects of both longer and shorter-run NGO intervention.

3. Social status: Four dummy variables measure effects of caste and religion: Each of the three lower castes (scheduled castes, dalit; scheduled tribal; and other backward castes, OBC) and Muslim religion were singled out for comparison with general caste and Hindu religion.

Interaction terms between low caste and NGO presence, long- and short-run are also used in some specifications. 'NGOLcaste' is a dummy variable which takes a value of 1 if a girl is both a member of one of the designated lower castes and lives in a village which has had long-term Veerni Project help. 'NGO1Lcaste' takes a value of 1 if she lives in a village which has had Veerni Project intervention for 2-3 years and is a member of a lower caste.

4. Economics status: Several variables are used to measure income and wealth. Head-of-family monthly income (in rupees) is used to approximate household income,¹⁵ and the presence of electricity in the home is used as an indirect measure of wealth. (For some tests, where access to information was thought to be an important determinant of behavior, an additional variable "has radio/TV" is included.) A measure of total wealth was constructed by summing the value of farm land owned and the value of farm animals owned by the household, each valued at its market price in a given village.

5. Household characteristics: Family size and/or number of children in a family are used to adjust family income for the number of people sharing the budget and also as an indicator of the cost to the family of a daughter's time spent in school. Both family size and number of children were used in some estimating equations since many of these households consist of multi-generational and/or joint families. Effects of number of sisters and number of brothers were considered separately when adolescent girls were studied.

6. Human Capital Variables: Literate/illiterate was used, since many of the girls and women

had not received formal schooling other than the NGO sponsored classes and the majority had not gone beyond primary education. Literacy is measured by a dummy variable, coded "1" if literate. For the adolescent girls, both own-literacy and mother's and father's literacy status were used. For the adult women, husband's literacy was also considered.

Knowledge about health was measured by a yes/no variable, 'knows how HIV/AIDS is transmitted'. This can be interpreted as "probability that an individual had such knowledge." This variable was used as an indicator of sophistication about health and disease since all health education classes for both women and girls included information about transmission of HIV, a disease that is unfortunately becoming less uncommon in these remote villages.

7. Marital status: For adult women, the status 'married' is distinguished from single, widowed, or divorced. For adolescent girls, married, effectively married, and unmarried are distinguished in the data. An effectively married girl is one who has had a marriage ceremony and gone to live in the home of her husband's family. 'Married' includes being betrothed and being effectively married.

III. The Findings

(A) Effect of NGO Intervention on Fertility of Adult Women

The presence of the Veerni Project, both long- and short-run, was associated with lower fertility. Significant negative effects on number of children ever born to a woman and number of living children, were observed when the NGO effect was isolated from environmental (village) effects, family socio-economic status, and personal characteristics. [Tables 2a and 2b]

The net effect of long-term intervention from the Veerni Project, whose medical team

provides information about fertility control and about clinics that offer voluntary sterilization, was a reduction in average number of children born to a woman of approximately 1.43. In villages where the Project had operated its health clinics for only two or three years, its presence was associated with a reduction of 1.76 in average number of children born to a woman. The long- and short term effects of the Veerni Project on number of living children were reductions of 0.93 and 1.26 respectively. The larger effect in villages where the Veerni presence was of shorter duration (due to later adoption of the village) probably reflects an unmeasured quality improvement in sterilization methods over time. The mortality and infection rates from hysterectomy (still the most common form of sterilization) have fallen; this is likely to have resulted in a decline in resistance to using this form of fertility control.

(B) NGO Effect on Infant Mortality Rates

No statistically significant effects of the Veerni Project on male and female infant mortality rates were found when number of children born to a woman was included as a control variable. Since the number of children ever born to a woman and number of infant deaths per woman were the only reliable fertility information available in a setting where birth records are only informally kept and the sense of time is often very inexact, the fertile life-span of many women in the sample preceded the presence of the NGO. Moreover, although age is included as an explanatory variable, there still is likely to be a time trend in the infant mortality rates that has not been fully adjusted for. It is therefore entirely possible that annual infant mortality rates have declined and that there is an NGO effect not shown in these data. That outcome would be consistent with other studies of NGO health programs in rural areas.¹⁶

That having been said, the only significant explanatory variables for male or female infant

mortality rates were number of children ever born to the mother and whether the family owned land. Infant mortality rates increase with number of children born to a woman and decrease if the family is land-owning. The constructed measure of family wealth based on value of farm animals and land was not found to be significant, whether a dummy variable for land ownership was included or omitted.

Thus it appears that it is land ownership and not wealth that contributes to lower infant mortality.

However, the R^2 in the estimating equations for infant mortality are very low, so the findings need to be considered with some reservation.

It is unusual to find no positive effects of mother's literacy on infant mortality.¹⁷ When we examine the data on female anemia levels in these villages it is less surprising. Seventy-six percent of the adolescent girls and 82 percent of the adult women in the samples were found to have some degree of anemia, using Indian standards of anemia thresholds. This is a part of the world in which malnutrition is a very great problem, and no amount of schooling or other interventions that do not directly improve nutrition of pregnant women and infants are likely to have much effect on infant mortality rates. The observed NGO-related reduction in fertility can, nonetheless, be viewed as having a positive, though indirect, effect on infant mortality.

