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HOW EFFICIENTLY DO PUBLIC WORKS PROGRAMS TRANSFER BENEFITS TO THE POOR? EVIDENCE FROM SOUTH AFRICA

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ABSTRACT

This paper uses project and household data to examine the ability of 100 or so public works projects in Western Cape Province, South Africa, to target benefits—both direct and indirect—to those living below the poverty line. We find that public works projects generally outperform hypothetical untargeted cash transfers in this regard under a wide range of assumptions about underlying parameters.

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1. INTRODUCTION

In the developing world, most best-practice national strategies to reduce poverty include workfare programs (World Bank 2000). The receipt of benefits from such programs is contingent on the preparedness of beneficiaries to work. Typically they comprise of public works schemes that involve the creation of physical assets at below market wages. Such initiatives attempt to create physical assets in a labor-intensive way so that as much employment is generated as possible. To increase the poverty-reducing impact, an attempt is made to generate assets—both physical and human—that benefit the poor in the medium to long run (Subbarao 1997).[1]

Despite these goals, this type of antipoverty intervention has not escaped the general skepticism faced by targeted programs in general (see some of the case-studies in van de Walle and Nead [1995], for example). Can the programs be sufficiently well targeted to generate additional employment rather than substitute for market-led employment? Will the administrative requirements of the programs consume too many of the resources? Can high-quality assets be generated in a fashion that is sufficiently labor-intensive to generate sufficient income for the poor? These are just some of the questions posed by the critics.

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[1] Workfare programs in the developing world are unlike those introduced in the United States and the United Kingdom in the1990s. The latter require a gradual substitution of income transfers with income from market-based employment. In general in the developing world, and in South Africa in particular, workfare programs are additional to a given set of social policy initiatives. Good starting points on the impacts of work to welfare programs in the U.S. and the U.K. are offered by Haveman and Wolfe (2000), Mills, Alwang, and Hazarika (2000), and Peck and Theodore (2000).

To date, the data to address these questions have not been available. This paper exploits a new data set from South Africa to do so. Unemployment and poverty are major problems in South Africa. Thirty percent of working age South Africans are unemployed (Klasen 1997).[2] For individuals in the poorest 20 percent of households, the rate is 53 percent. In 1993, 9,000 households nationwide were asked, "what in your opinion could government do to most help this household improve its living conditions?" From a list of 18 items, the top selection was "jobs." Moreover, "jobs" (i.e., job creation) was the number one issue in all three regions: rural, urban, and metropolitan, as well as for the Western Cape Province in which this study is located (PSLSD 1994; Klasen 1997).

In response to these problems, a National Public Works Programme (NPWP) was established in 1994. The objectives of the program are to (1) create, rehabilitate, and maintain physical assets that meet the basic needs of the poor and promote broader economic activity, (2) reduce unemployment through the creation of productive jobs, (3) educate and train those on the program as a means of "economic empowerment," and build the capacity of communities to manage their own affairs (NEF 1994a, 1994b).

This paper analyses project-level data collected by the authors in the South African province of the Western Cape. Specifically information on 101 NPWP-like public works projects undertaken in the province during the 1995-97 period is merged with household survey data from the 25 magisterial districts in which the projects were based. We employ and extend a framework first put forward by Ravallion (1999) to

[2] Unemployment is defined as "all people not working who would like to work and are actively seeking work or have given up looking" (Klasen 1997, 69).

estimate the rands of public expenditure necessary to transfer one rand of resources to the poor. We then compare this ratio to that generated by a hypothetical untargeted transfer under a range of assumptions about parameter values. We find that the vast majority of public works programs outperform the benchmark by some considerable distance over a wide range of parameter scenarios.

2. THE ANALYTICAL FRAMEWORK

How do we assess the ability of public works programs to transfer benefits to the poor? Ultimately we want to know how many rands of public funds it takes to transfer one rand to a poor worker. Projects that use less public funds to transfer one rand to the poor than other projects are more cost-efficient. What makes them more cost-efficient? Moreover, how do the public works projects compare with pure transfer programs? To help us answer these questions for our 101 projects, we use the analytical framework laid out in Ravallion (1999) as a starting point.

First, define the following:

G = government spending on public works,

C = private co-financing,

W = wage bill to poor workers on public works project,

L = wage bill leaked to nonpoor workers on project,

IB = nontransfer or indirect benefits to the poor, and

IBNP = nontransfer or indirect benefits to the nonpoor.

