Community participation and the performance of public works programs in South Africa

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1. Introduction

The notion of community participation in development initiatives has widespread currency. It is argued that the involvement of local people can lower the cost of achieving a given objective and can result in development initiatives that are consistent with their preferences (Uphoff 1986, Ostrom 1996, and Klitgaard 1997, and Narayan 1998). Moreover, such participation can assist in information pooling about exchange opportunities, to improve the transmission of individual reputations, and build institutions that allow the poor to act collectively in their own interest - all features of strengthened social capital (Coleman 1998, Collier 1998, Glaeser, Laibson and Sacerdote 2000, Mansuri and Rao 2004). While advocates of community participation are generally careful to note important caveats such as the potential for local elite capture of resources and ignorance of potential cross-community externalities, the overwhelming impression is that community participation is perceived to be less costly for government while being more responsive to community priorities.

To date, these assertions have been weakly scrutinized from a microeconometric point of view. The literature on participation and poverty reduction is rich in case study material but not in quantitative analysis (Hoddinott et. al. 2001). Mansuri and Rao assert that, "… not a single study establishes a causal relationship between any outcome and participatory elements of a community-based development project" (Mansuri and Rao, 2004, p.1). One reason for this is that data covering a large number of interventions are difficult to obtain. When they are available, a number of questions arise. Are they representative of all interventions of their type? Is there sufficient heterogeneity in design and implementation arrangements to test the importance of community participation? Is the distinction between *de jure* (what appears on paper) and *de facto*

(what actually happens) participation important? Does the extent of participation affect project outcomes, or merely its existence? Are the impacts of participation the same on all dimensions of project performance? Is the potential endogeneity of community participation taken into account?

Two studies stand out as having controlled for some of these considerations: Isham, Narayan and Pritchett (1995) and King and Ozler (1998). King and Ozler (1998) find that students attending schools in Nicaragua with *de facto* autonomy achieved better test scores than students in schools where no local autonomy was granted *or* where autonomy was only *de jure*. These findings are based on regression analysis that controls for student, household, school, and locality effects. Participation is assumed to be exogenous. Isham, Narayan and Pritchett (1995) undertake a multivariate analysis of the impact of participation on the performance of rural water supply performance. A synthetic, cardinal measure of project success was constructed, using subjective *ex post* assessments by two independent readers. The extent of community participation was assessed using *ex post* project reports, with "Participation scored on a continuum, progressing from information sharing, to more in-depth consultation, to shared decision making, to control over decision making" (Isham, Narayan and Pritchett, 1995). They find that controlling for the potential endogeneity of participation and country, locality and project characteristics, that participation increased this subjective measure of performance. However, it is unclear whether their data sources distinguished between '*de jure*' and '*de facto*' participation. As their outcome variable is cardinal, it is not possible to discern the magnitudes of the effects they find.[1]

[1] A third study bearing some relation to this topic is Isham and Kahkonen (1999). They examine the effectiveness of community-based water projects in Central Java in which household level participation in design was encouraged. They find that, "in villages with high levels of social capital – in particular with

This paper uses data on 99 public works projects in South Africa to address the question: does community participation affect project performance? The projects comprise the universe of all labor-intensive public works projects initiated and completed in Western Cape Province over the 1995-1997 period. The data are merged with 1995 household survey data and 1996 census data to control for a wide range of project and spatial characteristics.

Our work is notable for several reasons. First we are able to examine the impact of community participation across a range of project types—not simply water projects or school activities. Second, the set of projects represents a census of all such projects in large administrative region-thus allowing us to set aside issues of sample representativity. The availability of large amounts of census data allow us to use independently collected data to test for the endogeneity of participation. Third, we know whether communities had effective, *de facto*, decision-making authority

We find that d*e facto* participation has a statistically significant, positive effect on the project budget share spent on labor, the log number of days of work created, and the log number of training days undertaken. It increases the percentage of employment that goes to women and is associated with a reduction in the ratio of the project wage to local unskilled wages. It reduces the cost of creating employment and reduces the cost of transferring income to the poor. Further, the magnitudes of these impacts are sizeable and these findings are robust to a variety of model specifications and the inclusion of other covariates.

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active village groups and associations – household participation is likely to be high and monitoring mechanisms are more likely to be in place" (p. 53). They also find that "Village leaders and outsiders do not necessarily represent the preferences of households: household participation in service design and decision-making led to different – typically more expensive and convenient – water technology choices in Central Java" (p. 52).

Section 2 lays out the theory motivating the empirical specifications that follow. Section 3 describes the public works projects and the data collected. Section 4 discusses estimation issues, their resolution and our results and section 5 concludes.

2. Theory

Consider a world comprised of three groups: *financiers, providers and beneficiaries*. The primary role of the financier is to provide funds. Multilateral and bilateral donors, Ministries of Finance and non-government organizations (NGOs) are good examples of financiers. We assume that the financier is interested in reducing poverty but has only a limited budget to do so. The main role of providers is to implement interventions. Providers may be line ministries, autonomous government agencies, private firms, NGOs or community-based organizations. In the case of 'communities', we have in mind a group of individuals within a geographically defined area who collectively implement an intervention with financial backing from the financier. Beneficiaries comprise the communities, households and individuals who are the intended recipients of program benefits, the poor. Note that the roles of these three groups are not always strictly delineated. Depending on context, financiers, providers or beneficiaries may initiate and/or design the intervention. Communities and beneficiaries can be co-financiers as well as beneficiaries of interventions.

Poverty alleviation projects typically have *multiple objectives* or outcomes valued by the actors involved in the intervention. For example, a public works scheme in a rural area may be designed to raise incomes of a target group, say women or the 'poorest of the

poor', create a physical asset of lasting value, provide training in basic construction skills and create community 'capacity' or 'empowerment.' Without loss of generality, we will develop our model on the basis of a project that is characterized by a pair of objectives (z_1, z_2). For example, suppose that the anti-poverty intervention aims to reduce poverty in both the short and long-term. In this context, z_1 would be the level of current consumption of intended beneficiaries while z_2 is the extent to which the program tries to create human capital and eliminate long-term poverty.

