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Distributional Outcomes of a Decentralized Welfare Program

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Community-level targeting of antipoverty programs is now common. Do local community organizations target the poor better than the central government? In one program in Bangladesh, the answer tends to be yes, but performance varies from village to village. The authors try to explain why.

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Summary findings

It is common for central governments to delegate authority over the targeting of welfare programs to local community organizations — which may be better informed about who is poor, though possibly less accountable for getting the money to the local poor — while the center retains control over how much goes to each local region.

Galasso and Ravallion outline a theoretical model of the interconnected behavior of the various actors in such a setting. The model's information structure provides scope for econometric identification.

Applying data for a specific program in Bangladesh, they find that overall targeting was mildly pro-poor, mostly because of successful targeting within villages. But this varied across villages. Although some village characteristics promoted better targeting, these were generally not the same characteristics that attracted resources from the center.

Galasso and Ravallion observe that the center's desire for broad geographic coverage appears to have severely constrained the scope for pro-poor village targeting. However, poor villages tended not to be better at reaching their poor.

They find some evidence that local institutions matter. The presence of cooperatives for farmers and the landless appears to be associated with more pro-poor program targeting. The presence of recreational clubs has the opposite effect.

Sometimes the benefits of decentralized social programs are captured by local elites, depending on the type of spending being decentralized. When public spending is on a private (excludable) good, and there is no self-targeting mechanism to ensure that only the poor participate, there is ample scope for local mistargeting.

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Distributional Outcomes of a Decentralized Welfare Program

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1. Introduction

Community-level targeting of anti-poverty programs is now common. The center delegates the task of choosing program beneficiaries to local (governmental or non-governmental) organizations. Proponents of such decentralized targeting have claimed that more information is available at local level about who is poor than to the center, and that local institutions tend to be more accountable to local people, and hence have an incentive to use the locally available information to improve program performance. These arguments echo those commonly made for decentralizing other types of public spending.

The claim that more information is available locally seems plausible, and there is some supportive evidence (Alderman, 1998). However, the claim that local institutions are accountable to the poor is more contentious. The accountability argument is persuasive in settings in which there is little or no distributional conflict at local level; for example, Seabright (1996) develops the accountability argument for decentralization in the context of a model of locally homogeneous communities. This is often assumed to be the case in developed countries with seemingly low costs of inter-jurisdictional mobility.[2] However, the assumption of homogeneous local communities (and of free mobility) is implausible in many settings in which decentralization has been popular, including underdeveloped rural economies.[3] When local communities are not homogeneous, the benefits of decentralized social programs may well be captured by local elites. This will depend on the type of spending being decentralized. When it is public spending on a private (excludable) good, and there is no self-targeting mechanism to assure that only the poor want to participate, there is ample scope for miss-targeting at local level.

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[2] Though distributional conflicts arising from local heterogeneity can be expected even in developed country settings with relatively free mobility between local jurisdictions (Ravallion, 1984).

[3] The existence of strong and persistent geographic effects in living standards in developing countries, controlling for observable household characteristics, warns against assuming free mobility. For evidence on this point in the same setting as the empirical work in this paper see Ravallion and Wodon (1999a).

Thus one can posit a potential trade off between the informational advantage of community-based targeting, and an accountability disadvantage. The theoretical case for decentralization will then depend critically on the extent of local program capture by the nonpoor, as demonstrated theoretically by Bardhan and Mookherjee (1998).

What does the available evidence suggest? There is anecdotal evidence of local program capture of decentralized antipoverty programs and development projects. A well known example (in the same setting for our empirical work) was provided by Hartmann and Boyce (1983) in their description of how rich local farmers in Bangladesh were able to capture a publicly provided (World Bank funded) local irrigation facility intended for poor farmers. More recently, Participatory Poverty Assessments by the World Bank in Bangladesh suggest that the rich in the community (the "*matabbari*") tend to dominate the local power structure; they tend to be the first, and possibly only, people consulted when a development program is undertaken in the community (un Nabi et al 1999). Concerns about local capture have sometimes influenced the design of anti-poverty programs; for example, Tendler (1997) describes how drought-relief operations in the state of Ceará in Brazil included requirements for broad local participation in allocating relief efforts.[4]

Such observations warn against assuming homogeneous local communities, and point to serious accountability concerns about the case for decentralizing the power to decide who gets help from an antipoverty program. However, the seriousness of these concerns cannot be judged properly without more systematic evidence on the targeting performance of decentralized programs; evidence on these issues has been known to be scant for some time (Bardhan, 1996; Jimenez, 1999). The enthusiasm for community-based targeting in policy circles has clearly run well ahead of the evidence.

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[4] Similarly, the relative success of decentralized government in the state of Karnataka in India has been attributed to the effective system of democratic accountability (Crook and Manor, 1994).

This paper tries to understand the distributional outcomes of a decentralized program. We take the existence of decentralization as given, and focus on the factors influencing outcomes for the poor. However, the fact that the program is decentralized is crucial to our method. By building the empirics on explicit, and *a priori* plausible, assumptions about information structures we are able to identify some key structural parameters.

We motivate the empirics by a theoretical model of the behavior of the local organizations involved in the micro-targeting of an antipoverty program and their relationship to a central government that funds the program, and decides on the budget allocation across local areas. There is heterogeneity and distributional conflict within communities. The allocations are assumed to be efficient, but not necessarily equitable. The influence of the poor on outcomes varies, as do other factors influencing preferences of both the poor and nonpoor and local budget constraints. The model generates equilibrium allocations of the budget across areas and between poor and nonpoor within those areas.

We carry some key implications of this theoretical model to new data on a specific social program, namely Bangladesh's Food-for-Education (FFE) program. This is one of the many school-enrollment subsidy programs now found in both developing and developed countries. The official aim of the program is to keep the children of poor rural families in school. Fixed food rations are distributed to selected households conditional on their school-aged children attending at least 85% of classes. Participants receive the rations as long as they send their children to primary school. Over two million children participated in 1995-96 (13% of total primary school enrolment). There is evidence of significant gains in terms of school attendance with only modest foregone income through displaced child labor (Ravallion and Wodon, 1999b). However, little is known about how well the program has reached the poor. Yes, there are gains from the program, but are they gains to the poor?

Armed with a rich data set at household and community level we study the targeting performance of this program. There are two stages of targeting. First economically backward areas are chosen by the center. Second, community groups—exploiting idiosyncratic local information—select participants within those areas. We address two questions:

- How much of the program's performance in reaching poor families was due to the center's efforts at reaching poor communities versus the efforts of those communities to reach their own poor?
- What factors influenced the center's targeting of communities, and the distributional outcomes within communities?

We begin with our theoretical model of benefit incidence for a decentralized program. Section 3 outlines properties of our measure of targeting performance and then goes on to describe our data for Bangladesh and to present relevant descriptive results. Section 4 outlines our econometric methods for explaining distributional outcomes of the program. Our results are discussed in section 5 and section 6 concludes.

2. A model of benefit incidence for a decentralized social program

A poverty reduction program exists with a fixed aggregate budget. The program is run by a Project Office (PO) within the central (federal or provincial) government. The PO decides how to allocate the budget across "communities". People in each community decide how to allocate the PO's budget between the "poor" and "nonpoor" within that community. We assume that the program does not generate spillover effects across communities, such as due to mobility between them.[5] Mobility-induced spillover effects can be ruled out by assuming that the community only makes allocations across long-standing members or that

[5] On the implications of mobility of the poor for decentralized social programs see Brown and Oates (1987) and Wildasin (1991). On how mobility might impact on the local political economy see Rose-Ackerman (1983).

there are costs of moving. The PO does not observe how much is going to the poor in each area, and has imperfect information on other relevant local characteristics.