Now define:

*P** = the probability of the poor worker getting a job, in absence of project,

P = the probability of a poor worker finding work while working on the project, and

*W** = the wage rate of poor workers in the absence of the project.

The wages earned by poor workers in the absence of the project are P^*W^*. In the presence of the project, poor workers earn $(1-P)W + PW^*$.

The net wage gain to the poor, *NW*, is

$$(1-P)W + PW^* - P^*W^*$$

or

$$(1-P)W - (P^* - P)W^* .$$

The total benefits to the poor, *B*, become $NW + IB$, and the total nontransfer or indirect benefits, $SB = IB + IBNP$.

Using these components, we can define

labor intensity	=	$(W + L)/(G + C)$,
percent of earnings to poor	=	$W/(W + L)$,
the benefit to cost ratio	=	$SB/(G + C)$, and
the rands (from government) cost per unit of rand benefit to poor	=	G/B.

The lower the G/B, the more efficient transfer mechanism the public works project is for the poor, at least in terms of government outlays. In general, one might expect G/B to decline with (1) increased labor intensity (high $(W + L)/(G + C)$), (2) improved targeting performance (high $W/(W + L)$), (3) large new wage gains (large NW/W), (4) a large proportion of the indirect benefits to the poor (large IB/SB), and (5) the ability of public funds to leverage other funds (high $(G + C)/G$). However, the trade-offs between these components are complex. For example, a labor intensity that is too high might reduce the ability of the project to generate indirect benefits (a vegetation clearing program versus a road clearing program) that are important for the poor as well as the nonpoor.

3. DATA AND VARIABLES

The study focuses on seven public works programs containing 101 completed public works projects in the Western Cape Province—one of nine provinces in South Africa. Together, the 101 projects in the seven programs represent a census of all labor-intensive public works projects initiated and completed in the two-year period from 1995 to 1997. There are more than seven public works programs in the Western Cape Province, but only seven have been initiated since 1993 with a set of objectives that mirror those of the NPWP, and they are profiled in Appendix Table 6.

Using project documents, and mail-in questionnaires with follow-up telephone calls and visits, quantitative and qualitative data were collected for each project in terms

of location, type of asset created, cost structure, duration, employment days generated, wage rates offered, and type of implementing arrangement (Adato et al. 1999). Initially, all program-level documents were identified for each of the seven programs (monthly reports, final project close-out reports, project review summaries, etc.). However, it was soon determined that these documents either (1) contained data taken from project applications and did not reflect actual data collected during project implementation; (2) were incomplete, existing for some projects and not for others, and/or containing certain pieces of data for some projects and not for others; or (3) contained data that were of questionable origin or were contradictory. Thus, in order to get accurate data, a project-level questionnaire was designed and administered to implementing agents for each project. In many cases, the implementing agent did not have the data and many visits had to be made to a wide range of program and project administrators or managers, consultants, contractors, and accountants.

The project-level data were merged at the district level with district-level averages from the 1995 October Household Surveys (CSS 1998) conducted by the Government's Central Statistics Service. District-level variables include average income per capita, the standard deviation of per capita income within district, the headcount poverty rate, the unemployment rate (using the broad definition as in Klasen 1997), the wage rates of unskilled manual labor, and the percentage of individuals with at least a standard 10 education. Using these data, the variables outlined in Section 2 were constructed. Bearing in mind that we want to calculate G/B for each project, we first explain the assumptions behind our chosen values of the components of G/B.

Government spending on public works (G). This is collected directly from project records and verified with government records whenever possible. It consists of a combination of national, provincial, and local government spending. The range of per project government expenditure runs from 14,000 rands to 34 million rands. The median value is approximately 340,000 rands.

Private co-financing (C). We only have information on planned (as opposed to actual) co-financing. We use "planned private co-financing" as a proxy for actual private co-financing. Twenty-four projects have a nonzero value for *C*.

Wage bill leaked to nonpoor workers on project (L). It would have been a very large task to survey enough participating and nonparticipating individuals at each of the 101 project sites to determine the leakage of the wage benefits to the nonpoor on a project-by-project basis. Instead, we estimated this leakage as follows. For the 79 projects where the project wage was lower than the district wage for similar unskilled work (obtained from the OHS 1995 data, with appropriate cost-of-living adjustments for the date of project initiation), we assumed no leakage to the poor. For the 22 projects that set wages above the area wage for a similar task, we assume that leakage to the nonpoor is greater than zero. Specifically for 9 projects in districts that have a low variability in household per capita income (standard deviation of income below an arbitrarily determined 60th percentile cutoff), we assume leakage to the nonpoor is 10 percent. For the remaining 13 projects, we assume leakage is 20 percent. We recognize that these cutoffs and numbers are entirely arbitrary, but they seem to be in line with the general

consensus as to how large these numbers are in a middle-income country such as South Africa (Subbarao et al. 1996).