(C) NGO Effects on Health of Adult Women

(1) Probit analysis was used to examine the effects of the NGO's intervention on the likelihood of a woman exhibiting several different anemia symptoms. Results were mixed. For instance, if a woman lived in a "Veerni Village" this was associated with a lower probability of weakness but a higher probability of anemia-related vertigo. A negative association was found between probability of a woman exhibiting "any anemia symptoms" and long-term presence of the NGO. However, this result was only significant at an .08 level. [Table 3]

(2) A probit was estimated for the probability that a woman would eat at least two meals a day. There is an 18 percent increase in the likelihood of a woman having two meals a day if she lives in a village that has received long-run help from the NGO. [Table 4] Since village fixed-effects, wealth, income, number of children, both husband and wife's literacy, and access to information from radio or TV are included as control variables in the estimating equation, this finding suggests that the NGO presence for at least six years may affect a woman's status in the family, resulting in a different distribution of food among family members.

(D) NGO Effects on Adult Women's Knowledge about Health

Whether or not she had (correct) knowledge of how HIV is transmitted was used as a proxy variable for a woman's knowledge about health and disease. The long-term presence of the Veerni Project was associated with an increase of 43 percent in the likelihood that a woman would know how HIV is transmitted. [Table 5] Here, length of NGO presence appears to be crucial. There was no observed improvement in knowledge about how HIV is contracted in villages in which the health education classes had been conducted for only two to three years.

(E) NGO Effects on Health of Adolescent Girls.

For growing children, two measures of health are often used in studies of poor communities in Asia. One is the subject's body mass index (BMI) and another is whether or not she is anemic.

(1) When a regression was estimated for determinants of BMI in adolescent girls, the presence of the NGO was not found to have a significant effect on age-adjusted adolescent girls' body mass index.

(2) When a probit was estimated for the probability that an adolescent girl would exhibit anemia symptoms, the positive effects of the Veerni Project's health clinics, both long- and short-run, were dramatic. A girl was 20 percent less likely to be anemic if she lived in a village that had received long-term intervention from the Project. If her village had experienced short-term help, she was 13.7 percent less likely to exhibit symptoms of anemia. [Table 6]

(F) NGO Effects on Adolescent Girls' Knowledge about Health

A probit was run to estimate the probability that a girl would know how HIV is transmitted. If she lived in a village that had received help from the Veerni Project for six to ten years, the probability that she would know how HIV was transmitted was increased by 22 percent. [Table 7]

(G) NGO Effects on Adolescent Girls' Literacy

(1) A probit was estimated for the probability that an adolescent girl would be literate.

The long-run presence of the NGO was associated with an increase in the probability that an adolescent girl would be literate of 30 percent. The short-run NGO presence was associated with an increase of 23.5 percent. [Table 8a]

(2) A second probit estimation of probability of literacy included two additional variables: interactions between NGO effects and being a member of a lower caste. In this estimation, the negative marginal effect of being a member of a lower caste is a reduction of 13 percent in the probability of being literate. The marginal effect of both living in a village with long-term NGO intervention and being lower caste is an increase of 18.7 percent in the probability of being literate. The long-term NGO effect by itself is still positive but no longer significant. The coefficient for the interaction term between short-

term NGO presence and low-caste status is not significant. However, the short-term NGO effect was an increase in the probability of literacy of 28 percent. Thus, the main effect of the classes over the longer-term appears to be the overcoming of caste-based barriers to adolescent girl literacy whereas the shorter-term intervention improved the chances of a girl becoming literate regardless of her caste, although low-caste status reduced the magnitude of the positive effect. [Table 8b]

IV. Effectiveness and Cost Effectiveness of the Veerni Project.

This study has found some clear indications of success for the NGO programs. The medical program, including the work of the health educator, is associated with a significant reduction in fertility and improvements in some measures of health and knowledge about disease prevention for both adult women and adolescent girls. Villages with Veerni classes showed much higher literacy rates among adolescent girls and over the longer-term seemed to reduce the negative effects of low caste status on achieving literacy.

But at what cost were these benefits achieved? The 2006-7 annual budget for the NGO shows an expenditure on the medical program for all 16 villages of \$10,964 including travel costs, vehicle maintenance, and medicines and supplies. This does not include staff salaries or a pro-rated contribution to the stipends to the Village Promoters,¹⁸ which together totaled approximately \$14,000. The total cost of the combined medical and health education programs was thus approximately \$25,000 (or about \$1600 per village).¹⁹

Although originally set up to provide only reproductive health care, the medical team now treats

any villagers who come with medical problems, including male farm workers who have suffered accidents in the fields. It also arranges transportation to the hospital in Jodhpur for villagers whose medical problems are more severe than can be treated in the local clinic. It is therefore very difficult to establish an average per case expenditure for the medical program and even more difficult to assess the separate cost of the program to improve reproductive health.

