POLICY RESEARCH WORKING PAPER

WPS 2041

2041

Aid Allocation and Poverty Reduction

*Paul Collier**David Dollar*

In the "efficient" allocation of aid, aid is targeted disproportionately to countries with severe poverty and adequate policies. For a given level of poverty, aid tapers in with policy reform. In the actual allocation of aid, aid tapers out with reform.

Aid now lifts about 30 million people a year out of absolute poverty. With a poverty-efficient allocation, the same amount of aid would lift about 80 million people out of poverty.

The World Bank
Development Research Group
Office of the Director
and
Macroeconomics and Growth
January 1999

Summary findings

Collier and Dollar derive a poverty-efficient allocation of aid and compare it with actual aid allocations.

They build the poverty-efficient allocation in two stages. First they use new World Bank ratings of 20 different aspects of national policy to establish the current relationship between aid, policies, and growth. Onto that, they add a mapping from growth to poverty reduction, which reflects the level and distribution of income. They compare the effects of using headcount and poverty-gap measures of poverty.

They find the actual allocation of aid to be radically different from the poverty-efficient allocation.

In the efficient allocation, for a given level of poverty, aid tapers in with policy reform. In the actual allocation, aid tapers out with reform.

In the efficient allocation, aid is targeted disproportionately to countries with severe poverty and

adequate policies — the type of country where 74 percent of the world's poor live. In the actual allocation, such countries receive a much smaller share of aid (56 percent) than their share of the world's poor.

With the present allocation, aid is effective in sustainably lifting about 30 million people a year out of absolute poverty. With a poverty-efficient allocation, this would increase to about 80 million people. Even with political constraints introduced to keep allocations for India and China constant, poverty reduction would increase to about 60 million.

Reallocating aid is politically difficult, but it may be considerably less difficult than quadrupling aid budgets, which is what the authors estimate would be necessary to achieve the same impact on poverty reduction with existing aid allocations.

This paper — a joint product of the Office of the Director, and Macroeconomics and Growth, Development Research Group — is part of a larger effort in the group to examine aid effectiveness. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Emily Khine, room MC3-347, telephone 202-473-7471, fax 202-522-3518, Internet address kkhine@worldbank.org. The authors may be contacted at pcollier@worldbank.org or ddollar@worldbank.org. January 1999. (42 pages)

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent.

Aid Allocation and Poverty Reduction

Paul Collier and David Dollar
Development Research Group, World Bank

Not for citation without permission of the authors. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent. We thank Aart Kraay and Martin Ravallion for useful advice and Charles Chang and Dennis Tao for excellent research assistance.

1. Introduction

The allocation of aid among countries can legitimately reflect multiple objectives. Aid may be used to rebuild post-conflict societies, or to meet humanitarian emergencies. However, the core objective is most commonly poverty reduction. In this paper we estimate the allocation of aid that would maximize the reduction in poverty and compare it to actual allocations. We find that the present allocation of aid lifts around 30 million people out of poverty each year, whereas a fully poverty-efficient allocation would have more than double the impact. This apparent inefficiency with respect to poverty reduction does not necessarily imply that aid allocation is sub-optimal. First, our estimates do not incorporate all of the country-specific information which may be available to donors. Secondly, aid allocations may legitimately trade-off poverty reduction against other objectives. However, our poverty-efficient allocation can serve as a benchmark against which deviations can be justified, whether by superior information or by other objectives.

The paper is organised in three steps. In Section 2 we estimate the effect of aid upon income. We first show that whether aid raises income is dependent upon the policy environment. We utilise a new World Bank measure which rates twenty aspects of the policy environment for 144 countries as of 1997/98 and relate it to recent growth performance. We then estimate diminishing returns to aid. Combining these, we arrive at the marginal efficiency of aid in terms of increases in income.

In Section 3 we derive the conditions for the optimal allocation of aid for poverty reduction. This depends on the policy environment as well as on the mapping from changes in income to changes in poverty. Conditional upon policy, a one-year increase in

the aid flow will raise the growth rate for one year, thereby sustainably increasing the *level* of income. A sustained increase in the level of income will, conditional upon the initial level of income, its distribution, and the long-term growth rate, sustainably reduce poverty. For each country this yields a function in which aid reduces poverty but is subject to diminishing returns. A poverty-efficient allocation of aid is one in which the marginal cost of poverty reduction is equalised across recipient countries. The efficient allocation is, of course, conditional upon the overall aid budget constraint: for each global aid availability there is a poverty efficient allocation. A corollary is that for each efficiently allocated global aid availability there is a unique marginal cost of poverty reduction.

To find the optimal allocation of aid we need a mapping from income to poverty, and we explore several different approaches. We begin with the average elasticity of the poverty headcount with respect to mean income from a large number of surveys. We then refine this measure in three ways. First, we add information on the distribution of income, which is available for 60 countries. The estimated elasticity of poverty is then a function both of the level of mean income and of its distribution. Secondly, we switch the dependent variable from being the headcount of poverty to being the poverty gap. Thirdly, we experiment with a \$1 per day poverty line and a \$2 per day poverty line. We show that the “poverty-efficient” allocation of aid is very similar, regardless of which poverty line is used or which poverty measure.

If the present global flow of aid were efficiently allocated, the marginal cost of lifting a person permanently above the \$2 per day threshold would be \$665. Because of diminishing returns to aid, this marginal cost exceeds the average cost. The total annual

reduction in poverty achieved by an efficiently allocated aid program of \$36bn would be 82 million people, so that the average cost of taking a person permanently out of poverty would be only \$445. Explicitly or implicitly, developed country governments work with an acceptable unit cost of reducing domestic poverty which far exceeds this figure. In a globalising world it can be expected that there will be increasing awareness of poverty as an international phenomenon, and so a tendency for the present massive differences in the unit costs of reducing domestic and international poverty to diminish.

The fourth section of the paper examines the extent to which the actual allocation of aid deviates from the poverty-efficient allocation. First, we show that it is dramatically different from an efficient allocation. In particular, aid has the “wrong” relationship with policy, after controlling for poverty. In precisely the range of policy in which aid becomes increasingly effective in poverty reduction, aid is currently lower the better is policy. In short, aid is being tapered out with reform, when it should be tapered in with reform.

One way of expressing the inefficiency is as the consequence for the average cost of reducing poverty. On the current allocation of aid the average cost of poverty reduction is \$1,205, or around three times as high as it would be were aid efficiently allocated. Another way to measure the inefficiency is to estimate the gain that would result from shifting from the current allocation to the optimal: an additional 51 million people would be lifted out of poverty through this improvement in the allocation. With the current allocation, a four-fold increase in the total volume of aid would be required to achieve this same reduction in poverty. While radical revision of aid allocation may seem to be politically difficult, it is probably much less politically difficult than quadrupling

aid budgets. Indeed, it is reasonable to suppose that the move to an efficient allocation of aid would itself strengthen the case for expansion in aid budgets. For example, consider a budgetary choice which would face the world's most generous aid donor, Norway.