The probability of the worker getting a job, in absence of program (P)*. Most of the unemployed individuals in South Africa have not had work for a long time. This is confirmed by the OHS 1995 survey. For all those who have not worked in the 7 days prior to the survey, did not have their own business, and would accept a suitable job if offered, the length of time they reported they had been looking for work varied from 3 to 25 months (median = 17). We use the inverse of the average search length in the district as the probability of finding a job in the absence of the project.

Public works project wage bill (W). This is collected directly from project records and is equivalent to the wage costs to workers.

The wage bill of the workers in a job, in absence of program (W)*. This is estimated as the number of days of employment generated by the project (as derived from project records) multiplied by the area wage for similar unskilled work.

The probability of finding nonproject work while working on the program (P). For 7 of the 101 completed projects, we conducted surveys of a random selection of former project employees. In all, 193 former employees were asked the question, "was any new work related to the type of work on the project?" Of these individuals, 12 (or just over 6 percent) responded "yes" to this question. Hence, we estimate *P* as 0.06 for all projects, which, based on qualitative data from the seven case-study projects, is probably a conservative estimate.

Nontransfer Benefits (SB). This component of the cost-effectiveness analysis is by far the most complicated to generate without a detailed project-by-project full impact evaluation. We could not find estimates on the nontransfer benefits generated by public works projects in the literature. The World Bank (1994) has published some estimates of the rates of return on various types of infrastructure projects from around the world, but it is difficult to generate a benefit stream from this information for well-known reasons, including the non-uniqueness of the internal rate of return that equates the net present value of a benefit stream to zero. Based on an analysis of the Employment Guarantee Scheme in Maharashtra, India, Ravallion and Datt (1995) consider a level of Aindirect benefits@ (such as the increased demand for rural labor and the value of the infrastructure) of 40 percent of the costs of a project to be reasonable.

For our calculations we use the standard Little and Mirrlees (1974) approach whereby

$$\Pi = \alpha W - [W - \lambda(W - W^*P^*)],$$

where W, W^*, and P^* are defined as above; Π = the net benefits from an investment (what Ravallion [1999] terms "the non-transfer benefits"); αW = the value to society of the output produced, and $[W - \lambda(W - W^*P^*)]$ is the cost to society of the investment. Note that the costs to society comprise the immediate costs W minus by the output gain from redeploying labor $(W - W^*P^*)$ weighted by a factor λ. Note that $W - W^*P^*$ is identical to

NW when *P*, the probability of a poor worker finding work while working on the project, is zero.

The output gain is weighted by λ, which one can interpret as the social value of the income gain to the workers from funds extracted from richer income individuals (from taxes, for example). λ can be thought of as

$$= (Y^m/Y^w)^{\varepsilon},$$

where Y^m is the average income of those from who government resources are drawn, Y^w is the average income of the public works workers, and ε is a weight given to differences in Y^m and Y^w. For example, if $(Y^m/Y^w) = 2$ and $\varepsilon = 1$, then $\lambda = 2$. When $\varepsilon = 1$, we value the transfer to workers in direct proportion to (Y^m/Y^w). The larger the difference between Y^m and Y^w, the larger is λ for a given ε.

We calculate *SB* for each project by using *W*, *W**, *P**, and *P*. We assume $\varepsilon = 1$ and generate λ for each project as the ratio of 2,500 rands/month/capita (our proxy for Y^m) to the district average per capita monthly income (which ranges from 258 to 3,183) (our proxy for Y^w). We have to make assumption about Y^m and Y^w as we do not have income levels of workers in the projects, nor do we have the income levels of taxpayers. Our guesses about Y^w are probably overestimates of the income of workers. As to our assumption of 2,500 rand per month per capita as the average income of taxpayers in the Western Cape Province (Y^m), this is approximately twice the provincial average income (PSLSD 1994).