There is no reason to expect that all actors will have identical preferences over program objectives. In the case of public works, for example, actors may differ in the weights given to job creation and training. Given a pair of realized objectives, we denote the outcome that accrues to the poor as $B(z_1, z_2)$. We assume that $B(., .)$ is increasing in both arguments and that beneficiaries do not pay any of the costs of poverty reduction; z_1 and z_2 are measured so that more of both of them is considered to be a good thing.

Providers – in the case we will consider here, community-based organizations – and financiers – here government –have their own objectives in addition to caring about the poor. For the government this is

$$G(z_1, z_2) = \beta g(z_1, z) + (1 - \beta) B(z_1, z_2),$$

where $g(\cdot, \cdot)$ represents any "private" benefit that the government receives from having the program designed in a particular way. It could for example represent the fact that the government prefers to not to deliver significant benefits to women or particular ethnic groups. It could also represent differences in discount rates that imply different weighting of long and short-term poverty alleviation benefits. The parameter β denotes the weight

given to the government's versus the poor's payoff; where β =0, the government and the poor have identical preferences.

The community's preferences is denoted by

$$R(z_1, z_2) = \alpha r(z_1, z) + (1-\alpha)B(z_1, z_2),$$

where $r(\cdot, \cdot)$ denotes the "private" payoff of the community organization and α is the weight that it attaches to its own preference relative to that of the poor beneficiaries.

We now consider what would happen if the government managed the poverty reduction program, that is it is both financier and implementer. Any government expenditures not allocated to the project can be spent on some other valuable activity whose price is normalized at one. Thus, the government's objective is to choose (z_1, z_2) to maximize G (z_1, z_2) - C (z_1, z_2). Let the optimal values of this be, $\left(z_1^G, z_2^G\right)$. Thus, the benefit to the poor is $B^G\left(z_1^G, z_2^G\right)$. The community's payoff is $R\left(z_1^G, z_2^G\right)$.

Alternatively, the government could contract provision to the community whose cost function is denoted by c (z_1, z_2). We assume that the community enjoys an absolute advantage in production of both goals so that C (z_1, z_2) > c (z_1, z_2). We also assume that $\frac{\partial c(z_1, z_2)}{\partial z_i} < \frac{\partial C(z_1, z_2)}{\partial z_i}$ for all (z_1, z_2), i = (1, 2).[2] Given this cost advantage, a Pareto improvement is, in principle, possible from decentralizing the program to have some kind of community involvement. This is because $c\left(z_1^G, z_2^G\right) < C\left(z_1^G, z_2^G\right)$. Thus, the government could pay the community organization a transfer of $t = c\left(z_1^G, z_2^G\right)$ to undertake the project on its behalf, thereby saving money. Note, however, that solution is not incentive compatible unless the government has some direct way of controlling the

community organization's inclination to change the program's objectives ex post. This is because preferences over project objectives may differ if $G(z_1, z_2) \neq R(z_1, z_2)$. Define

$$\{z_1^C(y), z_2^C(y)\} = \underset{z_1 \geq 0, z_2 \geq 0}{\arg\max} \{R(z_1, z_2) : C(z_1, z_2) = y\}.$$

Thus, if it were given a transfer of $c(z_1^G, z_2^G)$ to undertake the project, the community organization would be $\{z_1(c(z_1^G, z_2^G)), z_2(c(z_1^G, z_2^G))\}$. This would be the solution under community management if it were not possible for the government to write some kind of contract that restrained the community's behavior. Thus, we are assuming an extreme form of contractual incompleteness in the model, a reasonable assumption when the precise objectives of poverty alleviation programs are very hard to describe *ex ante*.

It is interesting to ask when in this world, the government would wish to decentralize management of poor support to the community organization. Let

$$y^G = \arg\max \{G(z_1^C(y), z_2^C(y)) - y\},$$

as the optimal poverty alleviation budget to grant to a community given that the resource allocation decision will be made at the community level. Then the government will prefer to have a community organization manage a poverty alleviation project if

$$G(z_1^C(y^G), z_2^C(y^G)) - y^G > G(z_1^G, z_2^G) - C(z_1^G, z_2^G).$$

The left-hand side is the payoff of the government if it gives a budget of y^G to the community and the right hand side is the payoff to the government under pure government provision. It is easy to see that the likelihood of community involvement is highest where (i) government and community preferences are more congruent and (ii) the

[2] Hoddinott (2001) provides a detailed set of examples showing the different ways in which communities

absolute cost advantage of the community is largest. It is not clear *a priori* whether the budget is larger or smaller under community management—this depends on the nature of the agency problem involved and how budget sensitive are the different objectives. If the government gets a negative private benefit from pursuing one of the objectives of the program, then it may respond to the agency problem by cutting the budget below the cost of doing the project itself. It could still be optimal for the government to have the community organization undertake the project if there were a distinct cost advantage involved on the other poverty objective.

The community organization has also to be willing to undertake management of the project—it is not reasonable to assume that projects can be foisted on an unwilling organization. This requires that

$$R\left(z_1^C\left(y^G\right), z_2^C\left(y^G\right)\right) \geq R\left(z_1^G, z_2^G\right).$$

Now consider the well-being of the poor. Most of the discussion of poverty reduction tends to assume that the community organizations are more in tune with the preferences of the beneficiaries. If the community cares solely about the beneficiaries, then whenever community management is good for the poor, it will be chosen by the community. However, if there is an agency problem, in the sense that the well-being of the poor and the community organization are not fully in tune, there is no guarantee that this will be the case.