The annual expenditure on the literacy classes for girls was about \$15,000 including the teacher salaries and pro-rated contributions to the Promoter stipends. The annual cost of this program was slightly less than \$1000 per village. Between 15 and 20 girls attended the classes in each village, making the cost of the literacy program conservatively no more than \$67 per pupil per annum.

The long term benefits of this \$67 per pupil are more than negligible. Not only have female literacy rates increased significantly in the villages, but some of the girls are now going on to finish secondary school and some are now undertaking university level work. One should also factor in the well known inter-generational effects of educating women. Today the NGO no longer needs to bring in outside teachers for the primary level classes since villagers have been trained to conduct the classes themselves, a good example of sustainable development.

To what extent were the NGO sponsored health care and education programs merely substitutes for government services that could have been used by the villagers? At the time of the study, there were no competing government clinics in any of these villages. Some medical supplies, such as polio vaccine for children, can only be legally provided by the Indian government, but as recently as Fall 2000, distribution of the vaccine was spotty, at best, and some village children were still recent polio victims. Due, in part,

to village activism fostered by the NGO through the Promoters, the vaccine is now being given to all young children in the villages. The Veerni Project medical team monitors this. This is an example of NGO activity that is complementary to, not a substitute for, a government program.²⁰

Traditional local healers and midwives are still widely used by villagers, and the midwives receive instruction in sanitary birthing techniques from the NGO medical staff. The latter thus provides a service complementary with indigenous health workers who preceded and now co-exist with the NGO health program.

No government schools were in operation in any of the sample villages. The combination of conservative social values, low incomes, and lack of transportation generally prohibited girls from attending primary schools outside their own village. The Veerni classes were conveniently located and held at a time of day when children are most free from farm and household duties. This is an example of the flexibility which can give NGOs a comparative advantage in providing education in a rural setting.

Today government primary schools are replacing the Veerni classes, and are even employing graduates of the NGO program as primary school teachers. Pressure from local village activist groups has probably contributed to this recent increase in government schools located within the Veerni villages. Thus, one of the longer-term indirect benefits of the NGO presence is the empowerment of villagers, which leads them to demand more from the state and national governments.

The Veerni Project has itself evolved in response to its self-evaluation process. Evidence from the survey data showed that infant and child mortality rates were not declining in any noticeable way. As a result, the Project is now sponsoring a pilot nutrition program in which children aged 0 to 6 years are

receiving locally produced food supplements. It is hoped that this will not only reduce infant and child mortality and morbidity but also provide a “cash crop” for the villagers.

Notes

1. See, for instance Ullah, A.K.M. Ahsan and Jayant K. Routray, “Rural poverty alleviations through NGO interventions in Bangladesh: how far is the achievement?” *International Journal of Social Economics*, 34 (4) 2007, 237-248; Bornstein, Lisa, “Systems of Accountability, Webs of Deceit? Monitoring and Evaluation of South African NGOs,” *Development*, 49 (2) 2006, 52-61; and Easterly, William et al., “Aid, Politics, and Growth,” *American Economic Review*, 94 (3) 2004, 773-780.
2. Spar, Debora and James Dail, “Of Measurement and Mission: Accounting for Performance in a Non-governmental Organization,” *Chicago Journal of International Law*, 3 (1) 2002, 171-181.
3. The problems with self-evaluation were thoroughly examined by Biswajit Sen, “NGO Self-evaluation: Issues of Concern,” *World Development*, 15 (Supplement) 1987, 161-167.
4. Kilby, Patrick, “Accountability for Empowerment: Dilemmas Facing Non-Governmental Organizations,” *World Development*, 34 (6) 2005, 951-963.
5. An early acknowledgment of this is provided in Dreze, Jean and Amartya Sen, *Hunger and Public Action* (Oxford: Oxford University Press, 1989).
6. See Khan, Shahrukh Rafi et al., “A Comparative Institutional Analysis of Government, NGO, and Private Rural Primary Schooling in Pakistan,” *The European Journal of Development Research*, 17 (2) 2005, 199-223; and Dutt, Shushmita C., “Working for Women’s Empowerment: Issues before the Agency that Catalyses Change,” *Indian Journal of Gender Studies*, 11 (2) 2004, 157-177.
7. Collier, Paul and David Dollar, “Development Effectiveness: What Have We Learnt?” *The Economic Journal*, 114, 2004, F244-F271.
8. The NGO is funded by a small international donor agency, The Global Foundation for Humanity, but operates as a local grassroots organization.
9. Western Rajasthan did not have access to the India Local Initiatives Program of 1999-2003. The Veerni Project was the only NGO providing reproductive health resources to these villages.
10. Singh, Inderjit J., et al. (eds) *Agricultural Household Models— Extensions, Applications, and Policy* (Baltimore: the Johns Hopkins University Press, 1986).
11. For a good discussion of this problem see Taylor, J. Edward and Irma Adelman, “Agricultural Household Models: Genesis,

Evolution and Extensions,” *Review of Economics of the Household*, 1 , 2003, 33-58.