To generate α for each project, we rely on qualitative data that we collected on a project-by-project basis as to the community's perceptions about the value to them of the assets created by the project. One can think of α as the return on the investment *W*. Communities were asked to assess the wider value to the community of the asset generated (and the process by which it was generated) and to classify the generation of asset in three grades: no broader value mentioned, one broader value mentioned, broader value mentioned twice. Examples of such broader uses include future income generation from assets, community empowerment, and the development of small contractors in the area. For the first group, α was assumed to be 1.0, and for the second two responses, 1.1 and 1.2, respectively. These seem like reasonable rates of return, but they are chosen arbitrarily. For 20 of the CEP/IDT projects, we were unable to obtain this information. For the remaining 79 projects, 32 did not identify a broad effect, 39 identified one, and 10 identified two. We assigned the 20 CEP/IDT projects a value for α identical to the average of the CBPWP (1.0778)—a program with similar goals in terms of community participation.

Once the nontransfer benefits are estimated, they are allocated to the poor and nonpoor by the district poverty rate. If, for example, the proportion of the district population below the poverty line is 30 percent, then 30 percent of the nontransfer benefits are allocated to the poor. The nontransfer benefits to the poor (*IB*) are then added to the direct benefits to the poor (the value of the net transfer increase, *NW*) to give the total benefit to the poor (*B*). This is then compared to the government's contribution to

the cost of the public works project (G), to estimate the cost per public rand of benefit transferred to the poor: G/B.

4. RESULTS

First, we present estimates of some of the key variables that contribute to the calculation of G/B. We then present G/B for $\varepsilon = 1,2$ (the sensitivity to income transfers from rich to poor) and compare it to the cost of transferring a rand to the poor with a hypothetical transfer program for the district that the public works program is contained in. Finally, we make the untargeted transfer less efficient in that we impose an administrative charge that increases the cost of transferring one rand to the poor by 20 percent.

Table 1 describes some of the variables we outlined in earlier sections. A number of things are worth noting here. First, the public works wage bill to the poor (W) is, on

Table 1: Components of project performance

Variable	Mean	Minimum	Maximum	N
Wage bill to poor from the project (W)	380,616	6,600	3,158,700	101
Wage bill to nonpoor from project (L)	21,265	0	522,738	101
Wage earnings, poor, no program (W^*)	473,725	8,711	4,520,471	101
Probability of wages without project (P^*)	0.09	0.04	0.33	101
Government costs of project (G)	1,614,258	14,928	34,993,046	101
Costs co-financed by nongovernment (C)	18,186	0	430,000	101
Net wage benefit to poor (NW)	351,488	6,065	2,976,840	101
Net wage/wage bill (NW/W)	0.90	0.56	0.98	101

average, lower than the wages that workers could have earned if they had guarantees of full employment in the absence of the project (W^*). However, the mean expected probability of gaining employment in the absence of the program (P^*) is 0.09; hence, the expected value of earnings in the absence of the project is much lower than in the presence of the projects. Second, note the low level of leakage to the nonpoor (L), which represents about 4-5 percent of the total wage bill. This seems low, but recall that 79 of the 101 projects offer wages lower than the comparable unskilled area wage. Third, the costs of the projects borne by nongovernmental sources (C) are low, at least based on planned contributions. Fourth, note that the net wage bill to the poor as a proportion of the wage bill to the poor (NW/W) is 0.9 at the mean. This reflects the low value for P^*. As Ravallion (1999) notes, this ratio is often assumed to be 1.0, although our mean estimates are higher than those estimated by Ravallion and Datt (1995) for the Employment Guarantee Scheme. Their study finds that the opportunity cost of participation by the poor in the program is one-quarter of the gross wage earnings of the scheme; in other words, they estimate NW/W as 0.75.

Table 2 provides a breakdown of these numbers by program. First, note that the two least labor-intensive programs are PILOT and TRANSPORT, which are both involved in road construction. The most labor-intensive programs are the C & G and WFW—neither of which involves large-scale infrastructure construction. Second, note the different sizes of programs in terms of the average wage bill to poor workers, W, with the WFW program being the largest. So there is much variation in activity and scale

Table 2: Components of project performance, by program

Program name	Wage bill to poor (*W*)	Wage bill to non-poor (*L*)	Wage bill to poor without project (*W**)	Probability of earning *W** (*P**)	Govern-ment costs (*G*)	Non-govern-ment costs (*C*)	Percent of costs to labor 100*(*W*+*L*)/(*G*+*C*)	Net wages to poor (*NW*)	Number of projects
C & G	90,453	5,412	148,053	0.07	166,902	22,442	46	84,508	10
CBPWP	108,780	6,436	119,021	0.09	577,856	3,056	27	99,769	18
CEP/IDT	54,771	1,796	94,988	0.11	187,520	13,013	31	46,636	22
WFW	1,643,514	114,588	1,828,173	0.09	2,366,540	0	86	1,516,987	14
PILOT	626,265	0	1,159,015	0.04	4,993,744	0	13	610,088	2
TRANSP	457,512	16,822	539,452	0.07	10,522,935	0	11	430,845	6
NEF	254,067	8,038	378,773	0.08	1,399,569	43,830	36	234,148	29
All	380,616	21,265	473,725	0.09	1,614,258	18,186	39	351,488	101

between the programs. Third, we can see that some programs—CBPWP, CEP/IDT, C & G, and NEF—have been able to raise private funds.