2.1 The local collective action problem

We assume that the allocation within each community is Pareto efficient, in that it is not possible to increase the welfare of the poor (nonpoor) through the program without making the nonpoor (poor) worse off. The smaller the local government area that has power to decide who gets the program, the more plausible this assumption becomes. It appears to be a defensible assumption in the context of the classic village society in a developing country where one finds quasi-cooperative behavior based on repeated interaction and shared knowledge accumulated over long periods of relatively stable cohabitation.[6] However, there are circumstances in which this assumption will not hold, notably when program capture by the nonpoor requires a wasteful form of corruption. The actual institutional arrangement could take many forms, and we leave this open — it might be a representative village leader or a community council, or other delegated non-governmental organizations.

As is well known, Pareto efficiency in such a problem implies that there exist appropriate weights on the utilities of the poor and nonpoor such that the outcome of the collective decision making can be represented by the maximum of the weighted sum of utilities. A special case is the utilitarian, equal-weights, solution in which the allocation maximizes the sum of all utilities.[7]

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[6] We can draw some support for this assumption from recent empirical work suggesting that information on individual productivity differences is reasonably common knowledge within villages (Foster and Rosenzweig, 1993; Lanjouw, 1999). The assumption also accords with experimental evidence suggesting that people often achieve efficient cooperative outcomes without binding contracts (Dawes and Thaler, 1988).

[7] One can motivate a formally identical objective function by an "interest group model" of a local politician's vote maximization problem as in Plotnick (1986).

While the efficiency assumption implies that Pareto weights exist, it does not throw any light on how those weights are determined.[8] They can be interpreted as the relative power of the poor versus the nonpoor. This will presumably depend on the characteristics of the poor and nonpoor (such as the extent to which the poor are literate) and local political and economic environment, including variables that influence the reservation utilities of each party, should no agreement be reached. We postulate that all the exogenous variables of the equal weights solution are potential factors influencing the weights appropriate to each community, and (hence) which of the infinitely many efficient allocations will be observed.

The "poor" and "nonpoor" within the i'th (i=1,..,n) community receive per capita allocations G_i^p and G_i^n respectively. They have (per-capita) utility functions $U^p(G_i^p, X_i)$ and $U^n(G_i^n, X_i)$ respectively and these functions are strictly increasing and strictly concave in the allocations received from the program, and vary with a vector of area characteristics, X_i. A proportion H_i of the population is poor (giving the "headcount index" of poverty). The relative Pareto weight on utility of the poor (relative to the nonpoor), such that the outcome is efficient in the i'th community, is given by $\lambda(G_i, H_i, X_i)$. This is taken to vary with all the exogenous variables in the collective decision problem. We assume that the function λ is non-decreasing in G and H; either higher spending on the program or a higher incidence of poverty in the village will enhance (or at least not diminish) the power of the poor in local decision making.

Thus the community chooses G_i^p and G_i^n to solve the problem:

$$\max H_i\lambda(G_i, H_i, X_i)U^p(G_i^p, X_i)+(1-H_i)U^n(G_i^n, X_i) \qquad (1.1)$$

$$\text{s.t. } H_iG_i^p + (1-H_i)G_i^n = G_i \qquad (1.2)$$

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[8] In this respect our model has a formal similarity to recent collective-action models of household decision making that postulate an exogenous "distribution function" that weights the

In addition to satisfying (1.2), the solutions equate relative marginal utilities, U_G^n / U_G^p (where the subscripts denote partial derivatives) with the relative power of the poor λ. We can write the solutions in generic form as:

$$G_i^p = G^p(G_i, H_i, X_i) \tag{2.1}$$

$$G_i^n = G^n(G_i, H_i, X_i) \tag{2.2}$$

The difference between optimal spending on the poor and the nonpoor is:

$$T_i \equiv G_i^p - G_i^n = T(G_i, H_i, X_i) \tag{3}$$

We call this the "targeting differential". A positive (negative) value of T indicates that the program is targeted to the poor (nonpoor).

This model is too general to deliver many unambiguous comparative static properties, but some testable implications do emerge. Consider first the incidence of an increase in G. Differentiating the first-order conditions and solving one obtains (dropping i subscripts for notational brevity):

$$G_G^p = [U_{GG}^n - (1-H)\lambda_G U_G^p] / J \tag{4.1}$$

$$G_G^n = (\lambda U_{GG}^p + H\lambda_G U_G^p) / J \tag{4.2}$$

for the partial derivatives of (2.1) and (2.2) w.r.t. G, where $J = HU_{GG}^n + \lambda(1-H)U_{GG}^p) < 0$. It is evident from (4.1) that G_i^p is strictly increasing in G_i; the poor will gain from a program expansion. However, the outcome for the nonpoor is ambiguous. In the special case in which $\lambda_G = 0$, the nonpoor also gain from the expansion. More generally, however, the outcome will depend on how much a higher budget allocations to a village raises the relative power of the poor. Notice, however, that finding that $G_G^n \leq 0$ must imply that $\lambda_G > 0$.

The effect of a change in H is ambiguous. Similarly to (4.1) and (4.2) we have:

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utilities of household members; see, for example, Bourguignon and Chiappori (1994) and Browning and Chiappori (1998).

$$G_H^p = -[TU_{GG}^n + (1-H)\lambda_H U_G^p]/J \quad (5.1)$$

$$G_H^n = -[T\lambda U_{GG}^p - H\lambda_H U_G^p)/J \quad (5.2)$$

Consider the effect of a higher H on the per-capita allocation to the poor. Two opposing effects are evident in (5.1). The first term ($-TU_{GG}^n/J$ with opposite sign to T) can be thought of as a "budget effect": a higher H clearly makes it harder to increase the per capita allocations (to either the poor or nonpoor) while staying within the budget constraint when the poor are receiving more per capita than the nonpoor ($T > 0$). The second term ($-(1-H)\lambda_H U_G^p]/J \geq 0$) can be interpreted as a "power effect": by increasing the power of the poor in the community's decision making, a higher H will increase their share of the program's resources. The outcome depends on the balance of these two effects. If $T < 0$ then the two effects work in the same direction ($G_H^p > 0$). If $T > 0$, the outcome could go either way.

Similarly reasoning applies to the effect of H on G^n, except now the power effect naturally works against the nonpoor. If $T > 0$ then a higher H will unambiguously reduce the per capita allocation to the nonpoor. The outcome is ambiguous if the program favors the nonpoor ($T < 0$).

The effects of changes in X on the community's allocation are also ambiguous in this model. Consider any element of X that increases the marginal net gain from making a higher allocation to the poor (i.e., it increases $\lambda_i U_G^p - U_G^n$ at given G_i^p and G_i^n). Then it is evident that G_i^p will be strictly increasing in that variable, while G_i^n will be decreasing. An element of X that jointly increases the marginal utility of a higher program allocation to both groups will naturally have an ambiguous effect on the incidence of program spending.

In this model, effects on the relative power of the poor in community decision making can be crucial to understanding differences in distributional outcomes of program spending.