12. Dr. Shirley Johnson-Lans designed the study and oversaw the work of the Veerni staff members in the Jodhpur office who in turn trained and supervised the local interviewers.

13. These land-owning families are mostly members of the Vishnoi Caste, which is officially listed as OBC (other backward castes) although these families are relatively affluent.

14. Throughout this study, family income is measured by income of head of household. This has been a reasonably good approximation for total family monetary income, since women have generally not been employed outside the family home and plot. As the Veerni Project’s sewing centers are developing, this may soon no longer be true. Women and girls are receiving lessons in fashion and are beginning to produce articles of clothing and accessories that are becoming a “cash crop” sold in Jodhpur. It should also be noted that income does not include home-produced, home-consumed food and other products. As in rural economies elsewhere, monetary income is a very imperfect measure of economic status of families.

15. For instance, Mercer, Alex, et al., “Validating Neonatal Mortality and Use of NGO Reproductive Health Outreach Services in Rural Bangladesh,” *Studies in Family Planning*, 37 (2) 2006, 111-122.

16. Chou, Shin-Yi et .al., “Parental Education and Child Health: Evidence from a Natural Experiment in Taiwan,” NBER Working Paper 13466, 2007 and Mercer, Alex, et al., op. cit.

17. These are local village women who act as coordinators for the Veerni Project in their villages. Their work includes making members of their villages aware of and receptive to the services offered by the NGO.

18. This does not include the costs associated with the survey research that enabled this study.

19. This is an example of an NGO fulfilling the function of “watchdog of government programs,” which was recommended when the Indian government Five-Year Plans involved NGOs in the development process. See Raj, Sebesti L., “NGOs and India’s Future,” *International Policy Review*, 7, Winter 1997, 47-54.

20. Support for this view is provided in Behrman, Jere R. et al., “The Role of Decentralization in Promoting Effective Schooling in Developing Asia,” *Asian Development Review*, 20 (1) 2003, 57-99.

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Table 1
Socio-Economic Characteristics of Females in Study Villages

| Characteristic | Adult women | Adolescent Girls |
|-------------------------------|-------------|------------------|
| Avg HH Income Rs (Monthly) | 2827 | 3038 |
| % Households with Electricity | 51 | 44 |
| Avg Number in Household | 6.73 | 7.65 |
| % Households Owning Land | 82 | 86 |
| Avg No. Sons/Brothers | 1.66 | 2.19 |
| Avg No. Daughters/Sisters | 1.46 | 2.57 |
| % Literate | 15 | 75 |
| % Mother Literate | | 7 |
| % Father Literate | | 56 |
| Avg. Age of Marriage | 16.36 | 2.6* |
| % Scheduled Castes | 18.5 | 18.6 |
| % Scheduled Tribal | 7.4 | 8.3 |
| % OBC | 41.8 | 48.6 |
| % Hindu** | 95.7 | 94.1 |

*Includes betrothed. 65 percent of the adolescent girls in the sample were betrothed before their first birthday.

**All women and girls in the samples who are not Hindu are Muslim.

Table 2a
Determinants of Number of Children Ever Born to a Woman

$R^2 = 0.4672$

Adjusted $R^2 = 0.4556$

N = 943

| Variable | Coefficient | Standard Error | t | P > t |
|------------------------------|-------------|----------------|-------|--------|
| Long-Term NGO | -1.43414 | 0.3965412 | -3.62 | 0.000 |
| Short-Term NGO | -1.78482 | 0.3882773 | -4.6 | .0000 |
| Age | 0.1927192 | 0.0082363 | 23.4 | 0.000 |
| Low (Dalit) Caste | 0.2548415 | 0.2269434 | 1.12 | 0.262 |
| Scheduled Tribes | 0.0887693 | 0.2708895 | 0.33 | 0.743 |
| Other Backwards Castes (OBC) | -0.1762502 | 0.1818004 | -0.97 | 0.333 |
| Muslim | 0.9612904 | 0.4076469 | 2.36 | 0.019 |
| Age Married | -0.1550656 | 0.0216668 | -7.16 | 0.000 |
| Literate | -0.8470861 | 0.1950519 | -4.34 | 0.000 |
| Husband Literate | 0.0392954 | 0.1345412 | 0.29 | 0.770 |
| Electricity in Home | -0.0563853 | 0.1580952 | -0.36 | 0.721 |
| TV or Radio in Home | -0.026823 | 0.1859036 | -0.14 | 0.885 |
| Monthly Income in Rs. | - 6.91e-06 | 0.0000356 | -0.19 | 0.846 |
| Village 2* | -1.230829 | 0.3676879 | -3.35 | 0.001 |
| Village 3 | -0.1404816 | 0.2979209 | 0.47 | 0.637 |
| Village 4* | 0.1828299 | 0.3033618 | 0.06 | 0.547 |
| Village 6 | -0.139943 | 0.3774898 | -0.37 | 0.711 |
| Village 7 | -2.020098 | 0.3462615 | -5.83 | 0.000 |
| Village 8 | -1.774764 | 0.3570084 | -4.97 | 0.000 |
| Wealth | 2.52e-07 | 1.21e-07 | 2.09 | 0.037 |
| Constant | 1.829206 | 0.6024105 | 3.04 | 0.002 |