Example: Suppose that the only difference in preferences is which group to target resources on. Thus, let $b(z_i)$ be utility of members of group i when the aim of the anti-poverty program is get them to an income of z_i. We assume that $b(z_i) = \log(z_i)$. There are two groups and let λ be the share of type 1's in the population. The overall

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have a cost advantage.

benefit indicator of the poor is $\lambda b(z_1)+(1-\lambda)\log(z_2)$. The government and the community organization differ in the weight that they attach to the well-being of each group. Thus,

$$G(z_1, z_2) = \beta \log(z_1)+(1-\beta)\log(z_2)$$

and

$$R(z_1, z_2) = \alpha \log(z_1)+(1-\alpha)\log(z_2)$$

where $\alpha \geq \lambda > \beta$. This says that the government favors group 2 when it designs the program. We assume that there is a transaction cost c_i (C_i) for the community organization (government) to reach group *i*, and the initial (pre-transfer) income for group *i* is the same and fixed at *y*. Then the cost of achieving the objective is

$$\lambda z_1 + (1-\lambda) z_2 - y + C_1\lambda \ + C_2(1-\lambda) \equiv \lambda_1 z_1 + (1-\lambda) z_2 + \Gamma$$

if the government manages the project and

$$\lambda z_1 + (1-\lambda) z_2 - y - c_1\lambda_1 + c_2(1-\lambda) \equiv \lambda_1 z_1 + (1-\lambda) z_2 + \gamma$$

if the community organization does. It is now easy to check that

$$(z_1^G, z_2^G) = \left\{\frac{\beta}{\lambda}, \frac{(1-\beta)}{(1-\lambda)}\right\}.$$

It is also easy to check that

$$z_1^C(y), z_2^C(y) = \left\{\frac{\alpha}{\lambda}(y-\gamma), \frac{(1-\alpha)}{(1-\lambda)}(y-\gamma)\right\}$$

and that $y^G = 1+\gamma$. So in this case, the unconstrained community optimum and the constrained optimum yield the same allocation. The community organization spends more on the group that it favors relatively to the government. The two conditions for community participation to be optimal are

$$\beta \log\left(\frac{\alpha}{\lambda}\right) + (1-\beta)\log\left(\frac{1-\alpha}{(1-\lambda)}\right) - 1 - \gamma$$

$$> \beta \log\left(\frac{\beta}{\lambda}\right) + (1-\beta)\log\left(\frac{1-\beta}{(1-\lambda)}\right) - 1 - \Gamma$$

for the government and

$$\alpha \log\left(\frac{\alpha}{\lambda}\right) + (1-\alpha)\log\left(\frac{1-\alpha}{(1-\lambda)}\right) > \alpha \log\left(\frac{\beta}{\lambda}\right) + (1-\alpha)\log\left(\frac{1-\beta}{(1-\lambda)}\right).$$

The latter is clearly satisfied. The former will be satisfied when Γ is much larger than γ and α is closer to β. Whether the poor's benefit goes up or down depends upon whether

$$\lambda \log\left(\frac{\alpha}{\lambda}\right) + (1-\lambda)\log\left(\frac{1-\alpha}{(1-\lambda)}\right) > \lambda \log\left(\frac{\beta}{\lambda}\right) + (1-\lambda)\log\left(\frac{1-\beta}{(1-\lambda)}\right).$$

This will tend to be the case of α is closer to λ than is β, i.e., there is less of an agency problem with community organizations.

3. Data

3.1 Project data, overview

Following the transition to majority rule in 1994, the newly elected Government of South Africa initiated a series of new public works programs as part of its Reconstruction and Development Program. These public works programs shared four objectives: (1) to create jobs for the poor and unemployed; (2) to build or rehabilitate infrastructure, or to improve the natural environment; (3) to provide job training that would enable workers to find post-project employment; (4) build the capacity of communities to exert more control over their own development processes, through strengthening local institutions and

community participation in public works projects. These objectives were a reflection of high levels of unemployment, a backlog in infrastructure such as roads, water and sanitation systems in black rural and urban areas and the new government's development philosophy that stressed sustainability and democracy.

Beginning in 1996, one of us (Adato) began working on a project examining the performance of *all* public works programs implemented as part of the RDP in the Western Cape Province of South Africa. There were 99 projects that had as their primary focus, the alleviation of unemployment and they involved the construction of assets and the development of new skills. These were distributed across seven programs (number of projects in parentheses): "Clean and Green", which involved clean ups of the local environment, the planting of new trees and the clearing of alien vegetation (10); "Community Based Public Works", construction of community centers, stormwater drainage, improved sanitation and water supply (18); "Community Employment Programme", construction of community centers, roads, drainage, schools, clinics (22), "Fynbos Working for Water" project, alien vegetation clearing to improve water supply and retention (14); "Transport projects", roads and storm sewers (6); and "National Economic Forum/Western Cape Economic Development Forum", construction of community centers, roads, bridges drainage, schools, clinics (29). Programs formally began operation in early-mid 1996.

Data on individual project design and implementation were obtained from project documents and mail-in questionnaires. Close examination of these documents revealed that in many cases, they described what was planned, rather than what had actually occurred on the ground. For this reason, this information was complemented by follow-up telephone calls and visits along with a project-level questionnaire that was

administered to project administrators and managers, as well as – where appropriate – project consultants, contractors and accountants. This process – which took approximately 18 months to complete - meant that we obtained detailed information on both what was planned (eg. planned costs) and what actually happened (eg. actual costs), as well as permitting opportunities to check and cross-check information.[3]

Table 1 provides some descriptive statistics. Different types of public works activities - the construction of buildings and roads and bridges and removing alien vegetation and garbage – will have differences in requirements for materials and for specialist inputs such as engineering design. Accordingly, Table 1 groups the assets being constructed as part of these programs into three broad categories: community buildings such as centers, schools and clinics; basic infrastructure activities such as road, storm sewers, sanitation sewers and water reticulation; and other activities such as the removal of alien vegetation and general 'cleaning and greening'.

The average project operated for about nine months, with 20% being completed in less than four months and 33% operating for one year or longer. Only one project operated for more than two years. While projects typically went over-budget, it was only in the case of the construction of community buildings that these cost-overruns were significantly high. Materials-intensive projects such as the construction of community building devote a lower share of their budgets to labor and create fewer jobs. Infrastructure development and community building projects typically employed fewer women than other public works projects.

3.2 Measuring community participation and project outcomes

[3] Adato et. al. (2001) provides a more detailed description of the methods used to collect these data.

In the context we are considering here – one of considerable contractual incompleteness - establishing who has decision making power has a direct bearing on what is meant by community participation. Specifically, one can distinguish between formal (*de jure*) and real (*de facto*) authority. Formal authority - "whose name is on the contract" - is the right to decide; real authority - "who actually is responsible for planning and implementing the project"- is the effective control over decisions (Aghion and Tirole, 1997). The importance of this distinction lies in the possibility that in the absence of delegation of *de facto* decision making power, providers may be reluctant to act because of concerns that they will be overruled subsequently. Alternatively, central authorities may subsequently renege on commitments and the threat of this generates a hold-up problem.