Consider, for example, an increase in income inequality between the nonpoor and the poor. At given λ one expects a partially compensating pro-poor re-allocation of program spending (given diminishing marginal utility of income). However, it seems implausible that higher inequality would leave λ unchanged; more likely higher inequality dissempowers the poor in terms of their influence on collective decision making within the village.[9] Suppose that the income of the nonpoor increases leaving that of the poor unchanged. The marginal utility of transfers to nonpoor can be assumed to fall, while the marginal utility of a transfer to the poor will be unchanged (or possibly rise). This will tend to increase the transfer to the poor. However, if the higher income for the nonpoor relative to the poor decreases the Pareto weight on the poor then the effect on the incidence of program spending is ambiguous. The necessary (and sufficient) condition for a higher income of the nonpoor to result in higher transfers to the poor is that $\lambda_X > (U^n_{GX} - \lambda U^p_{GX})/U^p_G$ in obvious notation.

2.2 *The problem facing the center's Project Office*

The PO sets the budget allocation between communities, taking account of their behavior. The center has its own weight on the poor $\lambda^* > 1$, which it believes to be higher than many of the local λ_i's. The PO does not, however, have the same information set as is available locally. The PO has data supplied by the Central Statistics Office (CSO), represented by the vectors Z_i for i=1,..,n but it is impossible to infer (X_i, H_i) from Z_i. So the center does not know how the community organizations have agreed to allocate their disbursements between the poor and nonpoor. We can write $(X_i, H_i) = (Z_i, \eta_i)$ where η_i is a vector of random variables unobserved by the center but with known joint distribution.

The project office's allocations G_i (for i=1,..,n) solve the problem:

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[9] Bardhan and Mookherjee (1999) characterize the effect of inequality on the relative weight of the income groups in a model of electoral competition, where the nonpoor are organized in a lobby and can make campaign contributions: higher inequality lowers the level of awareness of the poor, decreasing the level of their political participation.

$$\max \sum_{i=1}^{n} E_{\eta}[H_i \lambda^* U^p(G_i^p, X_i) + (1-H_i)U^n(G_i^n, X_i)|Z_i]N_i \qquad (6.1)$$

$$\text{s.t.} \sum_{i=1}^{n} G_i N_i = G \qquad (6.2)$$

where there are N_i people in the i'th community, which is known with certainty. The center also takes account of the fact that G_i^p and G_i^n solve (1.1) and (1.2). We apply the "first-order approach" whereby (2.1) and (2.2) are used to eliminate G_i^p and G_i^n from (6) (recalling that (2.1) and (2.2) are the i'th community's first-order conditions in explicit form).

In addition to (6.2), the center's first-order conditions require that:

$$E[H_i \lambda^* U_{Gi}^p G_{Gi}^p + (1-H_i)U_{Gi}^n G_{Gi}^n | Z] \qquad (7)$$

is equalized across all i at a value given by the multiplier on the center's overall budget constraint, denoted μ. Sufficient conditions for this to be the unique maximum are that:

$$E[H_i \lambda^* U_{GGi}^p (G_{Gi}^p)^2 + (1-H_i)U_{GGi}^n (G_{Gi}^n)^2 + H_i U_{Gi}^p G_{GGi}^p (\lambda^* - \lambda_i) | Z] < 0 \qquad (8)$$

for all i.[10] We can write the solutions in the form:

$$G_i = G(Z_i, \mu) \quad (i=1,..,n) \qquad (9)$$

This can be thought of as the center's "payment schedule", giving its optimal outlays as a function of the observed indicators at local level.

This model of the center's behavior is too general to deliver unambiguous predictions about the comparative static properties. For example, suppose that H is known by the center and that the center does not attach any weight to the welfare of the nonpoor (λ^* approaches infinity), so that the center aims to maximize the total gain to the poor. Now compare the

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[10] Note that (8) implies that (6.1) is strictly quasi-concave in $(G_1,..,G_n)$. Note also that (8) is not implied by concavity of utility functions, which implies that the first two terms in brackets are negative. However, the sign of the third term is ambiguous. A sufficient condition for the third term to be non-positive is that the marginal allocation to the poor does not rise as spending increases

center's spending allocation between two communities with different values of H. There is nothing to guarantee that the community with the higher H should get more from the center. For a program that is initially targeted to the poor ($T>0$), a center aiming to maximize the aggregate gains to the poor will take account of the fact that communities with higher poverty incidence will tend to make lower per-capita allocations to their poor. Whether this effect is strong enough for the center to make lower transfers to poorer communities remains an open question; the answer cannot be predicted from the assumptions so far.

2.3 Relaxing the exogeneity assumptions

Two possible concerns about the above model relate to the exogeneity assumptions. The first is that we have treated the center's allocation as exogenous to community decision making. Possibly some local community organizations have greater political influence on the center than others, which they use to increase their allocation. To allow this possibility in our empirical work we will exploit the fact the model in the last section implies that the center's allocation to any one community will be a function of that community's characteristics relative to the characteristics of other communities. At the same time, the model of the local allocation problem in section 2.1 has the feaure that only the community's own characteristics matter to the distributional outcomes conditional on the allocation received from the center. Together, these theoretical properties imply that the community's relative position in terms of the center's allocation criterion is a valid instrumental variable for testing the exogeneity of the center's allocation to local decision making.

The second concern relates to the possibility that information supplied by the local areas is endogenous. In the model in section 2.2, the CSO monitors a vector of exogenous

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($G^p_{GG} \leq 0$) and that no community cares more about the poor than the center ($\lambda^* \geq \lambda_i$). In the empirical work later we find that we cannot reject the null hypothesis that $G^p_{GG} = 0$.

indicators Z_i directly for all i and the PO bases its allocation on that data. The exogeneity assumption can be questioned in three cases of potential relevance in this setting:

Case 1: one or more elements of Z may be influenced by the allocation of program spending between poor and nonpoor at local level. The center will then want to take account of this effect in making its allocation across communities.

Case 2: Z might include data that the CSO asks each local authority to supply. This presumes that it is prohibitively costly for the CSO to obtain all its data directly; it has no choice but to rely on the information supplied locally. This creates scope for the data to be manipulated by the local authorities. The center will then want to influence local incentives for providing good data.

Case 3: The data available to the researcher on Z might not be the same data that the center based its allocations on. For example, the researcher may be able to obtain more accurate data (not contaminated by the efforts of local authorities to manipulate the data).

Let us partition Z_i as (Z_{1i}, Z_{2i}) where Z_{1i} are endogenous and Z_{2i} are exogenous. We may want to take H_i to be an element of Z_{1i} (with further implications for the analysis in section 2.1 that we will comment on below). Andwe can assume that Z_{2i} is a sub-set of X_i which is still exogenous (and includes other variables unobserved by the center, in η_i.)

In both cases above, we can think of Z_{1i} as some function of X_i; write this as:

$$Z_{1i} = Z_1(X_i) \tag{10}$$

This assumption will help motivate our tests for endogenous data on the program's eligibility criteria when we come to try to explain the center's allocation across areas. In particular, the variables in X_i that are unobserved by the center will be valid instruments for testing the exogeneity of some of the determinants of the center's allocation choices. To help motivate the assumption in (10), let us briefly consider how it might be derived theoretically.

Consider Case 1. One can postulate that Z_{1i} is a function of G_i^p as well as X_i. (Notice that if H_i is an element of Z_{1i} then the objective function will no longer be additively separable between G_i^p and G_i^n. This would create the possibility of a higher value of G_i leading to a lower G_i^p.) G_i^p is in turn a function of (Z_{1i}, Z_{2i}). So we have a set of simultaneous equations in Z_{1i} and G_i^p for which (10) is then interpreted as the solution.