Currently, the Norwegian government accepts a per capita cost of around \$15,000 to link inhabitants of its islands to the mainland.¹ If, for each inhabitant linked to the mainland around twenty-five people could be permanently lifted out of severe poverty, Norwegians might choose to increase their already generous aid budget.

The final section concludes. While global reallocation of aid budgets would be remarkably effective in reducing poverty, this is not the true choice facing a national aid agency such as NORAD, or an international agency such as the World Bank. Global aid allocation is not the result of a collective decision but of many agency-specific decisions. The relevant consideration for an individual agency is what would be the impact of more efficient allocation of its own funds taking as given the present global allocation. Because many countries in which aid is highly effective in reducing poverty currently get far less aid than would be implied by an efficient allocation, there are remarkable unexploited opportunities for poverty reduction. Given the present allocation of aid, the marginal cost of reducing poverty with efficiently allocated incremental aid is only \$333. Hence, the true decision facing Norwegian society is whether linking one inhabitant to the mainland is more or less desirable than removing 45 people permanently out of severe poverty.

We started by acknowledging that poverty reduction is not the only legitimate rationale for aid, and so is not the only criterion on which aid allocation should be based. Could the typical aid agency therefore reasonably take the view that the current allocation of aid reflects an appropriate balance of considerations between poverty reduction and

other objectives? Our work sheds light on this question by providing a quantitative estimate of the opportunity cost – in terms of foregone poverty reduction – of pursuing other objectives with foreign aid. These other objectives reduce the annual poverty reduction impact from 82 million people to 31 million people. *Prima facie* is not consistent with the declared primacy of poverty reduction in aid programs. For example, the World Bank's *Annual Report 1998* opens with the statement that its "purpose is to help borrowers reduce poverty and improve living standards through sustainable growth and investment in people." And the British Government White Paper on international development states that "We shall refocus our international development efforts on the elimination of poverty and encouragement of economic growth which benefits the poor." (UK 1997, p. 6).

2. The Mapping from Aid to Growth

Our objective in this section is to arrive at estimates of the current impact of aid on growth for a large number of countries, as a first step toward estimating the impact of aid on poverty reduction. Burnside and Dollar (1997) have shown that the impact of aid on growth depends on the quality of the incentive regime.² However, their study has three limitations for the practical application of the results to aid allocation.

First, Burnside and Dollar confined their measurement of policies to three readily quantifiable macroeconomic indicators. It is implausible that these are the only policies which matter for growth and, as acknowledged by the authors, they are likely to be proxying a much broader range of policies for which comparable quantitative measures were lacking. We address this problem by utilizing a new data set, the World Bank's Country Policy and Institutional Assessment for 1997. This measure is composed of 20

different components covering macroeconomic and sectoral policies, as well as issues such as the rule of law and corruption. Each of the twenty components is rated ordinarily by country specialists, on a scale of 1-6, using standardized criteria. Considerable care is taken to ensure that the ratings are comparable both within and between regions. While the scores include an irreducible element of judgement, they have a reasonable claim to being the best consistent and comprehensive policy data set. Although the rationale for collecting twenty different aspects of policy is that all are expected to be of some importance for development, potentially some are more important for growth than others. However, in the absence of good evidence to the contrary, we attached equal weights to each of the components. In an appendix we demonstrate that the results are not sensitive to reweighting of the components.

Secondly, the Burnside-Dollar data set is for the period 1970-93, whereas the relationships between aid and policy may have changed since the end of the Cold War. Since our purpose is to compare poverty-efficient allocations with actual allocations, it is of little current interest to show that pre-1989 aid allocations were inefficient. We therefore switch from the Burnside and Dollar data set to data exclusively for the 1990s, covering the period 1990-96. The policy rating discussed above is only available for 1997, since for previous years criteria were different. However, policy and institutions in general only change slowly and differ considerably between countries, so that the rating is a reasonable proxy for the average policy stance prevailing during the 1990s. While the switch to the 1990s combined with the switch to a broader measure of policy has the advantage of making any results much more pertinent for current policy, it has the disadvantage of drastically reducing the sample size. Burnside and Dollar were able to

arrange their data into 272 growth-aid-policy episodes of four-years each, whereas having only a short period and a single observation of policy, we cannot similarly increase the sample size.

Thirdly, the Burnside-Dollar study covered only 56 countries and so cannot provide comprehensive guidance on aid allocation. By switching to more comprehensive data sets, we are able to re-estimate the aid-growth relationship for 86 countries and ultimately to estimate poverty-efficient aid allocations for 109 countries.

We now use the new data set to revisit the core Burnside-Dollar result. This is that the efficacy of aid in the growth process depends upon the policy environment: aid is more effective in raising growth the better is the policy environment. Thus, growth (G) is a function of exogenous conditions (X), the level of policy (P), the level of net receipts of aid relative to GDP (A), and the interaction of policy and aid:³

$$G = c + b_1X + b_2.P + b_3.A + b_4.A.P. \quad (1)$$

To increase comparability with the original results and for statistical validity, we rebase both the new measure of policy and the Burnside and Dollar measure so that they have a mean of zero and a standard deviation of 1. Since the new measure is an ordinal index, its information content is unaffected by any such monotonic transformation.

Table 1 column 1 presents the OLS results for the estimation of (1) on the new data set. Policy is directly significant in the growth process: a one standard deviation improvement in policy is associated with additional growth of 0.6 percentage points. As in Burnside and Dollar, policy is also significant via its interaction with aid. At the mean

of policy (=0), the marginal impact of aid is zero. At a policy level of 1, the marginal impact of 1 percent of real PPP GDP in assistance is additional growth of 0.3 percentage points. In column 2 we re-estimate to allow for the possibility that aid and the interaction of aid and policy are endogenous. We show that instrumenting for these variables does not alter the results: both variables remain significant and their coefficients are virtually unchanged.⁴ Hence, the core Burnside-Dollar result was not due to its particular choice of policy variables, nor was it due to a relationship which no longer holds in the post-Cold War era.