Table 3 presents estimates of the nontransfer benefits at values of $\varepsilon = 1, 2$ and for different overhead rates for the untargeted transfer. From the first panel of Table 4 ($\varepsilon = 1$, zero overhead), we can see that, on average, nontransfer benefits comprise just under half of the benefits to the poor (300,550/652,038). This ratio will tend to be higher for the programs that locate in poorer districts, since this is our rule for allocating nontransfer benefits to the poor and nonpoor.

The average cost of directing one rand to the poor ranges from 0.81 to 28.83. Given the assumptions in this panel of the table, 83 percent of the 101 public works programs deliver one rand to the poor more efficiently than does the hypothetical untargeted program. The WFW, C & G, CEP/IDT, and PILOT programs are particularly

Table 3: Project performance by program, e =1,2, overhead=0, 20%

Program	Non-transfer benefits to poor (*IB*)	Total benefits to the poor (*B*)	Gov. rands to give 1 rand to poor via a PW Project (*G*/*B*)	Gov. rands to give 1 rand to poor, via untargeted transfer	Proportion of PW projects that outperform untargeted program in terms of transfer efficiency. Assumed overhead 0%	Assumed overhead 20%	Number of PW projects
ε = 1							
C & G	53,051	137,559	2.27	13.44	1.00	1.00	10
CBPWP	40,584	140,353	4.26	7.79	0.83	0.89	18
CEP/IDT	46,607	93,243	2.37	4.22	0.86	0.95	22
WFW	1,401,559	2,918,547	0.81	4.50	1.00	1.00	14
PILOT	919,010	1,529,098	3.15	3.64	1.00	1.00	2
TRANSP	200,581	631,426	28.83	7.11	0.33	0.33	6
NEF	186,408	420,556	3.20	6.35	0.76	0.79	29
All	300,550	652,038	4.31	6.58	0.83	0.87	101
ε = 2							
C & G	105,490	189,997	2.06	13.44	1.00	1.00	10
CBPWP	80,216	179,985	3.38	7.79	0.89	0.89	18
CEP/IDT	92,086	138,721	1.75	4.22	0.95	0.95	22
WFW	2,777,758	4,294,745	0.59	4.50	1.00	1.00	14
PILOT	1,819,918	2,430,006	1.98	3.64	1.00	1.00	2
TRANSP	398,187	829,031	26.39	7.11	0.33	0.33	6
NEF	366,929	601,077	2.52	6.35	0.86	0.97	29
All	594,883	946,371	3.60	6.58	0.89	0.92	101

efficient in delivering benefits to the poor, at least in an absolute sense. The exception is the TRANSPORT program, which delivers resources to the poor in a relatively expensive way, on average (although 2 of its 6 projects still manage to do so more effectively than the hypothetical untargeted program). Note that this *G*/*B* ratio is less than one for the WFW projects. This means that they generate a benefit stream that is larger than the

government resources used in the project. We will explore the components of project performance later in this section.

In a relative sense, which programs seem to be doing best in terms of outperforming the untargeted program in their district? Still from the first panel of Table 3 we can see that the cost of delivering one rand in an untargeted program varies more by program location than does the cost of transferring one rand to the poor by the public works project. For example, the C & G projects are poorly targeted at the district level in the sense that they are located in districts that have a relatively low poverty rate (7.44 percent); hence, it costs 13.44 rands to deliver one rand to the poor. Conversely, the PILOT projects are situated in districts that have a poverty rate of 27.47 percent; hence, it costs 3.64 rands to deliver one rand to the poor. This logic might lead the reader to think that public works projects should therefore locate in low poverty areas, where universal untargeted schemes are not cost-effective interventions. However, the location of projects outside of poor and high unemployment areas will reduce the performance of the public works projects, as we shall see.