*Villages 1 and 5 dropped because of co-linearity

Table 2b
Determinants of Number of Living Children per Mother

$R^2 = 0.4503$

Adjusted $R^2 = 0.4383$

N = 943

| Variable | Coefficient | Standard Error | t | P > t |
|------------------------------|-------------|----------------|-------|---------|
| Long-Term NGO | -0.9347359 | 0.3465278 | -2.7 | 0.007 |
| Short-Term NGO | -1.2622 | 0.3393062 | -3.72 | 0.000 |
| Age | 0.165371 | 0.0071975 | 22.98 | 0.000 |
| Low (Dalit) Caste | -0.0154181 | 0.1983204 | -0.10 | 0.938 |
| Scheduled Tribes | -0.0164056 | 0.2367238 | -0.10 | 0.945 |
| Other Backwards Castes (OBC) | -0.2151039 | 0.158871 | -1.35 | 0.176 |
| Muslim | 1.011478 | 0.3562328 | 2.84 | 0.005 |
| Age Married | -0.119859 | 0.0189341 | -6.33 | 0.000 |
| Literate | -0.7680823 | 0.1704512 | -4.51 | 0.000 |
| Husband Literate | 0.0952999 | 0.1175723 | 0.81 | 0.418 |
| Electricity in Home | -0.1201878 | 0.1381556 | -0.87 | 0.385 |
| TV or Radio in Home | -0.0952235 | 0.1624567 | -0.59 | 0.558 |
| Monthly Income in Rs. | 0.000012 | 0.0000311 | 0.38 | 0.701 |
| Village 2* | -1.191486 | 0.3213136 | -3.71 | 0.000 |
| Village 3 | -0.2200855 | 0.2603459 | -0.85 | 0.398 |
| Village 4* | 0.2124584 | 0.2651006 | -0.80 | 0.423 |
| Village 6 | -0.0755852 | 0.3298792 | -0.23 | 0.819 |
| Village 7 | -1.162838 | 0.3025896 | -3.84 | 0.000 |
| Village 8 | -1.121167 | 0.3119811 | -3.59 | .0000 |
| Wealth | 1.69e-07 | 1.05e-07 | 1.60 | 0.109 |

| | | | | |
|----------|----------|-----------|------|-------|
| Constant | 1.148486 | 0.5264321 | 2.18 | 0.029 |
|----------|----------|-----------|------|-------|

* Villages 1 and 5 dropped because of co-linearity.

Table 3
Probability of an Adult Woman Exhibiting Anemia Symptoms

Pseudo R² = 0.0407

N = 942

Y = Probability of Exhibiting Anemia Symptoms = 0.58768794

Marginal Effects after Probit

| Variable | dy/dx | Standard Error | z | P > z |
|----------------------------------|------------|----------------|-------|--------|
| Long-Term NGO | 0.1899854 | 0.10897 | 1.74 | 0.081 |
| Short-Term NGO | -0.0364024 | 0.12484 | -0.29 | 0.771 |
| Age | -0.001353 | 0.00278 | -0.49 | 0.626 |
| Low (Dalit) Caste | 0.0245206 | 0.06013 | 0.41 | 0.683 |
| Scheduled Tribes | 0.1977788 | 0.06188 | 3.2 | 0.001 |
| Other Backwards Castes (OBC) | -0.0192249 | 0.0483 | -0.4 | 0.691 |
| Muslim | 0.1085018 | 0.1016 | 1.07 | 0.286 |
| Literate | -0.0874527 | 0.05383 | -1.62 | 0.104 |
| Monthly Family Income in Rs | - 1.94e-06 | 0.00001 | -0.20 | 0.838 |
| Electricity in Home | -0.003093 | 0.04267 | -0.10 | 0.942 |
| TV or Radio in Home | -0.098438 | 0.05051 | -1.95 | 0.051 |
| Number of Children Born to Woman | 0.0062319 | 0.00872 | 0.71 | 0.475 |
| Husband Literate | -0.053628 | 0.03589 | -1.49 | 0.135 |
| Wealth | - 4.36e-08 | 0.00000 | -1.35 | 0.178 |
| Village 2* | -0.4301161 | 0.07696 | -5.59 | 0.900 |
| Village 3 | -0.3145675 | 0.08219 | -3.83 | 0.000 |
| Village 4 | -0.0269728 | 0.10503 | -0.26 | 0.797 |
| Village 5* | -0.0287722 | 0.10239 | -0.28 | 0.779 |
| Village 7 | -0.0775737 | 0.09882 | -0.79 | 0.432 |

| | | | | |
|-----------|------------|---------|-------|-------|
| Village 8 | -0.1302442 | 0.10139 | -1.28 | 0.199 |
|-----------|------------|---------|-------|-------|