These regressions establish the single most important component in the aid-growth relationship: that the efficacy of aid depends upon policy. However, they do not address a second necessary component, namely, diminishing returns to aid. While a given quantity of aid is more effective in a good policy environment, presumably, if aid programs are expanded, beyond a certain point the marginal efficacy of aid diminishes. To estimate diminishing returns to aid we need to establish the curvature of the aid-growth relationship, so that (1) is replaced by:

$$G = c + b_1.X + b_2.P + b_3.A + b_4.A^2 + b_5.A.P \quad (2)$$

This is evidently more demanding of the data. In column 3 we report the Burnside-Dollar 2SLS results for (2) on their data set of 272 observations. They find that the coefficients on aid and Aid^2 are both significant, the former positive and the latter negative: as expected, there are diminishing returns to aid. For a country with very good policy (=2), the return to aid reaches zero at about 5% of real PPP GDP. (Since PPP

measures of GDP are typically 3-4 times higher than GDP at nominal exchange rates, this corresponds to 15-20% of GDP evaluated at nominal exchange rates.) Column 4 repeats the regression on the new 86-observation data set. The addition of the Aid^2 term does not alter the previous results: the efficacy of aid depends upon the policy environment, with both significance levels and coefficients essentially unaffected. However, we are unable to establish the curvature of the aid-growth relationship: both Aid and Aid^2 are insignificant. Either this is because during the 1990s the world has changed in such a way that there are no longer diminishing returns to aid, or the sharp reduction in sample size causes a loss of precision so that curvature cannot be estimated. Evidently, the latter is the more plausible interpretation: indeed, the presence of diminishing returns to aid is not controversial. While overall absorptive capacity might well be higher in the 1990s than previously owing to improvements in the policy environment, this would in no way contradict the notion that for a given policy environment the marginal efficacy of aid diminishes as its volume is increased.

The inclusion of diminishing returns to aid is critical for the establishment of a poverty-efficient allocation of aid. Without diminishing returns, the entire global aid budget would simply be allocated to whichever country happened currently to have the lowest marginal cost of poverty reduction. Not only would this be politically so unacceptable as to be uninteresting, it would be incredible. There are strong *a priori* grounds to suppose that there are diminishing returns: taking the point estimate of 0.3 percentage points of growth per 1% of GDP in aid, a country with good policy would evidently not grow at 30% p.a. if provided with aid worth 100% of GDP. Hence, we adopt the Burnside-Dollar estimate of the diminishing returns to aid, namely that b_3 is

2.21 and b_4 is -0.29 , and add these to the policy coefficient as estimated on our data set in regression 1. Specifically, the marginal impact of aid on growth is estimated to be:

$$G_a = 2.21 + 0.29P - 0.58A \quad (3)$$

3. The Poverty-Efficient Allocation of Aid

The results above suggest that if donors wish to maximize the reduction in poverty, aid should be allocated to countries that have large amounts of poverty and good policy. The presence of large-scale poverty is obviously necessary if aid is to have a large effect on poverty reduction. The good policy ensures that aid has a positive impact. In the remainder of this paper we formalize this idea, examine the extent to which donors are already behaving optimally, and estimate the gains in poverty reduction that could be achieved through a more efficient allocation of existing aid volumes.

One concern that arises immediately is whether in reality there are countries with good policies and mass poverty. It is possible that the two variables are negatively correlated to a high degree. However, in the 1990s poverty and policy are not highly correlated. Figure 1 shows the CPIA measure and the headcount poverty rate for 113 developing countries. There are 32 countries in the good policy, high poverty quadrant. More remarkably, a large majority of the world's poor lives in these 32 countries: 2 billion people out of a total of 2.7 billion poor people in the 113 countries included in the figure.

Not surprisingly, most of the countries in quadrant I are ones that have reformed in the past 10 years (for example, India, Uganda, Ethiopia, and Mali). Our intuition is

that aid will have more impact on poverty reduction in this quadrant where there are two billion poor people and policy makes aid effective. In quadrant II, on the other hand, there are most of the remaining 0.7 billion poor people, but the effectiveness of aid in reducing poverty is hampered by poor policies. In quadrant IV, assistance is effective in promoting growth, but there is less work for it to do since these countries already have relatively low poverty.

To formalize these ideas, we consider a world in which aid is given with the purpose of maximizing the reduction in poverty. That is, the objective function of donors is:

$$\text{Max Poverty Reduction} = \sum_i G^i \alpha^i h^i N^i$$

$$\text{Subject to } \sum_i A^i y^i N^i = \bar{A}, \quad A^i \geq 0 \quad (4)$$

where

y is per capita income

$\bar{A}$ is the total amount of aid

h is a measure of poverty (for example, the headcount index)

α is the elasticity of poverty reduction with respect to income

N is population

$\wedge$ denotes relative change, and

the superscript “i” indexes countries.

If the poverty measure is the headcount index, then this maximization has a simple interpretation: allocate aid so that the marginal aid cost of lifting someone above

the poverty line is the same in each country. For a more general poverty measure, such as the poverty gap, the objective is to equalize the marginal cost of reducing the gap.

Considering for the moment only interior solutions (in which each country gets some aid), the first order conditions for a maximum are

$$G_a^i \alpha^i h^i N^i = \lambda y^i N^i \quad (5)$$

Where λ is the shadow value of aid. Using the estimate of G_a from (3) above, we can solve explicitly for each country's aid receipts as a function of its policy, poverty level, per capita income, and elasticity of poverty with respect to income:

$$A^i = 3.7 + 0.5p^i - \frac{\lambda}{.6\alpha^i} \left(\frac{h^i}{y^i} \right)^{-1} \quad (6)$$

The basic properties of the equilibrium can be easily illustrated. Assume for simplicity that the elasticity of poverty reduction with respect to income is constant across countries. Then the equilibrium conditions define a set of relationships among aid, policy, and the poverty measure divided by per capita income – relationships that can be shown in two dimensions if we hold each variable constant in turn. For example, holding aid constant, we have the relationship between policy and poverty shown in figure 2a. Each isoquant shows combinations of policy and poverty that would justify a certain level of aid (given the shadow value of aid). The poorer a country, the lower is the policy quality required to justify a certain volume of aid. Intuitively, the aid will have less growth impact because of the weaker policies, but the poverty impact of a unit of growth

is higher. The isoquant for $Aid=0$ is the dividing line between countries that receive aid in the efficient allocation and countries that receive none. We also show the isoquant for an aid level of two percent of GDP.

Holding policy constant, the relationship between aid and poverty is upward-sloping, but with diminishing returns to aid (figure 2b). For a given poverty level, on the other hand, the optimal relationship between aid and policy is linear but kinked (figure 2c). There will be a threshold of policy below which even the first dollar of aid is not sufficiently productive in terms of poverty reduction. Above the threshold the poverty-efficient aid allocation is monotonic in policy and happens to be linear in our particular scaling of the ordinal policy rating. The reason for this is that, with poverty constant, the relationship shows combinations of aid and policy that maintain G_p at a constant level. This maps a linear relationship.

The general point is that the optimal allocation of aid for a country depends on its level of poverty, the elasticity of poverty with respect to income, and the quality of its policies. In order to calculate a poverty-efficient allocation of aid we need to specify a measure of poverty and estimate the elasticity of poverty with respect to income for a large number of countries. We experiment with four different approaches in order to investigate the extent to which the choice of poverty measure and elasticity affects the allocation.