In Case 2, one can interpret (10) as the solution to a contract problem between local authorities and the CSO. For example, suppose that the CSO knows that the project office bases its allocations on both Z_{1i} and Z_{2i}. To help assure more accurate reporting, we can assume that the statistics office is able to impose a penalty on local authorities supplying the data. The penalty takes the form of reporting a likely offender to the PO, which then cuts that community out of the program with some probability. The PO announces that the i'th community will receive $G(Z_{1i}, Z_{2i})$ where the function G is increasing in Z_{1i}. The CSO reports likely offenders with probability $1-\rho(Z_{1i})$ where the function ρ is decreasing in Z_{1i}. So the local authority chooses Z_{1i} to maximize:

$$\rho(Z_{1i})\,[V(G(Z_i), H_i, X_i) - V(0, H_i, X_i)] \qquad (11)$$

where $V(.)$ is the derived maximum of (1.1) subject to (1.2). We then assume an interior solution, which will take the form in (10).

Combining these observations, Table 1 summarizes how we will use the information structure in community-based targeting as part of our identification strategy.

3. Descriptive results

3.1 Measuring and decomposing targeting performance

The strength of association between poverty and program coverage is a natural indicator of the overall performance of an antipoverty program. To see how this can be

formalized, it is useful to introduce some notation for the classification of recipients/non-recipients as poor/nonpoor, as in Table 2.

Each household who participates in the program receives a sum G. The targeting differential (T in equation 4) is the difference between the average amount going to the poor ($n_{11}G/n_{\circ 1}$) and that going to the nonpoor ($n_{12}G/n_{\circ 2}$). When expressed as a ratio to G, we will refer to T/G as the "targeting coefficient":

$$\frac{T}{G} = \frac{n_{11}n_{22} - n_{12}n_{21}}{n_{\circ 1}n_{\circ 2}} \tag{12}$$

This is simply the difference between the fraction of the poor who receive the program and the fraction of the nonpoor who do so. The targeting coefficient lies between –1 and +1. If the program is perfectly targeted to the poor ($n_{12}= n_{21}=0$) then $T/G=1$; if the program is perfectly targeted to the nonpoor ($n_{11}= n_{22}=0$) then $T/G=-1$; a uniform ("untargeted") allocation ($n_{11}/n_{\circ 1}=n_{12}/n_{\circ 2}$) implies that $T/G=0$.

The targeting coefficient is a measure of association for the 2x2 contingency table in Table 2. It is related to the "phi coefficient", a common statistic of association in a 2x2 contingency table, and here given by:

$$\phi \equiv \frac{n_{11}n_{22} - n_{12}n_{21}}{\sqrt{n_{\circ 1}n_{\circ 2}n_{1\circ}n_{2\circ}}} = \frac{T}{G}\sqrt{\frac{n_{\circ 1}n_{\circ 2}}{n_{1\circ}n_{2\circ}}} \tag{13}$$

(The necessary and sufficient condition for $T/G = \phi$ is that $(n_{11} - n_{22})(n_{12} - n_{21}) = 0$.) The phi coefficient is related to the standard chi-square test statistic for the test of independence in a contingency table; in particular $N\phi^2 \sim \chi^2_{(1)}$. This provides a basis for statistical inference about targeting performance.

In a decentralized program, as in our case, the targeting performance can be analyzed beyond the overall national level. As out theoretical model suggests, the final allocation is the outcome of different layers of decision-making. The performance in reaching poor families

can be disaggregated into an 'inter-village' component, reflecting the center's efforts at reaching poor communities, and an 'intra-village' component, that describes the efforts of those communities to reach their own poor. It is readily demonstrated that the overall targeting coefficient can be decomposed into a weighted sum of within-community targeting differentials and a between-community component, as:

$$\frac{\overline{T}}{G} = \frac{\sum (T_i / G) n_{\circ 1i} n_{\circ 2i} N_i}{N n_{\circ 1} n_{\circ 2}} + \frac{\sum (n_{1\circ i} - n_{1\circ})(n_{\circ 1i} - n_{\circ 1}) N_i}{N n_{\circ 1} n_{\circ 2}} \qquad (14)$$

within communities — between communities

where $\overline{T}$ is the overall targeting differential, T_i is the targeting differential within community i, N is the overall number of households and N_i is the number of households in village i.

3.2 The Food-for-Education program

FFE is implemented in two stages. First, the participating Union Parishads (UP) are chosen. (A UP is a local government area; there are about 4,500 in rural Bangladesh, each of which belongs to a "Thana" of which there are 490.) 1,200 UP's were chosen to participate, through a process that assured that all Thanas participated.[11] The stated aim is to select UP's that are 'economically backward' and with a low literacy rate. The selection is done by the center in consultation with the Thana Education Committee and the minister in charge of coordination of development activities in that area of the country. The center controls the UP selection process, though there is clearly scope for local lobbying to attract the program.

The requirement that all Thanas participate appears to be political-economy constraint, whereby broad geographic spread of participants is deemed politically desirable.

[11] Initially one UP from each Thana was selected; 450 UP's were added in the year 1994-95 and extended to an additional 250 in 1995-96.

This is not uncommon in social programs.[12] Naturally it constrains the scope for pro-poor geographic targeting. We will see how much so later.

In the second stage, FFE households are identified within the selected UP's. Widows, day-laborers, low income professionals,[13] landless or near landless farmers, and households with school-aged children not covered by other targeted programs are officially eligible to receive the program.[14] The program relies heavily on community involvement in the selection of the households. The selection is typically done by the School Management Committee (SMC); this is composed of teachers, local representatives, parents, education specialists and donors to the school. The food is distributed by the SMC (or sometimes by the UP or a local NGO). Each participating household is entitled to receive 15kg per month for each child enrolled in school, up to 20kg for more than one child.

The empirical analysis will be based on the Household Expenditure Survey (HES) collected in 1995-96 by the Bangladesh Bureau of Statistics, following well-established and credible survey practices, with support from international agencies including the World Bank. The household questionnaire contains extensive information on household expenditures, and has specific questions on household participation in FFE. A comprehensive consumption aggregate can be formed from the data, including imputed values of consumption in kind, valued at local market prices. We deduct the imputed value of the FFE transfer from the consumption aggregate. A simple random sample of households was drawn from each primary sampling unit (PSU) and a detailed community survey was done. The PSU is the

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[12] See, for example, the discussion of the political economy of program placement for an Argentinean program in Ravallion (1999c).

[13] Defined as fishermen, weavers, cobblers, potters, blacksmiths, etc.

[14] In particular, the Vulnerable Group Development and Rural Maintenance Program are government sponsored programs distributing food to the poor that are not compatible with the FFE program. The household questionnaire accounts only for household participation to the FFE program. The community questionnaire contains information on the presence of the Vulnerable Group Development (reported positive for 4% of the villages) and on other programs: there are very few villages in which the two sets of programs overlap, so that the extent of potential omitted bias when analyzing the intra-village targeting performance is relatively small.

"mauza", which is a compact area of around 250 households, forming a single natural village in about 80% of the cases; in the other cases the will contain two or possible three natural villages. We will refer to it as a "village".

The program reaches 25% of the villages in the sample. The percentage of households participating in the program is 9.8% for the whole sample, and 40% within the participating villages. The poor are defined as those in the poorest half of the national distribution of per-capita expenditure distribution for rural areas (net of the FFE transfers). This accords reasonably well with both official and independent estimates of the poverty rate in rural Bangladesh (World Bank, 1998).