*Villages 1 and 6 dropped because of co-linearity

Table 4
Probability that an Adult Woman Eats at Least Two Meals a Day

Pseudo $R^2 = 0.1341$

N = 942

Y = Probability that Adult Woman Eats Two Meals a Day = 0.08858199

Marginal Effects after Probit

| Variable | dy/dx | Standard Error | z | P > z |
|----------------------------------|------------|----------------|-------|--------|
| Long-Term NGO | 0.1834177 | 0.07705 | 2.38 | 0.017 |
| Short-Term NGO | 0.0951128 | 0.08631 | 1.10 | 0.270 |
| Age | 0.0037581 | 0.00153 | 2.45 | 0.014 |
| Low (Dalit) Caste | -0.0299204 | 0.02683 | -1.12 | 0.265 |
| Scheduled Tribes | -0.0832544 | 0.0166 | -5.02 | 0.000 |
| Other Backwards Castes (OBC) | -0.0677165 | 0.02405 | -2.82 | 0.005 |
| Muslim | -0.0546814 | 0.02924 | -1.87 | 0.061 |
| Literate | 0.0522715 | 0.03559 | 1.47 | 0.142 |
| Monthly Income in Rs | 1.13e-06 | 0.00001 | 0.22 | 0.822 |
| Electricity in Home | -0.003553 | 0.02368 | -0.15 | 0.881 |
| TV or Radio in Home | -0.0207705 | 0.02477 | -0.84 | 0.402 |
| Number of Children Born to Woman | -0.005257 | 0.00492 | -1.07 | 0.285 |
| Husband Literate | -0.009075 | 0.02048 | -0.44 | 0.658 |
| Wealth | - 1.29e-08 | 0.0000 | -0.73 | 0.466 |
| Village 1 | -0.013776 | 0.03225 | -0.43 | 0.669 |
| Village 2* | -0.070568 | 0.01679 | -4.20 | 0.000 |
| Village 4 | -0.1010209 | 0.01837 | -5.50 | 0.000 |

| | | | | |
|-----------|------------|---------|-------|-------|
| Village 5 | -0.0175147 | 0.04632 | -0.38 | 0.705 |
| Village 7 | -0.0235535 | 0.05033 | -0.47 | 0.640 |
| Village 8 | -0.00257 | 0.05911 | 0.00 | 0.965 |

*Villages 3 and 6 dropped because of co-linearity

Table 5
Probability that an Adult Woman Knows How HIV is Transmitted

Pseudo $R^2 = 0.3396$

N = 942

Y = Probability that an Adult Woman Knows How HIV is Transmitted = 0.18200564

Marginal Effects after Probit

| Variable | dy/dx | Standard Error | z | P > z |
|----------------------------------|------------|----------------|-------|--------|
| Long-Term NGO | 0.4307195 | 0.11521 | 3.74 | 0.000 |
| Short-Term NGO | 0.157008 | 0.13808 | 1.14 | 0.295 |
| Age | -0.00096 | 0.00245 | -0.39 | 0.695 |
| Low (Dalit) Caste | -0.1491486 | 0.0333 | -4.48 | 0.000 |
| Scheduled Tribes | -0.1017853 | 0.03827 | -2.66 | 0.008 |
| Other Backwards Castes (OBC) | -0.1110261 | 0.03585 | -3.10 | 0.002 |
| Muslim | -0.0460166 | 0.07007 | -0.66 | 0.511 |
| Literate | 0.2807294 | 0.05645 | 4.97 | 0.000 |
| Monthly Income in Rs | 7.86e-06 | 0.00001 | 1.01 | 0.312 |
| Electricity in Home | 0.0608074 | 0.03654 | 1.66 | 0.096 |
| TV or Radio in Home | 0.1959155 | 0.04886 | 4.01 | 0.000 |
| Number of Children Born to Woman | -0.006157 | 0.00793 | -0.78 | 0.437 |
| Husband Literate | 0.055661 | 0.02994 | 1.86 | 0.063 |
| Wealth | 2.25e-09 | 0.00000 | 0.08 | 0.935 |
| Village 1 | -0.004171 | 0.05597 | -0.10 | 0.941 |
| Village 2* | -0.087385 | 0.03853 | -2.27 | 0.023 |
| Village 4 | -0.0415384 | 0.07769 | -0.53 | 0.593 |

| | | | | |
|------------|------------|---------|-------|-------|
| Village 5* | -0.0666164 | 0.0685 | -0.97 | 0.331 |
| Village 7 | -0.063974 | 0.0909 | -0.7 | 0.482 |
| Village 8 | 0.0399642 | 0.11373 | 0.35 | 0.725 |