Our data are sufficiently rich to enable us to ascertain the extent to which community based organizations had *de facto* authority. Based on qualitative information collected from project managers and administrators as well as other relevant parties, projects were divided into four categories: (1) the community based organization (CBO) is solely responsible for all aspects of the project, including design, overseeing the contractors, setting wages, selecting workers, controlling the bank accounts etc (32% of projects); (2) the CBO, together with another implementing actor, jointly participates in decision making over some or all aspects of the project, including design, overseeing the contractors, setting wages, selecting workers, controlling bank accounts and so on (23% of all projects); (3) the CBO assists in selecting workers, mediates disputes, liaises with the community but is not a decision maker; (31% of projects) and (4) cases where the community has little or no involvement in the project (15% of projects).

Our data are also rich in information on project outcomes. These can be divided into several categories. First, we would like to know if community participation enhanced

the attainment of program objectives to create employment and training opportunities. Three outcomes capture this: the share of the project budget allocated to labor; the log of the number of days of work created; and the log of the number of training days undertaken. Second, we would like to know who in the community captures these benefits and this is measured in two ways: via the ratio of the daily project wage to the local unskilled wage (consistent with the literature on self-targeting of public works, a lower ratio is indicative of improved targeting towards the poor); and the percentage of employment that goes to women. Lastly, we have information on the cost-effectiveness of community participation. This includes cost overruns (computed as the ratio of cost overruns to projected costs as submitted in the project proposal) relative to projected costs, the log cost in rands of creating one day of employment (calculated by dividing the number of days of employment generated by the project by its total cost); and the cost to the government of transferring one rand to poor. This variable is the benefit stream generated by the project divided by the government expenditure on it. The benefit stream consists of transfer benefits to workers net of what they would have earned in the project's absence plus non-transfer benefits captured by the poor.[4] A low value indicates that the project is cost-efficient in delivering resources to the poor.

Table 2 provides mean values of these project outcomes, disaggregated by varying degrees of community participation. The top panel classifies projects as to whether or not there is any participation. Community participation appears to be associated with an increased share of project budgets being allocated to labor, and with

[4] There are numerous details associated with calculating this figure, including estimating the size of leakages to the non-poor, the probability of obtaining work in the absence of the project, worker's wages on the project, workers' wages in the absence of the project, the probability of finding non-project work while working on the project, and the level of non-transfer benefits. These are documented in Haddad and Adato (2002).

greater amounts of job creation and training. However, these differences are not statistically significant. Community participation is associated with improved targeting to the poor, as proxied by the ratio of project wages to local unskilled wages as well as a markedly increased share of employment going to women. While projects with at least some degree of community participation have relatively higher cost overruns, this difference is not statistically significant and projects with community participation appear to have lower costs of creating work and transferring resources to the poor.

The bottom panel of Table 2 assesses whether the extent of community participation affects project outcomes. While the F statistic indicates that we can reject the null that mean outcomes are equal across differing degrees of participation, the pattern of these differences is not uniform. For example, job creation and training appear to be highest in projects where the community has an advisory or liaison role but no decision making authority whereas project wages are relatively lowest where the community has sole decision-making authority. Projects with the highest cost-overruns, relative to projected budget are those where communities have sole decision-making power, next highest where there is no community participation and lowest where there is joint decision-making. That all said, there are a number of reasons why we might not want to put too much weight on these findings. First, they do not account for other factors – for example project characteristics such as size and type of asset created – that might also affect these outcomes. Second, they do not take into account the processes by which projects were situated in particular localities- what Rosenzweig and Wolpin (1986) and Pitt, Rosenzweig and Gibbons (1993) call endogenous program placement. Third, they do not take into account the possible endogeneity of community participation.

3.3 Other characteristics that may be important for project outcomes

Project outcomes may also be affected by locality characteristics. For example, labor costs might be higher in areas with high local wages and low levels of unemployment. To account for this, we will draw on data that describes the 34 districts in which the projects are located. These are taken from the 1995 October Household Survey (OHS), conducted by the Government of South Africa's Central Statistics Service. The OHS collected detailed household data on jobs, wages and employment status, education and demographic data, information on aspects of living standards such as housing quality, and access to infrastructure (water, electricity, telephones, transport and health facilities) and crime and safety. In our multivariate analysis, these household level data are aggregated into district means.

4. Results

4.1 Estimation issues

An estimable model that captures the relationship between community participation and project outcomes can be written as:

$$I_{ij} = \beta \cdot CP_{ij} + \boldsymbol{\gamma}' \cdot \mathbf{P_{ij}} + \boldsymbol{\eta}' \cdot \mathbf{L_i} + e_{ij} \qquad (1)$$

where: I_{ij} is the outcome indicator of project j located in locality i; CP_{ij} captures the extent of community participation in the project; $\mathbf{P_{ij}}$ is a vector of other project characteristics; $\mathbf{L_i}$ is a vector of locality characteristics; β, $\boldsymbol{\gamma}$ and $\boldsymbol{\eta}$ are parameters to be estimated; e_{ij} is an error term; and vectors are written in bold.

There are two potential problems associated with attempting to obtain consistent estimates of β. First, governments *choose* to contract with community-based organizations and these organizations *choose* to accept these contracts. Factors that affect

this choice could also affect project outcomes. This implies that $E(CP_{ij}\, e_{ij}) \neq 0$ and therefore that estimates of β are biased and inconsistent. Second, government may choose to locate projects on the basis of locality characteristics, for example citing infrastructure projects in places with poor infrastructure. This implies that $E(\mathbf{P_{ij}}\, e_{ij}) \neq 0$ and that estimates of both $\boldsymbol{\gamma}$ *and* β are biased and inconsistent.