3.3 Measures of overall targeting performance

Table 3 gives our results on the program's targeting performance. Amongst all villages, 16% of the poor receive the program, as compared to 4% of the non-poor; in participating villages, the corresponding proportions are 55% and 18%. So the aggregate targeting coefficient is positive in both cases. We are able to convincingly reject the null hypothesis of independence between poverty incidence and program coverage. Two thirds of the overall targeting coefficient is accounted for by the intra-village component, and this accounts for virtually all of the targeting coefficient for participating villages. We repeated these calculations for two lower poverty lines, namely poverty rates of 25% and 36%. The same basic pattern was found.

Performance is heterogeneous across communities. A preliminary description of the variation across communities can be obtained non-parametrically by looking at how incidence varies (unconditionally) according to observed structural parameters.

As can be seen from Figure 1, the poor benefit from an increase in the budget allocated to the community, consistent with our theoretical model of the community's behavior. However, the benefit to the nonpoor rises only slightly and dies off at high levels of

G, suggesting satiation. Under the assumptions of our model, this implies that higher G must be increasing the relative power of the poor (section 2.1). So marginal gains as the program expands tend to be higher for the poor.[15]

An increase in poverty incidence reduces the allocation to the nonpoor (Figure 2a), but there is no sign of a systematic effect on the allocation to the poor. (There are too few observations to estimate non-parametrically the responsiveness of $G_i^{p,n}$ to H_i separately for $T_i>0$ and $T_i<0$.) Recall that our theoretical model allows either sign for the effect of H_i on G_i^p but G_i^n should be decreasing in H_i controlling for G_i, given that the program is targeted to the poor. The negative effect of H on G^n is confirmed by the data (Figure 2b). There is also a negative effect on G^p.

The empirical analysis in the next section will try to identify some economic and social characteristics relevant to community decision-making, and those characteristics responsible for attracting resources from the center to the community.

4. Econometric models

4.1. Modeling the intra-village allocations

Consider each community's optimal allocation between the poor and nonpoor. The empirical counterparts of (3.1) and (3.2) for the i'th participating village are:

$$G_i^p = \alpha^p G_i + X_i \Theta^p + \xi_i^p \qquad (15.1)$$

$$G_i^n = \alpha^n G_i + X_i \Theta^n + \xi_i^n \qquad (15.2)$$

where X_i is a vector of characteristics for village i. Note that the regressions mirror the 'structural' solution of the local authorities' problem: they are both conditional on G_i, the amount of the total budget allocated to the local area. In keeping with our theoretical model,

[15] This is consistent with evidence for other settings; Ravallion (1999) and Lanjouw and Ravallion (1999) find evidence of early capture by the nonpoor for Argentina and India respectively.

we assume that the center's allocation is exogenous (both ξ_i^p and ξ_i^n are uncorrelated with G_i). OLS estimation of the system (15) then provides consistent estimates of the parameters. The village allocations to the poor/nonpoor G_i^p, G_i^n are estimated only for $G_i > 0$, i.e. for the sample of villages participating in the program. Under the exogeneity assumption, there is no selectivity bias. We will however provide a test for exogeneity of G_I, exploiting the information structure of our theoretical model.

The results on intra-community targeting are presented in Table 5. The eligibility variables include the proportion of households in the village that are landless (land holdings below 0.5 acres), female headed and widows or in low occupational professions. In addition, the average number of children aged 6-15 for each household in the village measures the population of children of primary school age that are the prospective FFE recipients.

The set of 'structural variables' in Table 5 aims to measure the level of 'economic backwardness' of the village. They include indicators for agricultural development and the extent of diversification into non-farm activities, the illiteracy rate of the adult population, the number of schools in the community and its population density. Access to credit is measured by the presence of the Grameen Bank (a well known group-based credit program providing production credit to the poor) and of the Krishi Bank (a state-owned agricultural bank). An indicator for whether the village was hit by a shock in the previous year is also included. Shocks encompass natural disasters (floods, droughts, river erosion, cyclones), epidemic diseases, pest attacks and poultry plagues.[16] A group of variables indicate the degree of openness/isolation of the village with possible implications for the bargaining power of the poor in community decision making: these variables comprise electrification, presence of a telephone, road quality, and distance to the Thana headquarters and to the capital, Dhaka.

[16] Note that both the shock indicators and the number of schools are aggregated in the intra-village targeting regressions, in order to limit the number of regressors.

Two measures of inequality proxy for the balance of power between the poor and nonpoor. Following the discussion in section 2, higher inequality may be associated with worse targeting if the effect on the Pareto weights dominates the gains from reducing inequality (given diminishing marginal utility of income). We construct two measures of within-village inequality based on assets and income respectively: the interquartile range of land ownership (the difference between the 75^{th} and the 25^{th} centiles of the distribution) and the Wolfson polarization index based on household net per capita expenditure.[17]

The community questionnaire offers information on various socio-economic groups or organizations found in the village. Two distinct types of organizations can be identified. The first are clubs that are used mostly for recreational purposes; they are typically accessible only through user fees and tend to rely on financial assistance from patrons, mostly businessmen and voluntary contributions. The second are cooperatives for the poor, including the Farmers Cooperative Society and the B.S.S. (Assetless Cooperative Association).

We also use a measure of existing informal net transfers to the poor within the village. Again, two arguments can be made as to why this might matter. On the one hand, the pressure to target the poor using FFE transfers will be less if the poor are already being helped. However, on the other hand, a high level of transfers to the poor might reflect their power within the village. In view of the potential endogeneity concern here, rather than the level of transfers we shall use a dummy variable taking the value one if net transfers to the poor are positive on average.

We forgo discussion of the results until section 5.

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[17] The results are robust to alternative measures of land inequality; we tried the Gini index and the coefficient of variation. The Wolfson index is not strictly a measure of inequality but rather of the extent of "polarization", interpretable as how bi-modal the distribution is between "poor" and "nonpoor" (Wolfson 1994). More precisely, the index is defined as $W \equiv 2(\mu^* - \mu^L)/m$, where μ^* is the actual mean of PCE times 1 – Gini index, μ^L is the mean PCE for the poorest 50% of the population and m is the median PCE.

4.3 *Modeling the center's allocation across villages*

In modeling the center's allocation we allow the possibility that the set of eligibility criteria (the adult illiteracy rate, landlessness and occupation of the head in certain categories) are correlated with the error term (for the reasons discussed in section 2.3). The information available to the center, represented by the vector Z_i, is partitioned as (Z_{1i}, Z_{2i}) in which $Z_{1i} = Z_1(X_i)$ are the potentially endogenous eligibility criteria, while Z_{2i} (a subset of X_i) is a vector of exogenous variables. The model is:

$$G_i^* = Z_{1i}\beta_1 + Z_{2i}\beta_2 + u_i \tag{16.1}$$

$$Z_{1i} = X_i\Pi + \upsilon_i \tag{16.2}$$

This simultaneous equation system is estimated in a Limited Information Maximum Likelihood (LIML) framework for limited dependent variables, following Smith and Blundell (1986). We compare the results to a Tobit in which endogeneity is ignored.

Again, the information structure at the heart of a decentralized setting provides us with the exclusion restrictions necessary to identify the system. As discussed in section 2.3, the degree of inequality/polarization and the presence of informal transfers to the poor are presumably common knowledge within the village, but are unlikely to be part of the information set used by the center when deciding how to allocate the budget across communities. The set of variables deemed to be idiosyncratic to the local community (X_i^P) provides the instruments for the eligibility criteria.