*Villages 3 and 6 dropped because of co-linearity

Table 6
Probability that an Adolescent Girl will Exhibit Anemia Symptoms

Pseudo R² = 0.1015

N = 856

Y = Probability of Exhibiting Anemia Symptoms = 0.16114143

Marginal Effects after Probit

| Variable | dy/dx | Standard Error | z | P > z |
|------------------------------|------------|----------------|-------|--------|
| Long-Term NGO | -0.2023789 | 0.06263 | -3.23 | 0.001 |
| Short-Term NGO | -0.1369274 | 0.07222 | -1.09 | 0.058 |
| Age | 0.0181387 | 0.00526 | 3.45 | 0.001 |
| Low (Dalit) Caste | 0.0077334 | 0.04093 | 0.19 | 0.750 |
| Scheduled Tribes | 0.1081616 | 0.06126 | 1.77 | 0.077 |
| Other Backwards Castes (OBC) | -0.0672218 | 0.03445 | -1.95 | 0.051 |
| Muslim | -0.1247585 | 0.04193 | -2.98 | 0.003 |
| Effective Marriage | -0.0311378 | 0.02840 | -1.10 | 0.273 |
| Literate | -0.0650699 | 0.03407 | -1.91 | 0.056 |
| Monthly Family Income in Rs | - 7.47e-06 | 0.00001 | -0.90 | 0.366 |
| Mother Literate | -0.0694824 | 0.04256 | -1.63 | 0.103 |
| Father Literate | -0.0483844 | 0.02838 | -1.70 | 0.088 |
| TV or Radio in Home | -0.028962 | 0.0322 | -0.90 | 0.368 |
| Number of Brothers | 0.0046587 | 0.01217 | 0.38 | 0.702 |
| Number of Sisters | 0.0075722 | 0.00887 | 0.85 | 0.393 |
| Owens Land | -0.0188242 | 0.06684 | -0.28 | 0.778 |
| Wealth | 9.41e-09 | 0.00000 | 0.30 | 0.764 |
| Village 1* | 0.2557576 | 0.10189 | 2.51 | 0.012 |
| Village 3 | 0.0813746 | 0.06354 | 1.28 | 0.200 |

| | | | | |
|------------|------------|---------|-------|-------|
| Village 4 | -0.0791423 | 0.06315 | -1.25 | 0.210 |
| Village 5* | -0.080706 | 0.05907 | -1.37 | 0.172 |
| Village 7 | -0.1340157 | 0.04610 | -2.91 | 0.004 |
| Village 8 | -0.1542633 | 0.03441 | -4.48 | 0.000 |

*Villages 2 and 6 dropped because of co-linearity

Table 7
Probability that a Girl Knows How HIV is Transmitted

Pseudo R² = 0.4157

N = 851

Y = Probability that Girl Knows How HIV is Transmitted = 0.07715137

Marginal Effects after Probit

| Variable | dy/dx | Standard Error | z | P > z |
|------------------------------|------------|----------------|-------|--------|
| Long-Term NGO | 0.22043 | 0.10518 | 2.10 | 0.036 |
| Short-Term NGO | -0.0123055 | 0.07465 | -0.20 | 0.869 |
| Age | 0.0283867 | 0.00422 | 6.72 | 0.000 |
| Low (Dalit) Caste | -0.0893202 | 0.01778 | -5.00 | 0.000 |
| Scheduled Tribes | 0.0152425 | 0.04026 | 0.38 | 0.705 |
| Other Backwards Castes (OBC) | -0.0723339 | 0.02523 | -2.9 | 0.004 |
| Muslim | -0.0299094 | 0.06949 | -0.4 | 0.667 |
| Married | 0.0183932 | 0.02291 | 0.8 | 0.422 |
| Literate | 0.0830223 | 0.0179 | 4.64 | 0.00 |
| Monthly Income | 3.89e-06 | 0.0000 | 0.84 | 0.400 |
| Number of Brothers | 0.0042463 | 0.00898 | 0.47 | 0.636 |
| Number of Sisters | -0.00059 | 0.00658 | 0.00 | 0.929 |
| Mother Literate | 0.0437452 | 0.04274 | 1.02 | 0.306 |
| Electricity in Home | 0.069913 | 0.02389 | 2.93 | 0.003 |
| TV or Radio in Home | 0.1212413 | 0.03524 | 3.44 | 0.001 |
| Father Literate | 0.0209053 | 0.02067 | 1.01 | 0.312 |
| Wealth | - 1.44e-08 | 0.00000 | -0.65 | 0.517 |
| Village 2* | -0.0351904 | 0.02747 | -1.30 | 0.200 |

| | | | | |
|------------|-----------|---------|------|-------|
| Village 3 | 0.005844 | 0.03459 | 0.17 | 0.866 |
| Village 4* | 0.0214194 | 0.07236 | 0.30 | 0.767 |
| Village 7 | 0.0679008 | 0.09867 | 0.69 | 0.491 |
| Village 8 | 0.0446706 | 0.08924 | 0.5 | 0.617 |