One way of addressing these problems is to think of participation as an endogenous "treatment". That is, we estimate equation (1) as a treatment effects model using Heckman's (1979) two-step consistent estimator. This takes the following form:

$$I_{ij} = \beta \cdot CP_{ij} + \boldsymbol{\gamma}' \cdot \mathbf{P_{ij}} + \boldsymbol{\eta}' \cdot \mathbf{L_i} + e_{ij}$$

where CP_{ij}, the endogenous dummy variable is assumed to reflect an unobservable latent variable CP_{ij}^* which itself is determined by:

$$CP_{ij}^* = \boldsymbol{\tau} \cdot \mathbf{w_{ij}} + \nu_{ij}$$

where $\mathbf{w_{ij}}$ are covariates that affect participation, $\boldsymbol{\tau}$ are their associated parameters, ν_{ij} is a disturbance term and the relationship between CP_{ij} and CP_{ij}^* is given by:

$$\begin{aligned} CP_{ij} &= 1, \text{ if } CP_{ij}^* > 0 \\ &= 0, \text{ otherwise} \end{aligned}$$

and where e_{ij} and ν_{ij} are bivariate normal. Amongst others, Maddala (1983, p. 120-122) shows that consistent estimates of β can be obtained by first estimating the determinants of treatment (here, community participation). From this probit, the hazard (λ) or inverse Mill's ratio is calculated and this is then inserted as an additional regressor. This gives us:

$$I_{ij} = \beta \cdot CP_{ij} + \boldsymbol{\gamma}' \cdot \mathbf{P_{ij}} + \boldsymbol{\eta}' \cdot \mathbf{L_i} + \omega\lambda_{ij} + e_{ij} \qquad (2)$$

Estimating (2) requires that we identify covariates that plausibly affect participation but do not directly affect project outcomes. We use two such covariates as instruments for participation.

The first draws on insights found in Easterly and Levine (1997), Mauro (1995) and Knack and Keefer (1997). Easterly and Levine's note that "an assortment of political economy models suggest that polarized communities will be prone to competitive rent-seeking by the different groups and have difficulty agreeing on public goods like infrastructure … ethnic diversity may increase polarization and thereby impede agreement about the provision of public goods (Easterly and Levine, 1997, pp. 1205-1206). Additionally, where groups have a history of limited interaction – something certainly true of race relations in South Africa – one would expect that levels of trust across groups (which are built up by repeated interactions) would be lower. As Knack and Keefer emphasize, trust can be thought to help solve problems of information asymmetries to be solved thereby "allowing self-enforcing agreements to be reached." This suggests that racial fractionalization would be a natural determinant of the likelihood of community participation. Specifically, we construct an index of ethnic fractionalization that takes the form: $1 - \Sigma_{i=1}^{I} (n_i / N)^2$, i= 1, …, I; where n_i is the number of people in the ith group, N is the total population and I is the number of groups. By construction, it can range in value from 0 – complete homogeneity – to 1, complete heterogeneity. We use the OHS data at the district level on the percentage of individuals from different racial groups (White, Coloured, African, Asian) to construct the index. These data were collected prior to the implementation of these programs so there should not be any reverse causation from project implementation to racial fractionalization.

The second covariate follows from the observation found in the literature on community-based development that stresses that past experience with collective action enhances the capacity of people to take on new participatory projects. One covariate that captures this is the share of the vote that the African National Congress (ANC, the

leading political party in the struggle for majority rule) received in local elections held in the November 1995 and March 1996– elections that occurred prior to the implementation of these projects. The political struggle for majority rule in South Africa had a strong "grassroots" community-level participatory component and, that communities where this was most marked were communities that supported the ANC. As such, these communities may be able to engage in a different form of collective action.[5] Further, there were elections held for approximately 136 local councils; and it appears that for at least 1/3 of our sample, our unit of analysis, "the community" maps directly onto a local election. For the remainder, the "local council" refers to a geographical entity larger than "the community" but smaller than a district.

To see whether these characteristics affect the likelihood of *de facto* community participation, we estimated a probit where the dependent variable equals 1 if there is any community participation (ie cases where the community is the sole decisionmaker, joint decisionmaker or plays an advisory role), zero otherwise. These results are reported in Table 3. Racial fractionalization and ANC voting share in local elections have a statistically significant effect on the likelihood of participation at the 1% and 12% confidence levels respectively. A chi squared test does not accept the null hypothesis that these three correlates of participation are jointly zero at the 2% confidence level. The sign on racial fractionalization is negative, consistent with the hypothesis that increased diversity makes the provision of public goods more problematic. The sign on ANC voting share is positive.

[5] While other political parties – such as PAC and the Communist Party - were involved in these political efforts, they received little electoral support in the local elections.

In addition to showing that these covariates are correlated with participation, we also need to demonstrate that they are uncorrelated with project outcomes. We do so in two ways.

First, we estimate reduced form determinants of the eight project outcomes we have been considering. In these regressions, we *exclude* community participation, *include* the "instruments", racial fractionalization and ANC vote share, and test to see if these covariates are individually and jointly significant. These results are reported in Table 4. Neither covariate has any direct effect on these project outcomes.

Second, we construct a "pseudo-Hausman" test. We estimate a linear probability model with de facto community participation as the dependent variable and use the same covariates as in Table 4 as regressors. We recover the residuals and include these in a linear regression where the dependent variables are the project outcomes listed in Table 5 and the regressors are (exogenous) *de facto* community participation as well as project and locality characteristics.[6] In only one case, cost overruns, is an instrument statistically significant at the 15% level or better and so we drop this outcome from the remainder of our analysis. Collectively, we conclude from Tables 3, 4 and 5, we conclude that our instruments are correlated with participation but uncorrelated with the remaining seven project outcomes.

In addition to addressing the concern of endogenous participation, above we noted that endogenous project placement is also a potential concern. However, there are several reasons why it is unlikely to be problematic for our work here.

[6] We also constructed the over-identification test as set out in Wooldridge (2002, p. 123) but did not obtain results any different from those described here.

First although each program had its own stated set of location criteria[7], none of the programs explicitly state that they use socio-economic data to determine which areas should be prioritised and only two programs (encompassing seven per cent of our sample) mentioned infrastructure needs as a targeting requirement. Second, no locality received funding for more than one project within one program but programs paid no attention to what other development project funding the locality received. Third, in separate work, Adato and Haddad (2002/3) systematically examine the relationship between locality and project selection, and characteristics of the districts in which these projects are sited. They find no evidence of any systematic relationship between these. All these observations suggest that projects were allocated to localities in a somewhat unsystematic fashion and that, therefore, concerns regarding non-random placement of interventions in selected communities are not warranted here.