4.4 *Testing exogeneity of the center's budget allocations at village level*

Our theoretical model, and the regressions based on (15), assume that the center's budget allocation is taken as given in village level decision making i.e., that G_i is uncorrelated with ξ_i^p and/or ξ_i^n in (15). To test this assumption, we check whether our estimated residuals from (16.1) are significant when we add them to our regressions based on (15). For

identification we again rely on the information structure of the problem, and use the village's relative welfare ranking as an instrument, as discussed in section 2.3. Given that the center aims for broad geographic coverage, we use a dummy variable for whether the village is relatively poor within its region, namely whether average per capital expenditure (pre-FFE) is below the region mean. Here we assume that villages know the cardinal value of their average wealth but not that of competing villages, and that the ranking affects the village allocations only through its effect on the budget transferred to the village.

5. Discussion of the results

5.1. Targeting the poor within villages

The regressions in Table 5 confirm the bivariate associations in Figure 1, indicating that allocations to the poor increase significantly with an increase in the amount transferred from the center G_i, consistently with the theoretical predictions of our model of efficient intra-village allocation. On the other hand, the allocation to the nonpoor does not increase significantly with a higher aggregate allocation to the village, implying that the program shifts the balance of power within the village in favor of the poor (section 2.1).

When we add the residuals from the first stage Tobits for G to the regressions in Table 5, the t-tests do not reject the null that the center's budget allocation is exogenous at village level. Other coefficients and their standard errors changed little by treating G_i as endogenous.

Among the eligibility criteria, villages with a higher share of households whose head is employed as an agricultural worker or in a low profession are not more likely to target the poor. Villages with a higher proportion of households headed by women or widows are less likely to reach the poor. These results are suggestive of adverse effects on relative power within the village.

There are significant effects of some of the structural characteristics, suggesting that more developed villages are more effective in reaching the poor. Multiple cropping is associated with better targeting (Table 5).

Higher land inequality or income polarization within the village does not result in better targeting performance. This too suggests adverse effects of these variables on relative power of the poor, since without such an effect one would expect more pro-poor targeting in high inequality villages.

The indicators of existing institutions in the village are jointly significant predictors of the distribution of resources within the village. There is an indication that the presence of informal safety nets targeted to the poor is a substitute for public expenditures, though the effect is not strong. The role of the civil society in collective decision-making is indirectly captured by the presence of recreational clubs (more likely to foster cooperation amongst the non-poor) and cooperatives (more likely to help the poor cooperate) in the village. The degree of local capture and leakage of the program increases with the presence of a club in the community. Conversely, the targeting to the poor, and the share of transfers to the poor, improve when they are organized collectively in cooperatives, though the effect is not significant.

5.2. Targeting villages

The results from the Tobit regression of the allocation of the FFE funds across communities are in Table 6. The center reaches poor areas in some respects: communities that are relatively poorer in the region, with low cropping intensity or hit by a shock (epidemic/pests) are more likely to be receiving the program. Moreover, the center chooses areas where the Grameen Bank is operative.[18] However, the presence of the Krishi Bank weakly reduces the amount of FFE program transferred to the village: it may be the two

public activities are perceived as substitutes and that the center uses the total budget to maximize geographical coverage. There are other indicators going in the opposite direction and these account for the weak inter-village targeting (section 3). Villages with more non-farm activity tend to attract FFE resources. Areas with better irrigation are receiving more transfers from the center, not less.

We are able to reject the hypothesis of exogenous information; the residuals from the first stage predicted 'eligibility' criteria are jointly significant. The measure of relative economic development in the region is significant, justifying our use of this as the instrument for testing exogeneity of G in the regressions for the intra-village allocations.

6. Conclusions

It has often been argued in development policy discussions that by tapping into local information, a suitably decentralized antipoverty program will be able to help the poor more than a centralized program; the decentralized program will, it is claimed, be better at targeting those in need. Against this informational advantage, it is recognized that local communities need not share the center's objectives for the program, and may be less accountable to the poor. In attempting to understand distributional outcomes in this setting, our empirical analysis has been motivated by a model of Pareto-efficient community organizations dealing with a less well-informed central government that retains power over the inter-community allocation of spending, but has no ability to directly control distributional outcomes within communities.

Informed by this theoretical model and our descriptive findings, we have studied the performance of community-based targeting for Bangladesh's Food-for-Education Program. To measure targeting performance, we have proposed a "targeting coefficient". This lies

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[18] There is evidence that Grameen Bank branch placement is responsive to potential gains to the poor (Ravallion and Wodon, 1999c).

between minus one (when the program is perfectly targeted to the nonpoor) and plus one (when it is perfectly targeted to the poor), with a value of zero indicating that the poor and nonpoor are equally likely to get the program. We find that the program's transfers are well targeted to the poor, in that a higher proportion of the poor receive help than do the nonpoor. The difference is substantial; the estimated targeting coefficient is 0.12 and the association between program placement and poverty is statistically significant.

We find that most of this pro-poor overall targeting performance was due to pro-poor targeting within villages. The center's targeting of villages contributed less to overall targeting performance than intra-village targeting. Clearly, the center's desire to assure broad geographic coverage of the program constrained the scope for pro-poor village targeting.

Targeting performance varied greatly between villages, and we have tried to explain why. We cannot reject the null that the center's allocation across villages is exogenous to the intra-village decision making on who gets the program. Comparing villages with different allocations from the program, we find that the proportion of the poor receiving the program increases as the program expands, but the proportion of the nonpoor benefiting from the program does not. These findings are suggestive of a "early capture" of the program by the non-poor; targeting performance improves as the program expands, and worsens when it contracts. While there is pro-poor targeting within villages, the program's official eligibility criteria at village level turn out to be rather weak indicators of inter-village differences in performance. Controlling for the center's allocation, there is a tendency for poorer villages to be less effective at reaching their poor. This is indicated by the village poverty rate and by some of its likely determinants, such as the extent of multiple cropping. So our results lead us to question whether more pro-poor targeting of villages by the center would in fact be poverty reducing.

Our results are suggestive of effects on the relative power of the poor in local decision making. For example, we find that more unequal villages are no better at targeting the poor through the program. This is not what one would expect to find with fixed Pareto weights. We infer that higher inequality comes with lower power for the poor in village decision making, so the nonpoor are able to capture the benefits of this antipoverty program. There is no sign here of a self-correcting mechanism whereby community-based targeting allows the program to reach the poor better in highly unequal villages. There is, however, evidence of substitution between private and public transfers; villages in which there are already transfers to the poor tend to be ones in which the program's resources go relatively more to the nonpoor.

We also find some evidence that local village institutions matters, though they are not necessarily pro-poor. The presence of cooperatives for farmers and the landless does appear to be associated with more pro-poor targeting of this program. However, the presence of recreational clubs—which probably reflect, and help build, the social capital of the nonpoor—has the opposite effect.

A number of factors appear to have influenced the center's allocation across villages, including the official eligibility criteria. There is evidence that some of the data on eligibility criteria used by the center are endogenous; this could be purposive manipulation, real feedback effects or simply the fact that our data differ from those actually used in targeting. Partially offsetting this, controlling for eligibility, the center appears also to have been attracted by more developed villages such as those with more irrigation, and more non-farm activities. Overall, there is not much agreement between the village characteristics that attracted the program and those that enhanced performance at reaching the poor.