*Villages 1, 5, and 6 dropped because of co-linearity

Table 8a
Probability of an Adolescent Girl Being Literate

Pseudo R² = 0.2086

N = 856

Y = Probability of Being Literate = 0.79750706

Marginal Effects after Probit

| Variable | dy/dx | Standard Error | z | P > z |
|------------------------------|------------|----------------|-------|--------|
| Long-Term NGO | 0.3036476 | 0.07463 | 4.07 | 0.000 |
| Short-Term NGO | 0.2352465 | 0.07995 | 2.94 | 0.003 |
| Age | -0.0474663 | 0.00586 | -8.1 | 0.000 |
| Low (Dalit) Caste | -0.0415263 | 0.05258 | -0.79 | 0.430 |
| Scheduled Tribes | -0.1910097 | 0.07577 | -2.52 | 0.012 |
| Other Backwards Castes (OBC) | -0.0146969 | 0.04245 | -0.35 | 0.729 |
| Muslim | -0.3643326 | 0.15554 | -2.34 | 0.019 |
| Effective Marriage | -0.0411165 | 0.03364 | -1.22 | 0.222 |
| Monthly Income in Rs | 0.0000196 | 0.00001 | 2.00 | 0.045 |
| Number of Brothers | -0.0199592 | 0.1347 | -1.48 | 0.138 |
| Number of Sisters | -0.0106958 | 0.01025 | -1.04 | 0.297 |
| Mother Literate | 0.1272416 | 0.04496 | 2.83 | 0.005 |
| Electricity in Home | 0.1216753 | 0.03737 | 3.26 | 0.001 |
| TV or Radio in Home | 0.0688541 | 0.04013 | 1.72 | 0.086 |
| Father Literate | 0.0470558 | 0.03192 | 1.47 | 0.140 |
| Wealth | - 1.75e-09 | 0.00000 | -0.10 | 0.979 |
| Village 1* | -0.1031514 | 0.11348 | -0.91 | 0.363 |
| Village 3 | -0.2707392 | 0.09062 | -2.99 | 0.003 |

| | | | | |
|------------|------------|---------|-------|-------|
| Village 4 | 0.0106421 | 0.1028 | 0.1 | 0.918 |
| Village 5* | -0.2030389 | 0.12902 | -1.57 | 0.116 |
| Village 7 | 0.0555227 | 0.08238 | 0.67 | 0.500 |
| Village 8 | 0.1126477 | 0.06523 | 1.73 | 0.084 |

Villages 2 and 6 dropped because of co-linearity.

Table 8b
Probability of an Adolescent Girl Being Literate
(with interaction terms for NGO and Low Caste)**

Pseudo R² = 0.2032

N = 856

Y = Probability of Being Literate = 0.78292056

Marginal Effects after Probit

| Variable | dy/dx | Standard Error | z | P > z |
|-----------------------------|------------|----------------|-------|--------|
| Long-Term NGO | 0.1748924 | 0.10377 | 1.69 | 0.092 |
| Short-Term NGO | 0.2811462 | 0.08857 | 3.17 | 0.002 |
| Age | -0.1669903 | 0.02056 | -8.12 | 0.000 |
| Low Caste** | -0.1305502 | 0.05996 | -2.18 | 0.029 |
| Low Caste * Long-Term NGO | 0.1843711 | 0.06021 | 3.06 | 0.002 |
| Low Caste * Short-Term NGO | -0.0459006 | 0.14001 | -0.33 | 0.743 |
| Muslim | -0.4565599 | 0.15295 | -2.99 | 0.003 |
| Effective Marriage Status | -0.0998265 | 0.04300 | -2.91 | 0.004 |
| Monthly Family Income in Rs | 0.0000205 | 0.00001 | 2.15 | 0.032 |
| Number of Brothers | -0.0344627 | 0.01328 | -2.6 | 0.009 |
| Number of Sisters | -0.0131671 | 0.01023 | -1.29 | 0.198 |
| Mother Literate | 0.0838095 | 0.05774 | 1.45 | 0.147 |
| Electricity in Home | 0.0945981 | 0.0369 | 2.56 | 0.010 |
| TV or Radio in Home | 0.0773911 | 0.04024 | 1.92 | 0.054 |
| Father Literate | 0.0504716 | 0.03218 | 1.57 | 0.117 |
| Wealth | - 2.39e-08 | 0.00000 | -0.68 | 0.494 |
| Village 1* | -0.0937484 | 0.10996 | -0.85 | 0.394 |

| | | | | |
|------------|------------|---------|-------|-------|
| Village 3 | -0.2492967 | 0.08707 | -2.86 | 0.004 |
| Village 4 | 0.0420754 | 0.09833 | 0.43 | 0.669 |
| Village 5* | -0.1388433 | 0.12537 | -1.11 | 0.268 |
| Village 7 | 0.1252387 | 0.07102 | 1.76 | 0.078 |
| Village 8 | 0.1651534 | 0.05513 | 3.00 | 0.003 |

*Villages 2 and 6 dropped because of co-linearity

** Low Caste = scheduled caste (dalit), scheduled tribal, or OBC