Instead, it appears that private-sector engineering consultants played a large role in accessing public works funds for any given locality. In the Western Cape, large-scale white-owned consulting engineer and construction companies have long standing relationships with local and provincial governments. Taking advantage of their knowledge of funding opportunities, these firms informed communities about the availability of funds, assisted in the preparation of project applications and then were almost inevitably contracted to design the infrastructure. An excerpt from an interview with a consulting engineer in one project illustrates this vividly:

> … the new system is that we can go out in the field, we can advertise, we can go speak and sell ourselves you see. What we do is like now in the Karoo: when we first started here it was about 1993, we visited all the small towns and we said, well you know the new funding is going to work like this, you've got to apply. It's not going to work like: a small town

[7] See Adato and Haddad (2002).

> you've got so many inhabitants you get so much, it depends on what you need. You've got to apply, and the more you apply for and the quicker you apply, the more you'll get.

4.2 Estimation strategy

Given the discussion above, we adopt the following estimation strategy. We will estimate the determinants of seven different project outcomes: the share of the project budget allocated to labor; the log of the number of days of work created; the log of the number of training days undertaken; the ratio of the daily project wage to the local unskilled wage; the percentage of employment that goes to women; the log cost in rands of creating one day of employment; and the cost to the government of transferring one rand to poor.

We control for project characteristics that might affect these outcomes: projected duration and type of asset being created (construction of community buildings, construction of basic infrastructure). We will control for locality characteristics that might have an independent effect on project outcomes: log mean local wages for comparable semi-skilled work; the local unemployment rate; the locality's poverty rate and the percentage of households reporting that they feel safe or very safe. Lastly, we include regional dummy variables (regions are geographical entities smaller than a province but larger than a district) to capture regional fixed effects. With these covariates, we will estimate models (1) and (2).

4.3 Basic results

Estimates of (1) and (2) are reported in Tables 6, 7 and 8. We have grouped these tables according to type of project outcome being considered. Table 6 looks at the impact of

participation on the attainment of project objectives. Table 7 looks at the measure of the distribution of project benefits and Table 8 examines aspects of cost-effectiveness.

Treating participation as exogenous, participation has a statistically significant, positive effect on the project budget share spent on labor and the log number of training days undertaken. Treating participation as endogenous, participation has a statistically significant, positive effect on the project budget share spent on labor, the log number of days of work created and the log number of training days undertaken. It increases the percentage of employment that goes to women and is associated with a reduction in the ratio of the project wage to local unskilled wages. It reduces the cost of creating employment and reduces the cost of transferring income to the poor.

4.4 Robustness checks and additional results

A concern we had in developing these results was that our measure of community participation was picking up the impact of some other locality characteristic. For this reason, in preliminary work we added a wide range of locality characteristics to these specifications. These included: average household size; proportion of female headed households; the percent of individuals that have completed standard 5 and standard 10 of schooling (standard 10 is the equivalent of completing high school); mean per capita incomes; the standard deviation of per capita incomes; the standard deviation of male and female wages; quality of infrastructure; the proportion of households who report that they are unable to feed their children; the district rate of unemployment; the district rate of long term (greater than one year) unemployment; proportion of adults by occupational class; housing quality (side, building materials, sanitation); levels of home ownership; access to water, electricity, telephones, transport and health facilities; and reported levels

of crime. None of these variables had explanatory power, thus they are not used in the results reported below. We experimented with different controls for project location; again doing so had no meaningful impact on the results reported here. Finally, we included a set of dummy variables that reflected our subjective assessment of the quality of the project level data we had obtained. These had no statistical significance and their inclusion does not substantively alter our results.

We experimented with the inclusion of other variables that we believed might affect community participation. These included measures of economic stratification (such as the standard deviation of earnings, levels of unemployment; percentage of individuals in different occupations; levels and severity of poverty); political fractionalization, derived in the same manner as the index of ethnic fractionalization and drawing on information on the shares of votes obtained by different political parties and measures of community access to infrastructure (such as distance to various facilities; access to telephones); and other measures of political activity, such as voter turn out and the identity of the party that controlled the local council. None of these variables had explanatory power in the regressions used to predict the probability of participation and hence their exclusion does not affect our results.

Finally, we note that as part of the fieldwork that generated this research, one of us (Adato) conducted a series of case studies that covered, *inter alia*, the role of community participation in project implementation. These discussions generated a series of observations that are consistent with our empirical findings. Participation early-on in the project cycle enabled communities and planners to iron out problems before physical construction commenced. Making changes midway through a project can be costly; further a community unhappy with the way they see a project progressing may disrupt it.

In one locality, community members indicated that constructing a road out of bricks would lead to vandalism (ie people taking the new bricks out of the road for use as building materials) and therefore it was less costly to pave the road. By contrast, in another community where vandalism was not problematic, the community pressed for the use of bricks in road construction, because this would be more labour intensive as well as creating new brick making skills (Adato et al. 1999). After the initial findings were generated, two of us (Adato and Hoddinott) presented these results at a two-day workshop where government, NGO and community representatives were present. The findings of improved cost effectiveness elicited a particularly strong response. A number of community representatives indicated that this finding was consistent with their own experiences; specifically in cases where communities were actively involved in project decision making, there was a strong preference for using standardized designs for the construction of community halls, crèches etc. Doing so reduced expenditures on design consultants such as engineers and architects.

5. Conclusion

This paper has examined the relationship between different types of community participation and the performance of interventions designed to reduce poverty. We develop some simple analytics that are used to motivate the empirical analysis of the impact of participation on the efficacy of public works interventions in South Africa. The empirical implications of our model are straightforward: (i) we should expect to see an empirical difference between programs that are community managed and those that purely government run, (ii) there is no direct link between the cost of delivering benefits in a program and whether a program is community run. We could easily find community

managed programs that have more or less cost per unit in equilibrium because of changes in objectives. Formally testing these implications is, however, challenging. For a reasonably large number of interventions, we need information about the extent of community participation, the level of benefits to the community, the distribution of benefits within the community and indicators of cost effectiveness. Further, such data, while necessary, are not sufficient. Project outcomes might also be affected by locality characteristics and so we need additional data that can control for these. Lastly, the fact that in our model financiers *choose* to work with community-based organizations implies that we cannot necessarily assume that community participation is exogenous and so are data must also be rich enough to take this potential endogeneity into account.