For a given level of mean income, the aid-poverty mapping is affected by the distribution of income. In a highly unequal society there will be more poverty, but, unless aid changes the distribution, much of the aid-induced increase in income will accrue to people who are not poor. The former effect tends to make aid more effective in reducing

poverty in highly unequal societies, and the latter effect makes it less effective.

Potentially, aid can change the distribution of income. Indeed, projects will normally attempt to target the poor. However, in aggregate aid tends to be fungible (Pack and Pack 1993; Feyzioglu et al. 1998) and so has distributional consequences which are similar to a general increase in public expenditure combined with a general decrease in taxation. Such evidence as there is on the distributional incidences of public expenditure and taxation in developing countries suggests that on average such changes will not be distributionally progressive to any great extent. The incidence of public spending in developing countries is mildly progressive (van de Walle 1995; Devarajan and Hossain 1998). However, the tax reduction effect of aid is likely to be regressive. Furthermore, there is evidence that the distribution of income is fairly stable over time in a majority of countries (Li, Squire, and Zou 1998). We will therefore assume that the net effect of aid is distributionally neutral. This should be understood, however, not as an empirically well-grounded result, but rather as a neutral assumption pending evidence which would enable distribution to be endogenized with respect to aid. Thus, at present the aid-poverty mapping is being endogenized with respect to income distribution, but that distribution is not endogenous with respect to aid.

High-quality information on the distribution of income is now available for more than 60 developing countries (Deininger and Squire 1996). For these countries we have estimates of the headcount index of poverty for a \$1 per day poverty line ($h1$), the poverty gap corresponding to that line ($pg1$), the headcount index for a \$2 per day poverty line ($h2$), and the poverty gap corresponding to that line ($pg2$). For a given

distribution of income, there is a remarkably simple formula for the elasticity of the poverty gap with respect to mean income (Datt and Ravallion 1993):

$$\alpha_{pg} = (pg-h)/pg. \quad (7)$$

Thus, the poverty gap and the headcount contain all of the information that we need about the distribution in order to know the elasticity of pg with respect to income. For the poverty gap measure of poverty, which is conceptually superior to the headcount, we will calculate a country-specific elasticity based on the formula above. The elasticity of the headcount, on the other hand, is far more complicated and requires full knowledge of the density function. However, Ravallion and Chen (1997) have estimated the elasticity of headcount poverty with respect to mean income for a large sample of countries. The mean elasticity for this sample is two, and we will adopt this as our measure for the headcount. So, we have two different concepts of poverty, poverty gap and headcount, with two different poverty lines (\$1 and \$2 per day).

We now bring together the aid-growth mapping and the growth-poverty mappings, and generate poverty-efficient allocations of aid, initially using 58 countries for which we have complete data. Our first result is that if aid allocation is not politically constrained, even despite diminishing returns, aid budgets would be allocated overwhelmingly to India. Because India has reasonable policies, very high poverty and a very large population, its capacity to absorb aid is enormous. While this result is of interest, telling us that under any politically realistic aid allocation India will be underfunded on the criterion of poverty reduction, it does not provide a good basis for

discrimination between other environments and so does not guide marginal improvements in aid allocation. We therefore constrain both India and China to their actual levels of aid, and investigate poverty-efficient allocation among remaining countries.⁵ The results are reported in Table 2. (The total amount is the \$26 billion in aid that these countries actually received in 1996.)

Our second result addresses the considerable conceptual attention which has been given to refining the measurement of poverty from the simple headcount to the more sophisticated poverty gap. We find that in allocating aid, it makes virtually no difference whether one uses the headcount index with a constant elasticity or the poverty gap with a country-specific elasticity. For the \$1 poverty line the correlation between the allocations resulting from the different approaches is .998, while for the \$2 poverty line it is .967. It makes a small difference which poverty line is used, but still the correlation between the allocation based on the \$1 headcount and that based on the \$2 headcount is .90. It is reassuring that the different approaches yield similar allocations. By any measure countries such as Uganda or India have a high incidence of poverty, whereas a country such as Chile, while it may have good policy, does not have a comparable poverty problem and receives no aid in any of the four allocations.

The final step in this section is to bring more countries into the analysis. The number of countries in Table 2 is constrained by the availability of information on the distribution of income. Now that we have evidence that using a simple headcount measure of poverty and a constant elasticity of 2 produces results very similar to those from a more sophisticated approach, we can use that technique to arrive at an optimal allocation of aid for more than 100 countries. As before, we constrain China and India to

their actual level of aid, and otherwise allocate aid to maximize the reduction in poverty based on the \$2 per day headcount.

The marginal cost of poverty reduction, given the current allocation of aid, varies enormously. For around twenty countries *additional* aid would not reduce poverty (and indeed may even increase it). At the other end of the spectrum, the marginal cost of poverty reduction is only \$333 per person in Bangladesh, and is almost as low in India and Ethiopia. In these countries an additional \$1 million of aid would permanently lift between 2,400 and 3,000 people out of poverty. The poverty-efficient allocation of aid (table 3) gives each country an amount such that the marginal dollar is equally effective in reducing poverty. Given the present total aid budget this marginal cost of poverty reduction is \$1,502. Countries such as Chile have a marginal cost of poverty reduction which is above this level and so receive a zero allocation. It is worth noting that in the unconstrained optimum (in which India gets the bulk of all aid) the marginal cost is \$665.

Not surprisingly, the poverty-efficient allocation of aid is more sharply targeted to high-poverty countries than is the actual allocation. The correlation between the poverty rate and the poverty-efficient allocation is .79, compared to .52 for the actual allocation. Within the high-poverty group of countries, the poverty-efficient allocation gives particularly large amounts to good-policy countries such as Ethiopia or Uganda. Thus, it is possible to make the allocation of aid more sharply targeted to poverty and more sharply targeted to good policy, *simultaneously*.

4. Reallocating Aid for Poverty Reduction

We now consider in more detail how the actual allocation of aid compares to the allocation that maximizes poverty reduction and quantify the gains from moving from the current allocation to the allocation derived in the previous section.

In our model of efficient aid, what a country receives relative to GDP should be a monotonic but non-linear increasing function of the headcount index divided by per capita income (which we will denote *POV*). It should be a monotonic increasing function of policy, and linear in our transformation of the ordinal policy measure (CPIAS). The actual allocation of aid in 1996 across 106 countries has a broadly appropriate relationship to poverty (Table 4, regression 1). However, there is no significant linear relationship to policy. One possible reason might be that in practice countries with small populations receive higher per capita aid and this may be disguising the true aid-policy relationship. When population is added to the equation it is indeed highly significant, but there is still no significant linear relationship between policy and aid (regression 2). Nor is the absence of a significant relationship caused by outliers. Omitting three outliers with aid to GDP above 20% does not change this result (regression 3).⁶

Nevertheless, there is a significant relationship between policy and aid, but it is non-monotonic. Regression 4 shows that policy is significant once it is included as a quadratic. The shape of the relationship is shown in figure 3, evaluated at the mean level of *POV*. For a given level of poverty, in the range between bad policies and mediocre policies aid is positively related to policy. However, still controlling for poverty, in the range between mediocre policies and good policies aid sharply *declines*. Thus, just as

policy moves into the realm in which aid becomes effective in reducing poverty, aid starts to be phased out. Whereas the efficient aid-poverty mapping would require that aid should *taper in* with policy reform, actual donor behavior is for aid to *taper out* with reform. Evidently, if policy is treated as exogenous to aid, this represents a large misallocation of aid on the criterion of poverty reduction.