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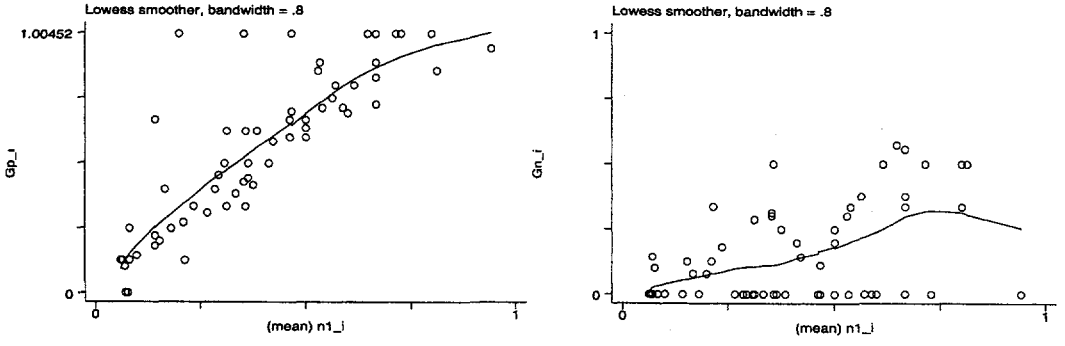
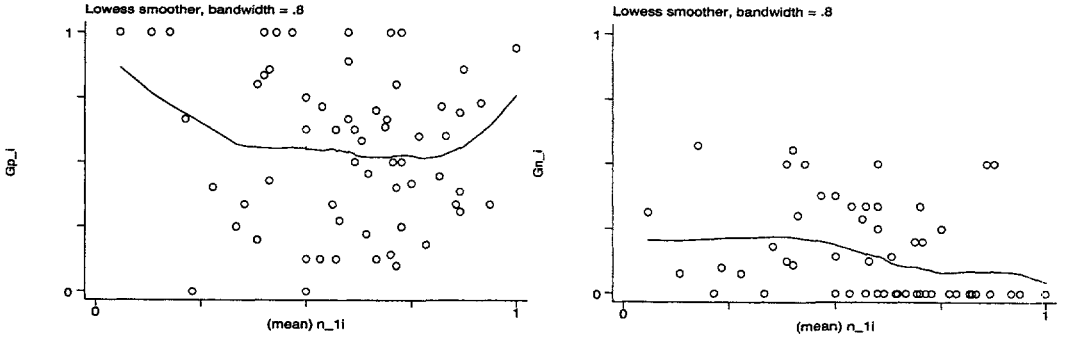
Figure 1: G_i^p and G_i^n on G_i



Note: lowess estimates, bandwith 0.8

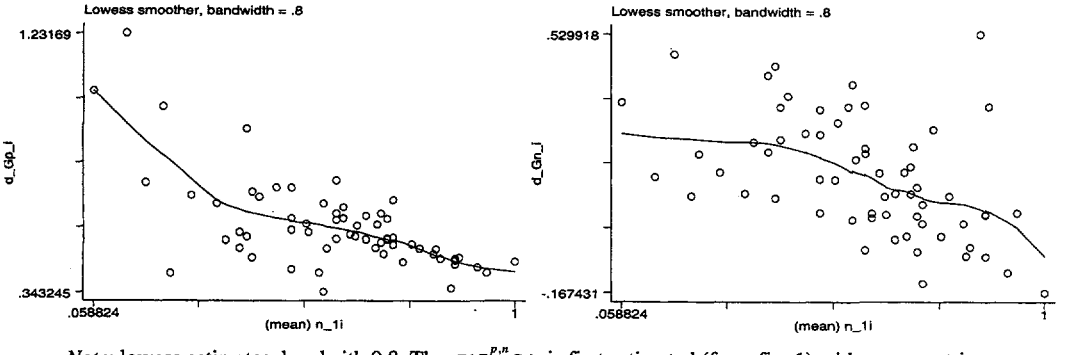
Figure 2a: G_i^p and G_i^n on H_i



Note: lowess estimates, bandwith 0.8

Figure 2b: G_i^p and G_i^n on H_i conditional on G_i:

$G_i^p - E(G_i^p \mid G_i) + \overline{G}^p$ on H_i $\qquad$ $G_i^n - E(G_i^n \mid G_i) + \overline{G}^n$ on H_i



Note: lowess estimates, bandwith 0.8. The $E(G_i^{p,n} G_i)$ is first estimated (from fig. 1) with a symmetric nearest neighbor smoother estimator. The variable on the y-axis is given by the deviations from the fitted line $G_i^{p,n} - E(G_i^{p,n} \mid G_i)$, normalized by $\overline{G}^{p,n}$ for comparability.

Table 1: Information structure and identification

Observed by: Center	community	Examples	Identifies exogenous variation in:
Yes	yes	Commonly known data such as from the census	
Yes	no	Community's relative position on eligibility criteria	center's allocation across communities when explaining local targeting
No	yes	Inequality within the village; transfers within the village	potentially endogenous data on eligibility criteria when explaining center's allocation

Table 2: Notation

		Poor? Yes	No	
Program?	Yes	n_{11}	n_{12}	$P = n_{1\circ}$
	No	n_{21}	n_{22}	$1\text{-}P = n_{2\circ}$
		$H = n_{\circ 1}$	$1\text{-}H = n_{\circ 2}$	1

Table 3: The targeting performance of the FFE program

	$\frac{G^p}{G} = \frac{n_{11}}{n_{\circ 1}}$	$\frac{G^n}{G} = \frac{n_{12}}{n_{\circ 2}}$	$\frac{\overline{T}}{G}$	Intra-village	Inter-village	ϕ	prob. value (χ^2)
All villages	0.157	0.037	0.120	0.076	0.044	0.041	0.000
Participating villages only	0.548	0.180	0.368	0.319	0.049	0.136	0.000

Table 4: Descriptive statistics

		Mean	Std. dev.
Land ownership:	Fraction landless	0.115	0.142
	Fraction near-landless	0.376	0.173
Occupation head:	Agricultural workers	0.195	0.153
	Low profession	0.075	0.101
Fraction female/widow heads		0.037	0.053
Average number children aged 6-15		2.146	0.382
Number of schools:	Government	3.017	1.251
	Private	0.317	0.659
	NGO	0.167	0.454
	Religious (Madrasha)	0.246	0.431
% irrigated area		0.453	0.313
Cropping intensity: 1 crop/year		0.308	0.272
Main activity in village: non-agriculture		0.472	0.500
Main activity females in the village: non-agriculture		0.247	0.432
Illiteracy rate adults		0.597	0.175
Expenditure per member		611.523	164.35
Krishi Bank in the village		0.054	0.227
Grameen Bank in the village		0.047	0.212
Shock: natural disaster		0.754	0.431
Shock: epidemic/pests		0.717	0.452
Village area/no.households (in acres)		1.518	0.981
Road to the village unpaved		0.579	0.495
Distance to Thana (in miles)		8.100	4.955
Distance to Dhaka (in miles)		156.838	89.303
Village is electrified		0.471	0.500
Telephone in the village		0.075	0.264
Club/recreation in village		0.441	0.498
Farmers/poor Cooperative Society in village		0.504	0.501
Average net transfers received by the poor>0		0.345	0.476
Inter-quartile range of landholdings		1.444	1.032
Polarization index		0.266	0.099
Gini index		0.268	0.075