When the overhead rate is raised from zero to 20 percent in panel 2, the untargeted transfer becomes less efficient and the public works projects become more competitive. Now 87 percent of them deliver a rand to the poor more effectively than a hypothetical untargeted transfer. In the third panel, $\varepsilon = 2$. This increases the nontransfer benefits in total, and hence the absolute amount to the poor. Nontransfer benefits now comprise over 60 percent of the benefits to the poor (594,883/946,371). This assumption

makes the public works more competitive, with 89 percent of them being more efficient transfer mechanisms for the poor. An assumption of a 20 percent overhead on the untargeted transfer results in 92 percent of the projects outperforming the untargeted transfers.

Why, then, are some programs more efficient in transferring one rand to the poor? Table 4 selects the scenario with the ε = 1, and a 20 percent overhead on the untargeted transfer program. In this situation, the WFW, C & G, and PILOT projects do the best, with all of their 26 projects outperforming the hypothetical untargeted transfer. Why is this? Table 4 offers some clues.

Table 4: Deconstructing performance, by program (e = 1, overhead = 20 percent)

Program	Percent of wage bill to nonpoor (*L*)	Percent of costs to labor (*W*+*L*)/(*G*+*C*)	Mean net wage to poor/ wage bill to poor (*NW*/*W*)	Gov. rands to give 1 rand to poor, un-targeted transfer	a	l	Percent of PW cost from NGO source 100**C*/(*G*+*C*)	Gov. rands to give 1 rand to poor (*G*/*B*)	Proportion of PW projects that do better than untargeted transfer	Number of projects
C & G	3.00	0.46	0.93	16.12	1.04	2.54	13.4	2.27	1.00	10
CBPWP	5.56	0.27	0.90	9.34	1.08	2.47	1.04	4.26	0.89	18
CEP/IDT	2.27	0.31	0.87	5.06	1.08	3.16	7.24	2.37	0.95	22
WFW	7.14	0.86	0.91	5.40	1.06	3.82	0.00	0.81	1.00	14
PILOT	0.00	0.13	0.97	4.36	1.10	5.37	0.00	3.15	1.00	2
TRANSP	5.00	0.11	0.93	8.53	1.05	2.25	0.00	28.83	0.33	6
NEF	1.38	0.36	0.91	7.61	1.09	3.43	7.86	3.20	0.79	29
All	3.47	0.39	0.90	7.89	1.07	3.13	5.35	4.31	0.87	101

First, the low leakage of benefits to the nonpoor for the C & G, PILOT, and NEF projects is a reflection (by construction) of their ability to offer wages below comparable

area wages. The WFW projects do less well in setting wages below market, but they are very labor-intensive, hence ensuring that the poor will receive a sizeable transfer, no matter the magnitude of the nontransfer benefits or the percent of the latter that are captured by the nonpoor. It is important to note, however, that other projects that perform well against the untargeted transfer have much lower labor intensities. This is our second point: a project does not have to be labor-intensive to be an effective transfer mechanism to the poor, but it helps, up to a point. A project that does not generate an asset that is of value to the poor in the community will have a small value of α and therefore a smaller nontransfer component, all things being equal.

Third, a large net transfer benefit is generated by locating a project in a high unemployment area and by offering a wage that is not too low. If the area is not a high unemployment area, the value of nonproject employment lost due to the existence of the project will be high. Moreover, if the project wage is set too low, the benefit from working on the project will be minimal and the project could become, or be seen to become, exploitative. If the wage is too high, however, leakage to the nonpoor occurs. Project location in a high unemployment area will boost *NW*, but because poverty and unemployment are correlated, untargeted programs in such districts will be more efficient than in other districts. Hence projects located in areas that boost *NW* have to work harder to outperform the untargeted programs. This is the fourth point: that good targeting implies trade-offs in transfer efficiency vis-à-vis an untargeted transfer. Fifth, our measure of returns to the community of the asset, α, varies by program. As indicated

above, it tends to be smaller for the more labor-intensive projects of the C & G and WFW programs. A smaller α will mean lower nontransfer benefits. Sixth, our measure of the value of transferring one rand from taxpayer to the poor, λ, is another parameter that is affected by project location. For the PILOT programs, it has a high value, reflecting their location in poorer areas. This is also reflected in a low value of L for these projects and a high NW/W, but it also means that untargeted transfers are efficient in the districts in which the two PILOT projects operate. Seventh, the C & G, NEF, and CEP/IDT projects do fairly well in terms of raising funding outside of government, and this will boost B/G, all things equal.