Clearly, the rationale for the present aid allocation rule is that aid is being used to induce policy change. This is why it is concentrated over the range of policy in which there is the most scope for improvement. Were policy highly responsive to aid then this assignment might be poverty-efficient even though, for given policy environments, it is highly inefficient. However, Burnside and Dollar (1997) find that increases in the amount of aid do not typically result in better policy. Although there are undoubtedly particular instances where aid does induce reform, there are also cases where it delays reform, and these results are consistent with much other literature (Collier 1997; Killick 1991; Rodrik 1996; Williamson 1994). Unfortunately, this ineffective use of aid to induce policy change has had a very high opportunity cost. As can be seen from Figure 3, the optimal relationship between aid and policy is the opposite of the actual. While aid has not proved effective at inducing sustained policy change in poor policy environments, it is proving highly effective in reducing poverty in the newly reformed environments.

We now turn from the overall allocation of aid to the allocation of World Bank concessional lending (IDA). The policy rating used in our study is already a factor in the allocation of IDA and so it might be expected that IDA allocations are more poverty-efficient than for aid in general. We test this by re-estimating the aid allocation equations for IDA. Using the maximum number of observations there is a significant, positive

relationship between IDA and policy, after controlling for poverty (Table 5, regression 1). The relationship is stronger if population is added to the equation (regression 2). In the case of IDA, about half of the countries in the data-set receive none at all. Essentially, there is a poverty threshold that countries have to cross before they become eligible. If the model is run for only the observations with positive amounts of IDA (53 countries), the relationship between IDA and policy is stronger (regression 3), though the coefficient declines somewhat if three large outliers are dropped (regression 4). The mean level of IDA receipts for these 50 countries is 0.47% of PPP GDP. The coefficient in regression 4 indicates that a one standard deviation improvement in policy results in an increase in IDA of about 25%.

The actual allocation of IDA in 1996 is compared to the ideal allocation of aid in Figure 4, and they have remarkably similar slopes. (To adjust for the fact that IDA is only a fraction of total aid we have scaled IDA receipts up by a factor of five so that mean receipts are about the same as for total aid.) At first glance it may seem that the IDA line corresponds to a larger volume of aid. However, the IDA relationship is drawn for a given population, while the poverty-efficient allocation does not depend on population. Thus, relative to the efficient allocation, IDA gives too much to small countries and too little to large ones. (An increase in population leads to a parallel shift of the IDA relationship to the right. At a high level of population, the IDA line would be to the right of the poverty-efficient allocation.)

Even with its present allocation, aid achieves much in terms of poverty reduction. We estimate that without aid each year there would be an additional 30 million poor people. However, at present aid overall is not allocated very efficiently with respect to

poverty reduction. To return to our poverty-policy quadrants, a large majority of poor people (74%) live in Quadrant I: countries with high poverty and satisfactory policies. On our analysis, a poverty-efficient allocation of aid would assign a larger share of aid to these countries than is accounted for by their share of global poverty because aid is more effective in these environments. We have already noted that one rationale for the current allocation of aid is a reluctance to increase aid to the very populous countries – India and China. But even in the constrained optimum in which these countries are held at their actual levels of aid, 69% of total aid should go to the countries in Quadrant I. In fact, as shown in figure 5, the share of aid going to Quadrant I countries (55%) is considerably *less* than this and far less than the quadrant's share of poor people.

The allocation in table 3 would lead to an additional 27 million people per year rising out of poverty. Recall that this is a constrained optimum in which India and China are held at their actual aid levels. The figure would be even larger (51 million) if the allocation were unconstrained. To put this in perspective: it would take a four-fold increase in the total volume of aid *holding allocations constant* to achieve the same poverty reduction. Restated, the average cost of permanent poverty reduction would fall from its current level of \$1,205 per person to only \$445 at the unconstrained optimum.

Finally, suppose that the world raised an extra \$10 billion in assistance; what would be the differential poverty impact of allocating it across-the-board versus allocating the increment efficiently (that is, allocating the increment so that the marginal impact is equalized across countries receiving part of the increment). We estimate that an across-the-board increase totaling \$10 billion would lift 7 million people out of poverty. An efficient increase, on the other hand, would raise about 25 million out of poverty.

5. Conclusion

Although aid is allocated coherently, it is allocated inefficiently with respect to poverty reduction. At present, aid is allocated primarily as an inducement to policy reform. This produces a pattern in which aid is targeted on weak policy environments. Often these are environments in which poverty is less severe than in better policy environments: aid is being diverted from high-poverty countries. Further, even among countries with similar poverty problems, aid is being diverted from countries in which the poverty problem is soluble, to those in which, given policy, it is insoluble. The policies which matter for aid to be effective in poverty reduction are not narrowly macroeconomic, but include both distributional policies and the provision of social safety nets. This diversion of aid from poverty reduction to policy improvement would only be justifiable if there was clear evidence that the offer of finance was effective in inducing policy improvement. However, there is now reasonable evidence to the contrary: finance is ineffective because it impairs government ownership of the process of policy reform.

A large majority of poor people now live in policy environments in which aid is effective in reducing poverty. Indeed, far more poor people live in such environments than in the poor policy environments on which aid is currently disproportionately targeted. We estimate that with the present allocation aid lifts around 30 million people permanently out of poverty each year. With a poverty-efficient allocation this would increase to around 80 million per year. Even with political constraints which kept India and China at their present allocations, there would be an increase to around 60 million per year. Hence, the attempt over the past decade to buy policy reform has been hugely expensive for the world's poor.

We have argued that the choice between finance for poverty reduction and finance for policy reform is relatively straightforward: finance is effective for the former but not for the latter. However, there are other choices which are more problematic. There is some evidence that aid is effective in reducing the risk of conflict, both pre-conflict and post-conflict (Collier 1998). Indeed, some of the largest deviations from poverty-efficient allocations favor post-conflict countries such as Rwanda and Bosnia. Similarly, newly reformed countries often experience a phase of low private investment as investors wait for uncertainties to be reduced. There is some evidence that in these environments aid is effective in raising private investment (Dollar and Easterly 1998). Hence, even with poverty-efficiency as a benchmark, donors will continue to face genuinely hard choices between poverty alleviation and other effective uses of aid. We plan further work on these alternative priorities for aid.