We draw on a unique set of data from the Western Cape Province, South Africa, that meets all these requirements. *De facto* participation has a statistically significant, positive effect on the project budget share spent on labor, the log number of days of work created, and the log number of training days undertaken. It increases the percentage of employment that goes to women and is associated with a reduction in the ratio of the project wage to local unskilled wages. It reduces the cost of creating employment and reduces the cost of transferring income to the poor. The magnitudes of these impacts are sizeable. These finding are robust to a variety of model specifications and the inclusion of other covariates.

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Table 1: Project characteristics

Project characteristics	Constructs community buildings	Constructs basic infrastructure	Other projects	All projects
Duration (days)	339	236	329	295
Project cost (‘000s rands)	1099	1458	1322	1305
Ratio: Cost overruns to planned project costs	31.5	11.3	11.4	18.8
% Projects over budget	64.5	61.5	66.7	63.9
Project budget share spent on labor	30.2	34.8	70.4	43.2
Ratio: Project wage to local unskilled wage	71.1	81.3	85.0	79.1
Number of person years of work created	34.7	27.1	141.8	61.4
Number of person years of training undertaken	3.8	1.8	5.9	3.6
% Jobs taken up by women	14.2	20.1	40.2	23.9
Sample size	31	39	27	97

Table 2: Mean project outcomes by degree of community participation

	Attaining program objectives			Distribution of benefits		Cost-effectiveness		
Degree of community participation	(1) Mean project budget share spent on labor	(2) Mean log number of days of work created	(3) Mean log number of training days	(1) Mean ratio, Project wage to the local unskilled wages	(2) Mean Percentage employment to women	(1) Mean ratio, Cost overruns to planned project costs	(2) Mean log cost of creating one day of work	(3) Mean cost of transferring one rand to a poor person
No participation	0.37	7.94	5.49	0.85	8.25	13.4	5.12	11.10
Any participation	0.44	8.45	5.94	0.78	25.94	19.2	4.41	7.19
F test on differences in means	0.76	1.25	0.76	0.90	5.80**	0.17	8.75**	3.93**
No participation	0.37	7.94	5.49	0.85	8.25	13.4	5.12	11.10
Community advises but does not decide	0.52	9.61	6.63	0.82	33.84	4.9	4.32	6.47
Community is joint decision maker	0.45	7.69	5.09	0.85	21.31	2.1	4.51	8.15
Community is sole decision maker	0.35	7.90	5.82	0.70	21.93	41.0	4.40	6.92
F test on differences in means	3.03**	14.25**	5.01**	2.59*	3.78**	4.71**	3.31**	1.70

Table 3: Probit estimates of the determinants of *de facto* participation

	Dependent variable equals one where community, *de facto*, participates in project decision-making
Log projected duration of project (days)	-1.601
	(4.63)**
Project constructs community buildings	-3.933
	(4.17)**
Project constructs basic infrastructure	-3.190
	(6.04)**
Log average wage in district	6.624
	(3.86)**
District unemployment rate	0.386
	(3.86)**
District (P0) poverty rate	-5.366
	(1.92)*
Percentage of households reporting that they feel safe or very safe	-0.348
	(1.47)
ANC voting share in local council election	4.302
	(1.53) (Significant at the 12% level)
Index of racial fractionalization	-47.03
	(2.73)**
Constant	47.26
	(4.01)**
Chi squared on joint significance of instruments	7.61** (Significant at the 2% level)

Notes: 1. Covariates that serve as instruments for participation are in italics. 2. Absolute value of z statistics in parentheses. 3. Standard errors account for clustering at the magisterial district level. 4. * Significant at the 10% level; ** significant at the 5% level. 5. Magisterial district dummy variables for Metropolitan Cape Town and Winelands included but not reported. 6. Sample size is 97.

Table 4: Reduced form determinants of project outcomes

	Attaining program objectives			Distribution of benefits		Cost-effectiveness		
	Project budget share spent on labor	Log number of days of work created	Log number of training days	Ratio: Project wage to the local unskilled wages	Percentage employment to women	Ratio: Cost overruns to planned project costs	Log cost of creating one day of work	Cost of transferring one rand to a poor person
ANC vote share	0.167	0.494	-0.064	-0.063	-16.19	-0.145	-0.595	-5.45
	(0.98)	(0.67)	(0.06)	(0.16)	(0.92)	(0.24)	(1.35)	(0.45)
Racial fractionalization	0.212	-1.183	-0.984	0.325	56.78	-1.356	-0.157	-12.97
	(0.78)	(0.79)	(0.73)	(1.21)	(0.97)	(1.95)*	(0.21)	(1.61)
F test on joint significance of racial fractionalization and vote share	1.36	0.35	0.64	0.80	0.64	2.66	0.90	1.37

Notes: 1. (1) Additional variables included but not reported are log projected project duration, type of infrastructure build, district mean wages, unemployment, poverty (P0) rate, and % households feeling safe or very safe and location dummies. 2. Absolute value of t statistics in parenthesis. 3. Standard errors account for clustering at the magisterial district level. 4. * Significant at the 10% level; ** significant at the 5% level. 5. Sample size is 97.

Table 5: Parameter estimates for the first stage residual in the determinants of project outcomes

	Attaining program objectives			Distribution of benefits		Cost-effectiveness		
	Project budget share spent on labor	Log number of days of work created	Log number of training days	Ratio: Project wage to the local unskilled wages	Percentage employment to women	Ratio: Cost overruns to planned project costs	Log cost of creating one day of work	Cost of transferring one rand to a poor person
Residual	0.142	-0.589	-0.166	0.211	73.52	-1.115	-0.013	-10.94
	(0.37)	(0.43)	(0.13)	(0.80)	(1.41)	(1.18)	(0.01)	(0.95)

Notes: 1. (1) Additional variables included but not reported are de facto community participation, log projected project duration, type of infrastructure build, district mean wages, unemployment, poverty (P0) rate, and % households feeling safe or very safe and location dummies. 2. Absolute value of t statistics in parenthesis. 3. Standard errors account for clustering at the magisterial district level. 4. * Significant at the 10% level; ** significant at the 5% level. 5. Sample size is 97.