The PILOT and TRANSPORT projects present an example of the complexities involved in assessing these programs. From Table 4, we can see that they are both road and stormwater programs, but the former is the fourth most efficient transfer mechanism (3.15 rands per rand) and the latter is by far the most inefficient (28.83 rands per rand). Why the difference? First, the PILOT projects offer wages below market wage (a low L); second, they locate in high unemployment areas (low P^* and hence a higher NW); third, they locate in high poverty areas (high λ and hence higher nontransfer benefits); and fourth, they produce things that the community values more highly (higher α). The two programs have similar labor intensities, are roughly the same size on average, and neither generates private funds. The main difference is in the higher λ for the PILOT projects, but the other differences are important because they are multiplicative within our framework. Note again that the only downside to good targeting is that an untargeted

project is more efficient at transferring to the poor. Nevertheless, the two PILOT projects still manage to outperform the untargeted project.

What are the key factors in determining some of these performance indicators? For example, how much of a program's success is due to the asset it chooses to generate? Or to the institutional incentives embodied in implementing and financing arrangements? These are questions that require a multivariate analysis, with due attention to endogeneity and unobserved heterogeneity and are being taken up by Besley et al. (1999). We can begin to address this issue, however, with Table 5, which is similar to Table 4, but broken down by asset type. The table shows that the performance of the different projects by asset type is similar, except for the road and bridge projects that only outperform the untargeted transfer (with a 20 percent overhead) 63 percent of the time. Why is this? They have low leakage to the nonpoor so wages are set lower than market, but λ is relatively low, indicating their location in better-off districts, and this is confirmed by the low value of NW/W, which indicates location in a higher than average employment area. Interestingly, the poverty rate of the districts in which these projects are located is not the lowest (as indicated by the rands necessary to transfer one rand to the poor via an untargeted transfer) of the five asset types, and this reminds us that poverty, average income levels, and unemployment are not perfectly correlated, at least at the district level. Interestingly, the cleanup and water/sanitation projects do equally well in outperforming the untargeted transfer, but they have very different labor intensities (0.69 versus 0.37, respectively).

Table 5: Deconstructing performance, by asset (e = 1, overhead = 20 percent)

Activity/ asset type con-structed	Percent of wage bill to non-poor (L)	Percent of costs to labor ($W+L$)/($G+C$)	Mean net wage to poor/ wage bill to poor (NW/W)	Gov. rands to give 1 rand to poor, un-targeted transfer	a	l	Percent of PW cost from NGO source 100*C/($G+C$)	Gov. rands to give 1 rand to poor (G/B)	Proportion of PW projects that do better than the untargeted program	Number of public works projects
Cleanup	4.64	0.69	0.92	7.98	1.05	3.75	4.80	1.29	0.96	28
Road/ bridges	1.58	0.21	0.92	7.50	1.07	2.69	0.23	11.65	0.63	19
Clinic/ schools	4.55	0.34	0.88	6.58	1.07	3.47	10.7	4.06	0.82	11
Community center	3.18	0.22	0.88	9.40	1.12	2.79	12.8	3.35	0.91	22
Water/ sanitation	3.33	0.37	0.90	7.22	1.07	2.89	0.12	2.81	0.95	21
All	3.47	0.39	0.90	7.89	1.07	3.13	5.35	4.31	0.87	101

5. CONCLUSIONS

We have examined the ability of 101 public works projects in the Western Cape of South Africa to transfer resources to the poor. The projects represent the universe of such projects in 1995-1997 with a set of objectives that mirror those of the NPWP. These objectives include short-term job creation; the creation of assets or environmental improvement via labor-intensive means; sustainable job creation through skills training;, and local institutional capacity building and community empowerment through participation in infrastructure projects.

We applied Ravallion's (1999) framework for appraising public works projects to the projects and fleshed it out in doing so. We were fortunate to have several detailed sources of quantitative and qualitative information at the project and district levels.

Despite these data, we had to make a number of fairly crude assumptions as to some of the costs and benefits involved.

Based on our assumptions, we find that between 83 percent and 92 percent of public works projects outperform an untargeted transfer scheme, depending on the scenario. Not surprisingly, the performance of the projects improves when a higher value is placed on a transfer from taxpayers to workers and when an administrative overhead is applied to the benchmark untargeted transfer.

A number of lessons can be drawn from the analysis. First, the performance of public works projects as public-sector antipoverty initiatives vis-à-vis untargeted transfers depends on the interplay of many factors. Projects are more likely to perform well if they (1) offer wages that are lower than comparable market wages, (2) locate in areas that have a high unemployment rate among the poor, (3) have a labor intensity high enough to generate a sizeable transfer income, (4) create assets that generate nontransfer benefits valued by the poor, (5) locate in areas that are poor, but not so poor that an untargeted transfer is inevitable, and (6) leverage additional nongovernmental funding.