References

- Alesina, Alberto, and David Dollar, 1998, "Who Gives Aid to Whom and Why?" NBER Working Paper, no. 6612.
- Boone, Peter. 1994. "The Impact of Foreign Aid on Savings and Growth." London School of Economics, mimeo.
- Burnside, C. and D. Dollar, 1997, "Aid, Policies, and Growth," Policy Research Working Paper, no. 1777, The World Bank.
- Cassen, Robert, 1994, *Does Aid Work?* Oxford, Clarendon Press.
- Collier, Paul, 1997, "The Failure of Conditionality," in C. Gwin and J. Nelson, eds., *Perspectives on Aid and Development*, Washington, DC: Overseas Development Council.
- Collier, Paul, 1998, "The Economics of Civil War," World Bank mimeo.
- Datt, Gaurav, and Martin Ravallion, 1993, "Regional Disparities, Targeting, and Poverty in India," in M. Lipton and J. van der Gaag, eds., *Including the Poor*, World Bank.
- Devarajan, Shantayanan, and Shaikh I. Hossain, 1998, "The Combined Incidence of Taxes and Public Expenditures in the Philippines," *World Development*.
- Dollar, David, and William Easterly, 1998, "The Search for the Key: Aid, Investment, and Policies in Africa," World Bank mimeo.
- Feyzioglu, Tarhan, Vinaya Swaroop, and Min Zhu, 1998, "A Panel Data Analysis of the Fungibility of Foreign Aid," *World Bank Economic Review* 12(1): 29-58.
- Killick, Tony, 1991, "The Developmental Effectiveness of Aid to Africa," World Bank Working Paper No. 646.
- Kruger, Anne O., Constantine Michalopoulos, and Vernon Ruttan, 1989, *Aid and Development*, Johns Hopkins University Press: Baltimore and London.
- Levy, Victor, 1987, "Does Concessionary Aid Lead to Higher Investment Rates in Low-Income Countries?" *Review of Economics and Statistics*
- Li, Hongyi, Lyn Squire, and Heng-fu Zou, 1998, "Explaining International and Intertemporal Variations in Income Inequality," *The Economic Journal*, 108: 1-18.

- Mosley, P., 1987, *Overseas Aid: Its Defence and Reform*, Brighton: Wheatsheaf Books.
- Pack, Howard and Janet Rothenberg Pack, 1993, "Foreign aid and the Question of Fungibility," *Review of Economics and Statistics*,
- Ravallion, Martin and Shaohua Chen, 1997, "What Can New Survey Data Tell Us about Recent Changes in Distribution and Poverty?," *The World Bank Economic Review*, Vol. 11, No. 2, 357-82.
- Rodrik, D., 1996, Understanding Economic Policy Reform, *Journal of Economic Literature*, XXXIV.
- Summers, R. and A. Heston, 1991, "The Penn World Table, Version V," *Quarterly Journal of Economics*, 106: 1-45.
- United Kingdom Secretary of State for International Development, 1997, *Eliminating World Poverty: A Challenge for the 21st Century*, White Paper on International Development.
- van de Walle, Dominique, 1995, "The Distribution of Subsidies Through Public Health Services in Indonesia, 1978-87," in van de Walle and Nead, eds., *Public Spending and the Poor*, Johns Hopkins U. Press for the World Bank.
- van de Walle, Nicholas, and Timothy Johnston, 1996, *Improving Aid to Africa*, Washington, DC: Overseas Development Council.
- White, H., 1992, "The Macroeconomic Analysis of Aid Impact," *Journal of Development Studies*, 28.
- Williamson, J. (ed.), 1994, *The political economy of policy reform*, Institute for International Economics, Washington, DC.

End Notes

¹ New York Times, August 28th 1998, p.A4, 'Norway's Awesome Nature Awesomely Overcome'.

² Earlier literature generally did not find any robust effect of aid on investment or growth (Boone 1994; Levy 1987; White 1992). The Burnside-Dollar result is consistent with this earlier literature in that during the 1970s and 1980s their estimate of the effect of aid on growth in a country with mean policy level is not significantly different from zero.

³ Burnside and Dollar consider the possibility that policy is endogenous and in particular is influenced by the level of aid, but they find no significant effect of the amount of aid on policy. Though we have fewer control variables, we also estimated an equation for the policy index, included aid, and instrumented for it. There was no relationship. Our specification for growth makes use of this information, that the policy measure is not affected by the level of aid and can be taken as independent of it.

⁴ As instruments we use population and donor interest variables such as membership in the franc zone, and also interact these with policy.

⁵ In the unconstrained optimum, China does not get much aid. But if India is constrained, then China would receive the bulk of all aid.

⁶ Our objective here is not to estimate a full behavioral model of aid allocation, but simply to look at whether the allocation of aid meets the efficiency condition that we have established. Alesina and Dollar (1998) show that much of the allocation of aid can be explained by strategic-political variables such as colonial past or UN voting patterns.

Figure 1. Poverty and Policy, 113 Developing Countries, 1996

Figure 2a

Figure 2b

Figure 2c

Figure 3. Actual Aid, Poverty-Efficient Aid, and Policy

Figure 4. IDA and Poverty-Efficient Aid

Figure 5. Poverty, Aid, and Poverty-Efficient Aid

SHARE OF POOR PEOPLE

SHARE OF POVERTY-EFFICIENT AID (UNCONSTRAINED)

SHARE OF POVERTY-EFFICIENT AID (CONSTRAINED)

SHARE OF ACTUAL AID

I: (GOOD POLICY, HIGH POVERTY)	II: (POOR POLICY, HIGH POVERTY)
III: (POOR POLICY, LOW POVERTY)	IV: (GOOD POLICY, LOW POVERTY)

Table 1
Dependent variable: Growth rate of per capita GNP

	(1)	(2)	(3)	(4)
Method	OLS Cross Section	TSLS Cross Section	TSLS Panel	OLS Cross Section
Time Period	1990-96	1990-96	1970-93	1990-96
Initial Income	0.62 (1.82)	0.52 (1.46)	-.80 (1.22)	0.59 (1.84)
Policy	0.63** (2.18)	0.72** (2.19)	0.19 (0.28)	0.59 (1.91)
Aid/GDP	-0.01 (0.13)	-0.06 (0.41)	2.21 (1.89)	-0.02 (0.64)
(Aid/GDP) x Policy	0.27* (3.31)	0.24* (2.63)	0.65** (1.96)	0.29* (3.38)
(Aid/GDP) ²	--	--	-0.29** (2.06)	0.02 (0.60)
N	86	86	272	86
R ²	0.59			0.59

*Significant at the 1 percent level.

**Significant at the 5 percent level.

Note: t-statistics in parentheses. Regional dummies included. Regression (3) includes all of the control variables used in Burnside and Dollar (1997).