Table 5: Intra-community targeting performance

	T_i	G_i^p	G_i^n
Budget allocation G_i	0.946**	1.125**	0.178
	(4.55)	(6.89)	(1.35)
Eligibility:			
Fraction landless	0.249	0.165	-0.085
	(0.69)	(0.60)	(0.40)
Fraction near-landless	-0.285	-0.043	0.243
	(1.14)	(0.26)	(1.44)
Fraction heads - low profession	0.125	0.118	-0.007
	(0.23)	(0.35)	(0.02)
Fraction heads - agricultural workers	0.111	-0.292	-0.403**
	(0.38)	(1.38)	(2.05)
Fraction heads – female/widows	-1.013	-0.786*	0.227
	(1.22)	(1.81)	(0.32)
Average number children aged 6-15	0.015	0.012	-0.002
	(0.16)	(0.28)	(0.03)
Structural			
Number of schools in village	-0.029	-0.013	0.016
	(0.63)	(0.40)	(0.56)
Main activity: NAG	0.013	-0.006	-0.019
	(0.17)	(0.11)	(0.30)
Main activity women: NAG	-0.022	0.107	0.13*
	(0.19)	(1.48)	(1.64)
Area village per household	0.073	0.009	-0.065
	(1.07)	(0.15)	(1.59)
Cropping intensity: 1 crop/year	-0.372**	-0.129	0.243**
	(2.11)	(0.98)	(2.61)
% irrigated area	-0.002	-0.001	0.002
	(1.24)	(0.60)	(1.50)
Grameen Bank in the village	0.014	-0.031	-0.045
	(0.11)	(0.29)	(0.55)
Krishi Bank in the village	-0.129	-0.056	0.072
	(0.61)	(0.39)	(0.40)
Shock in past 12 months	-0.092	-0.047	0.045
	(0.42)	(0.51)	(0.23)
Illiteracy rate for adults	-0.265	-0.052	0.213
	(1.19)	(0.35)	(1.14)
Modernization/openness			
Road to the village unpaved	0.023	0.028	0.004
	(0.24)	(0.36)	(0.08)
Telephone in the village	0.099	0.057	-0.043
	(0.51)	(0.48)	(0.33)
Village electrified	-0.011	-0.052	-0.041
	(0.15)	(1.10)	(0.80)
Distance to Thana	-0.008	-0.002	0.006
	(1.11)	(0.43)	(1.31)
Distance to Dhaka	0	0	0
	(0.32)	(0.94)	(0.81)
Inequality			
Interquartile range land	-0.025	-0.014	0.01
	(0.72)	(0.73)	(0.41)

Wolfson polarization index	0.045	0.028	-0.017
	(0.41)	(0.35)	(0.16)
Institutions			
Avg net transfers to the poor>0	-0.087	-0.104	-0.016
	(0.96)	(1.52)	(0.28)
Poor Cooperative Society	-0.001	0.041	0.042
	(0.02)	(0.79)	(0.72)
Club/recreation in village	-0.199**	-0.059	0.139**
	(2.86)	(0.99)	(2.37)
Constant	0.73	0.438	-0.292
	(1.65)	(1.54)	(0.89)
R^2	0.85	0.95	0.8
N. obs.	45	45	45
F-test joint significance: (p-value)			
Eligibility	0.655	0.368	0.277
Structural	0.454	0.308	0.145
Modernization	0.726	0.501	0.555
Inequality	0.691	0.758	0.888
Institutions	0.057**	0.498	0.067**
All	0.0**	0.00**	0.0028**

Note: The t-tests of the residuals from the 1st stage LIML (testing for endogeneity of G) are 0.002,1.09 and 1.09 for T, G^p, G^n respectively. The F-test for the joint significance of the interaction effects (G^p/G on the whole set of regressors) is F(27, 17) = 1.71, p-value 0.126.

Table 6: Inter-community incidence of program spending

	Community selection	Budget allocation	
	Probit	*Tobit*	*LIML*
Eligibility			
Fraction landless/near-landless	0.484	0.151	1.525
	(0.79)	(0.64)	(1.25)
Residual land[1]			-1.400
			(1.08)
Adult illiteracy	-0.408	-0.033	-4.103**
	(0.52)	(0.09)	(2.10)
Residual adult illiteracy[1]			4.166**
			(2.14)
Heads – low profession/agricultural workers	1.304	0.629	4.985**
	(1.35)	(1.57)	(3.82)
Residual low profession[1]			-4.686**
			(3.51)
Fraction heads – female widows	0.961	0.607	1.425
	(0.36)	(0.49)	(1.11)
Average number children aged 6-15	0.052	0.037	0.061
	(0.19)	(0.30)	(0.40)
Net PCE village<avg net PCE in the region	0.373	0.206**	0.205**
	(1.55)	(1.93)	(1.99)
Number of schools:			
Government	0.005	-0.014	-0.038
	(0.05)	(0.27)	(0.56)
Private	0.179	0.055	0.165*
	(0.94)	(0.66)	(1.71)
NGO	-0.07	-0.059	-0.264*
	(0.22)	(0.44)	(1.76)
Religious (Madrasha)	-0.186	-0.067	-0.232*
	(0.68)	(0.56)	(1.68)
Structural			
Main economic activity: NAG	0.696**	0.314**	0.019
	(2.89)	(3.03)	(0.14)
Main economic activity females: NAG	-0.485	-0.188	-0.109
	(1.58)	(1.35)	(0.69)
% irrigated area	0.006	0.003**	0.000
	(1.50)	(2.01)	(0.10)
Cropping intensity: 1 crop/year	0.803*	0.339*	0.164
	(1.85)	(1.73)	(0.71)
Grameen Bank in the village	0.877*	0.198	-0.153
	(1.90)	(1.17)	(0.54)
Krishi Bank in the village	-0.275	-0.195	0.069
	(0.55)	(1.12)	(0.33)
Area village per household	0.029	0.014	0.016
	(0.22)	(0.23)	(0.29)
Shock: natural disaster	0.163	0.139	0.204
	(0.52)	(1.01)	(1.41)
Shock: epidemic/pests	0.964**	0.356**	0.208
	(3.20)	(2.67)	(1.39)

Modernization/openness			
Road to the village unpaved	-0.028	0.026	-0.174
	(0.11)	(0.22)	(1.26)
Telephone in the village	-0.347	-0.032	-0.188
	(0.69)	(0.14)	(0.79)
Distance to Thana	-0.006	0.001	0.009
	(0.22)	(0.09)	(0.53)
Distance to Dhaka	0.001	0.000	-0.002**
	(0.72)	(0.32)	(2.08)
Institutions			
Poor Cooperative Society	-0.114	-0.031	-0.151
	(0.44)	(0.27)	(1.39)
Club/recreation in village	0.069	0.024	-0.113
	(0.27)	(0.21)	(0.72)
Constant	-3.211**	-1.57**	0.028
	(2.60)	(2.72)	(0.02)
Pseudo R^2	0.189		
Wald χ^2		56.55	66.72
(p-value)		(0.0003)	(0.0001)

Note: Figures in parentheses are asymptotic t-ratios. 186 observations; 141 censored. Tobit estimates are based on Huber/White standard errors. [1]First stage regressions for landholdings, adult illiteracy and low profession are available upon request: they include, in addition to the regressors above, the inter-quartile range for land, the Wolfson polarization index and an indicator of net transfers to the poor in the community as instruments. The F - test (F(3,161)and p-values) for the joint significance of the instruments in the 1st stage are 1.61 (0.189), 4.35 (0.005) and 1.80 (0.149) respectively. The $\chi^2_{(3)}$ (and p-value) for the joint significance of the 1st stage residuals in the LIML regression is 13.63 (0.003).

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