However, the trade-offs between these factors are important to note. For example, if labor intensity is too high, not enough of the project budget will go to an asset that can generate nontransfer benefits. Similarly, if a project is located in an area in which nearly everyone is poor, an untargeted transfer might be more appropriate as a transfer program. At the province level, the ability of the programs to locate in relatively poor and unemployed areas is particularly crucial to their performance. Doing so reduces leakage of the transfer benefits to the nonpoor, increases the capture of nontransfer benefits by the

poor, and increases the social value of transfers of income from taxpayer to worker. But Adato and Haddad (1999) find that for these projects, there is little relationship between the district level share of public works activity and the district level share of poverty, unemployment, and infrastructure need. This is despite the wide availability of repeated surveys of living standards in South Africa and is a reflection of the philosophy that the location of these projects should be community led. More developed communities are better connected and better able to apply for public works resources, hence, the trade-off with targeting objectives.

Interestingly, the performance of the programs does not seem to depend overly on the type of asset that is constructed, although this is based purely on the bivariate comparisons in Table 5. If program characteristics are found to be important for the antipoverty performance of the projects, this has implications for the mechanisms that the government uses to select proposals for projects. For example, if projects led by community-based organizations were found to be more effective in transferring benefits to the poor, this could lead to an increased share of projects being awarded to community-led proposals.

Second, we have shown the value of collecting a key set of indicators for project monitoring and evaluation purposes, including total costs, labor costs, duration, wage rates, number of days of employment, the number of project workers that leave for nonproject employment, and the area wage rate for comparable work. Such data collection protocols need to be developed by the programs. Also at the program level, poverty, employment, and infrastructure maps need to be generated and used when

alternatives for project location present themselves. Unfortunately, such protocols that exist are generally inadequate and nonstandard. Moreover, few incentives exist for them to be adequately completed (Adato et al. 1999).

Third, it is important to note that there are many limitations to our analysis. All the assumptions and guesses we have made are open to challenge. Moreover, we have focused on poverty reduction as our yardstick of performance, despite the other stated goals of the public works projects. In particular, our comparisons with hypothetical untargeted transfers do not consider the sizeable nontransfer benefits that are generated for the nonpoor by the assets the projects generate. Moreover, we have not been able to capture skills development and community empowerment effects that do affect the poor, except via our measure of α. Nevertheless, we have tried to make our guesses conservative and our assumptions based on our detailed knowledge of the area. We have had a database available to us that is much richer than any other such database we know of. We trust that others will simply merge quantitative project-level data with extant district-level data, reinforced and supplemented by qualitative data. In this way, the dialogue on the antipoverty effectiveness of public expenditures will be enriched, both within countries such as South Africa and within the wider international context.

APPENDIX TABLE

Table 6: Public works programs in Western Cape Province included in the study

Name of program	Administering institution	Number of projects	Rural/urban	Types of infrastructure and number of projects of each type
Clean and Green (CAG)	Provincial Department of Transport and Public Works (DTPW)	10	All urban	Cleaning (2), greening, alien vegetation clearing (7), parking area (1)
Community Based Public Works (CBPWP)	DTPW	18	6 Rural	Community centre (4), roads (2), stormwater drainage (1), sanitation (6), water supply (5)
Community Employment Program (CBPWP/CEP)	Department of Public Works (DPW, national) and the Independent Development Trust (IDT)	22	6 Rural	Community centre (7), roads (1), stormwater drainage (1), sanitation (4), school (1), crèche (5), clinic (1), greening (1), roads and stormwater (1)
Fynbos Water Conservation Project (FWCP) also known as the *Fynbos Working for Water Project (WWP)*	Department of Water Affairs and Forestry (DWAF)	14	All urban	Alien vegetation clearing (14)
Pilot Projects (Pilot)	DPW/DTPW	2	All urban	Roads and stormwater (2)
Transport Projects (Trans)	DTPW	6	1 Rural	Roads (3), roads and stormwater (3)
National Economic Forum/Western Cape Economic Development Forum (WCEDF/NEF)	WCEDF/DBSA	29	3 Rural	Community centre (11), roads (1), stormwater drainage (2), sanitation (1), water supply (1), cleanup (3), recreation grounds (1), roads and stormwater (4), multiple services (4), bridge (1)

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