Table 2

		Poverty				Elasticities				Reallocated Aid based on :			
		Pop below \$1 / day	Pov gap at \$1 / day	Pop below \$2 / day	Pov gap at \$2 / day	Elasticity: Pop below \$1 / day	Elasticity: Pov gap at \$1 / day	Elasticity: Pop below \$2 / day	Elasticity: Pov gap at \$2 / day	Pop below \$1 / day (\$ mn)	Pov gap at \$1 / day (\$ mn)	Pop below \$2 / day (\$ mn)	Pov gap at \$2 / day (\$ mn)
CHN	CHINA	22.2	6.9	57.8	24.1	2	2.22	2	1.40	2,617	2,617	2,617	2,617
IDN	INDONESIA	11.8	1.8	58.7	19.3	2	5.58	2	2.04	0	0	450	1,877
MYS	MALAYSIA	5.6	0.9	26.6	8.5	2	5.22	2	2.13	0	0	0	0
PHL	PHILIPPINES	28.6	7.7	64.5	28.2	2	2.71	2	1.29	6,267	6,454	4,094	3,283
THA	THAILAND	1	..	23.5	5.4	2	..	2	3.35	0	..	0	0
BLR	BELARUS	1	..	6.4	0.8	2	..	2	7.00	0	..	0	0
BGR	BULGARIA	2.6	0.8	23.5	6	2	2.25	2	2.92	0	0	0	0
CZE	CZECH REP.	3.1	0.4	55.1	14	2	6.75	2	2.94	0	0	0	0
EST	ESTONIA	6	1.6	32.5	10	2	2.75	2	2.25	0	0	0	0
HUN	HUNGARY	1	..	10.7	2.1	2	..	2	4.10	0	..	0	0
KAZ	KAZAKHSTAN	1	..	12.1	2.5	2	..	2	3.84	0	..	0	0
KGZ	KYRGYZ REP.	18.9	5	55.3	21.4	2	2.78	2	1.58	275	283	256	251
LTU	LITHUANIA	1	..	18.9	4.1	2	..	2	3.61	0	..	0	0
MDA	MOLDOVA	6.8	1.2	30.6	9.7	2	4.67	2	2.15	0	0	21	34
POL	POLAND	6.8	4.7	15.1	7.7	2	0.45	2	0.96	0	0	0	0
ROM	ROMANIA	17.7	4.2	70.9	24.7	2	3.21	2	1.87	0	0	0	0
RUS	RUSSIA	1	..	10.9	2.3	2	..	2	3.74	0	..	0	0
SVK	SLOVAK REPUB	12.8	2.2	85.1	27.5	2	4.82	2	2.09	0	0	0	2
TKM	TURKMENISTAN	4.9	0.5	25.8	7.6	2	8.80	2	2.39	0	0	0	0
BRA	BRAZIL	23.6	10.7	43.5	22.4	2	1.21	2	0.94	0	0	0	0
CHL	CHILE	15	4.9	38.5	16	2	2.06	2	1.41	0	0	0	0
COL	COLOMBIA	7.4	2.3	21.7	8.4	2	2.22	2	1.58	0	0	0	0
CRI	COSTA RICA	18.9	7.2	43.8	19.4	2	1.63	2	1.26	0	0	0	0
ECU	ECUADOR	30.4	9.1	65.8	29.8	2	2.34	2	1.22	0	0	0	0
GTM	GUATEMALA	53.3	28.5	76.8	47.6	2	0.87	2	0.61	1,173	910	524	0
HND	HONDURAS	46.9	20.4	75.7	41.9	2	1.30	2	0.81	429	405	329	248
JAM	JAMAICA	4.3	0.5	24.9	7.5	2	7.60	2	2.32	0	0	0	0
MEX	MEXICO	14.9	3.8	40	15.9	2	2.92	2	1.52	0	0	0	0
NIC	NICARAGUA	43.8	18	74.5	39.7	2	1.43	2	0.88	284	270	217	168
PAN	PA..MA	25.6	12.6	46.2	24.5	2	1.03	2	0.89	71	0	0	0
VEN	VENEZUELA	11.8	3.1	32.2	12.2	2	2.81	2	1.64	0	0	0	0
DZA	ALGERIA	1	..	17.6	4.4	2	..	2	3.00	0	..	0	0
EGY	EGYPT	7.6	1.1	51.9	15.3	2	5.91	2	2.39	0	0	1,806	2,365
JOR	JORDAN	2.5	0.5	23.5	6.3	2	4.00	2	2.73	0	0	0	0
MAR	MOROCCO	1	..	19.6	4.6	2	..	2	3.26	0	..	0	0
TUN	TUNISIA	3.9	0.9	22.7	6.8	2	3.33	2	2.34	0	0	0	0
IND	INDIA	52.5	15.6	88.8	45.8	2	2.37	2	0.94	1,936	1,936	1,936	1,936
NPL	NEPAL	50.3	16.2	86.7	44.6	2	2.10	2	0.94	547	544	472	425
PAK	PAKISTAN	11.6	2.6	57	18.6	2	3.46	2	2.06	3,340	3,805	5,011	5,237
LKA	SRI LANKA	4	0.7	41.2	11	2	4.71	2	2.75	0	0	501	689
BWA	BOTSWA..	33	12.4	61	30.4	2	1.66	2	1.01	161	106	0	0
CIV	COTE D'IVOIRE	17.7	4.3	54.8	20.4	2	3.12	2	1.69	601	630	581	581
ETH	ETHIOPIA	46	12.4	89	42.7	2	2.71	2	1.08	1,170	1,172	1,133	1,114
GIN	GUINEA	26.3	12.4	50.2	25.6	2	1.12	2	0.96	267	221	170	104
GNB	GUINEA-BISSAU	88.2	59.5	96.7	76.6	2	0.48	2	0.26	34	31	29	16
KEN	KENYA	50.2	22.2	78.1	44.4	2	1.26	2	0.76	845	813	710	593
LSO	LESOTHO	48.8	23.8	74.1	43.5	2	1.05	2	0.70	128	121	105	82
MDG	MADAGASCAR	72.3	33.2	93.2	59.6	2	1.18	2	0.56	363	354	320	268
MRT	MAURITANIA	31.4	15.2	68.4	33	2	1.07	2	1.07	130	114	108	94
NER	NIGER	61.5	22.2	92	51.8	2	1.77	2	0.78	250	247	224	203
NGA	NIGERIA	31.1	12.9	59.9	29.8	2	1.41	2	1.01	2,394	2,295	2,054	1,847
RWA	RWANDA	45.7	11.3	88.7	42.3	2	3.04	2	1.10	125	126	118	115
SEN	SENEGAL	54	25.5	79.6	47.2	2	1.12	2	0.69	505	480	414	323
ZAF	SOUTH AFRICA	23.7	6.6	50.2	22.5	2	2.59	2	1.23	0	0	0	0
TZA	TANZANIA	10.5	2.1	45.5	15.3	2	4.00	2	1.97	547	568	591	598
UGA	UGANDA	69.3	29.1	92.2	56.6	2	1.38	2	0.83	919	908	845	766
ZMB	ZAMBIA	84.6	53.8	98.1	73.4	2	0.57	2	0.34	307	294	282	222
ZWE	ZIMBABWE	41	14.3	68.2	35.5	2	1.87	2	0.92	632	613	400	254
										26,316	26,316	26,316	26,316