Table 6: The impact of participation on attainment of project objectives

	Project budget share spent on labor		Log number of days of work created		Log number of training days	
	(1)	(2)	(1)	(2)	(1)	(2)
De facto participation	0.070	0.161	0.701	1.178	0.629	1.264
	(2.16)**	(1.72)*	(1.13)	(2.52)**	(0.76)	(1.87)*
Project characteristics						
Log planned duration	-0.026	-0.019	1.489	1.525	1.265	1.322
	(0.68)	(0.65)	(8.53)**	(9.97)**	(4.79)**	(6.16)**
Constructs community buildings	-0.429	-0.427	-0.261	-0.248	0.442	0.497
	(7.30)**	(8.68)**	(0.57)	(1.01)	(1.60)	(1.47)
Constructs basic infrastructure	-0.383	-0.379	-0.433	-0.414	-0.404	-0.370
	(6.63)**	(7.65)**	(1.70)*	(1.67)*	(2.23)**	(1.08)
Locality characteristics						
Unemployment rate	0.001	0.0002	-0.022	-0.026	-0.035	-0.043
	(0.16)	(0.04)	(1.00)	(0.95)	(0.94)	(1.12)
Log average wages	-0.181	-0.183	-0.745	-0.758	1.251	1.242
	(2.20)**	(1.81)*	(1.91)*	(1.50)	(1.59)	(1.83)*
District (P0) poverty rate	-0.463	-0.448	-1.719	-1.636	2.894	2.852
	(2.86)**	(1.93)*	(1.57)	(1.41)	(1.25)	(1.72)*
Percentage of households reporting that they feel safe or very safe	-0.002	-0.001	-0.044	-0.039	-0.022	-0.018
	(1.09)	(0.38)	(3.49)**	(3.03)**	(1.94)*	(1.08)
Inverse Mill's Ratio		-0.089		-0.469		-0.565
		(1.34)		(1.41)		(1.22)
Chi squared statistic, all regressors		113.52**		186.27**		92.10**
R2	0.513		0.647			

Notes: 1. (1) Is basic specification; specification (2) is a "treatments" regression with community participation treated as endogenous. 2. Absolute value of t statistics in parenthesis for specification (1). 3. Absolute value of z statistics in parenthesis for specification (2). 4. Standard errors are robust to cluster effects at the magisterial district level. 5. * Significant at the 10% level; ** significant at the 5% level. 6. Magisterial district dummy variables for Metropolitan Cape Town and Winelands included but not reported. 7. Sample size is 97 for budget share and days work created, 85 for days training created.

Table 7: The impact of participation on the distribution of project benefits

	Ratio: Project wage to the local unskilled wages		Percentage employment to women	
	(1)	(2)	(1)	(2)
De facto participation	-0.131	-0.208	14.41	17.78
	(1.46)	(2.17)**	(2.30)**	(1.68)*
Project characteristics				
Log planned duration	-0.010	-0.015	3.843	4.094
	(0.18)	(0.50)	(1.36)	(1.19)
Constructs community buildings	-0.151	-0.153	-24.812	-24.726
	(5.77)**	(3.03)**	(9.08)**	(4.45)**
Constructs basic infrastructure	-0.037	-0.040	-20.342	-20.207
	(0.75)	(0.79)	(5.79)**	(3.61)**
Locality characteristics				
Unemployment rate	-0.001	-0.001	-0.852	-0.875
	(0.25)	(0.15)	(1.32)	(1.43)
Log average wages	-0.604	-0.602	-2.047	-2.144
	(9.77)**	(5.80)**	(0.16)	(0.19)
District (P0) poverty rate	-0.387	-0.400	-3.774	-3.185
	(2.58)**	(1.68)*	(0.08)	(0.12)
Percentage of households reporting	-0.005	-0.006	-0.405	-0.367
that they feel safe or very safe	(2.29)**	(2.32)**	(3.88)**	(1.27)
Inverse Mill's Ratio		0.077		-3.317
		(1.11)		(0.42)
Chi squared statistic, all regressors		80.57**		56.81**
R2	0.416		0.323	

Notes: 1. (1) Is basic specification; specification (2) is a "treatments" regression with community participation treated as endogenous. 2. Absolute value of t statistics in parenthesis for specification (1). 3. Absolute value of z statistics in parenthesis for specification (2). 4. Standard errors are robust to cluster effects at the magisterial district level. 5. * Significant at the 10% level; ** significant at the 5% level. 6. Magisterial district dummy variables for Metropolitan Cape Town and Winelands included but not reported. 7. Sample size is 97.

Table 8: The impact of participation on project cost-effectiveness

	Log cost of creating one day of work		Cost of transferring one rand to a poor person	
	(1)	(2)	(1)	(2)
De facto participation	-0.435	-0.904	-3.839	-8.041
	(1.47)	(2.82)**	(1.56)	(2.64)**
Project characteristics				
Log planned duration	0.137	0.102	-0.194	-0.506
	(1.67)*	(0.97)	(0.15)	(0.51)
Constructs community buildings	0.680	0.668	3.354	3.247
	(3.19)**	(3.96)**	(2.80)**	(2.03)**
Constructs basic infrastructure	0.936	0.917	3.172	3.004
	(6.18)**	(5.39)**	(3.93)**	(1.86)*
Locality characteristics				
Unemployment rate	0.020	0.023	-0.423	-0.394
	(1.41)	(1.25)	(1.70)*	(2.23)**
Log average wages	0.772	0.785	0.241	0.361
	(1.91)*	(2.24)**	(0.08)	(0.11)
District (P0) poverty rate	0.986	0.904	-1.457	-2.191
	(1.06)	(1.13)	(0.56)	(0.29)
Percentage of households reporting that they	0.018	0.012	0.005	-0.043
feel safe or very safe	(3.99)**	(1.41)	(0.13)	(0.51)
Inverse Mill's Ratio		0.462		4.139
		(2.13)**		(1.99)**
Chi squared statistic, all regressors		91.50**		41.38**
R2	0.451		0.219	

Notes: 1. (1) Is basic specification; specification (2) is a "treatments" regression with community participation treated as endogenous. 2. Absolute value of t statistics in parenthesis for specification (1). 3. Absolute value of z statistics in parenthesis for specification (2). 4. Standard errors are robust to cluster effects at the magisterial district level. 5. * Significant at the 10% level; ** significant at the 5% level. 6. Magisterial district dummy variables for Metropolitan Cape Town and Winelands included but not reported. 7. Sample size is 97.