Table 3. Actual and Poverty-Efficient Allocations of Aid

Country	Population below \$2 a day (%)	Population below \$2 a day (people)	Actual Aid (per Real GDP)	Poverty-Efficient Allocation (per Real GDP)
ETHIOPIA	89.00%	48,536,477	2.90%	3.75%
UGANDA	92.20%	16,625,529	3.34%	3.68%
MOZAMBIQUE	100.00%	15,858,402	9.21%	3.56%
MALAWI	96.04%	8,882,111	7.09%	3.49%
ZAMBIA	98.10%	8,339,111	7.53%	3.46%
MALI	92.79%	8,544,451	6.95%	3.44%
BANGLADESH	87.63%	101,726,385	1.02%	3.38%
RWANDA	88.70%	6,126,779	15.75%	3.22%
BURKINA FASO	86.43%	8,488,849	4.11%	3.09%
NIGER	92.00%	7,789,197	2.97%	3.03%
SIERRA LEONE	77.48%	3,333,213	8.11%	3.01%
GUINEA-BISSAU	96.70%	991,558	15.67%	3.00%
MADAGASCAR	93.20%	11,763,329	2.84%	3.00%
CHAD	85.40%	5,240,924	5.07%	3.00%
BENIN	79.94%	4,140,478	4.15%	2.99%
LAO, PDR	83.44%	3,647,992	5.73%	2.80%
LESOTHO	74.10%	1,407,570	3.09%	2.79%
SENEGAL	79.60%	6,292,971	4.03%	2.78%
BURUNDI	88.03%	5,241,705	5.31%	2.77%
KENYA	78.10%	19,799,948	1.91%	2.72%
NEPAL	86.70%	17,647,835	1.70%	2.70%
VIETNAM	80.00%	56,715,974	0.78%	2.64%
NIGERIA	59.90%	62,964,795	0.19%	2.62%
HAITI	68.28%	4,697,580	4.51%	2.52%
GHANA	68.30%	11,063,068	2.04%	2.49%
HONDURAS	75.70%	4,232,519	2.82%	2.39%
MAURITANIA	68.40%	1,480,059	6.15%	2.36%
NICARAGUA	74.50%	3,071,999	10.21%	2.31%
PAKISTAN	57.00%	70,045,184	0.41%	2.31%
TAJIKISTAN	47.80%	2,696,884	2.12%	2.25%
TOGO	65.26%	2,527,496	2.33%	2.23%
COTE D'IVOIRE	54.80%	7,227,401	3.91%	2.20%
CAPE VERDE	56.61%	205,931	15.49%	2.17%
KYRGYZ REP.	55.30%	2,479,662	2.45%	2.16%
MONGOLIA	57.29%	1,354,219	4.34%	2.13%
CENT. AFR. REP.	70.24%	2,204,091	3.41%	2.07%
CONGO, DEM. REP.	70.71%	29,163,044	0.41%	1.98%
CAMEROON	58.49%	7,343,886	1.57%	1.86%
GUYANA	60.16%	490,507	6.96%	1.81%
ZIMBABWE	68.20%	7,170,704	1.45%	1.77%
CONGO, REP.	64.82%	1,614,468	8.86%	1.73%
GUINEA	50.20%	3,142,361	2.45%	1.64%
COMOROS	63.95%	299,132	4.49%	1.64%
AZERBAIJAN	36.12%	2,667,190	0.93%	1.33%
EL SALVADOR	52.43%	2,830,701	1.94%	1.24%
PHILIPPINES	64.50%	43,320,003	0.36%	1.17%
GUATEMALA	76.80%	7,713,746	0.51%	1.06%
ANGOLA	68.17%	6,916,587	2.45%	0.93%
MALDIVES	56.58%	133,084	3.77%	0.88%
EGYPT	51.90%	29,010,796	1.31%	0.83%
SRI LANKA	41.20%	7,271,972	1.16%	0.83%
SOLOMON ISL.	54.24%	192,639	4.79%	0.83%
MOLDOVA	30.60%	1,330,958	0.59%	0.75%
PAPUA NEW GUIN.	58.46%	2,404,443	2.87%	0.55%
VANUATU	51.53%	82,428	6.36%	0.48%
EQUATORIAL GUIN.	78.06%	297,013	2.39%	0.38%
INDONESIA	58.70%	110,169,378	0.16%	0.26%
SWAZILAND	55.92%	473,597	0.99%	0.25%
INDIA	88.80%	797,248,087	0.13%	-
CHINA	57.80%	680,302,826	0.06%	-
TURKMENISTAN	25.80%	1,079,247	0.26%	0.00%
BELARUS	6.40%	659,969	0.16%	0.00%
UZBEKISTAN	43.44%	9,511,108	0.15%	0.00%
ECUADOR	65.80%	7,223,496	0.44%	0.00%
PARAGUAY	40.74%	1,864,685	0.56%	0.00%
UKRAINE	30.52%	15,801,298	0.33%	0.00%
BULGARIA	23.50%	1,999,285	0.46%	0.00%
RUSSIA	10.90%	16,169,747	0.00%	0.00%
ROMANIA	70.90%	16,201,271	0.21%	0.00%
FIJI	37.46%	288,538	1.33%	0.00%

Table 3. Actual and Poverty-Efficient Allocations of Aid

Country	Population below \$2 a day (%)	Population below \$2 a day (people)	Actual Aid per Real GDP	Poverty-Efficient Allocation (per Real GDP)
VENEZUELA	32.20%	6,732,427	0.02%	0.00%
ALGERIA	17.60%	4,728,311	0.22%	0.00%
BELIZE	45.31%	93,095	1.87%	0.00%
JAMAICA	24.90%	615,849	0.66%	0.00%
GABON	54.41%	568,089	1.51%	0.00%
DOMINICAN REP.	47.71%	3,597,500	0.29%	0.00%
KAZAKHSTAN	12.10%	2,030,282	0.23%	0.00%
MEXICO	40.00%	35,348,244	0.04%	0.00%
MOROCCO	19.60%	5,003,306	0.70%	0.00%
TURKEY	47.91%	28,485,601	0.06%	0.00%
JORDAN	23.50%	903,797	3.26%	0.00%
THAILAND	23.50%	13,616,464	0.20%	0.00%
BRAZIL	43.50%	67,340,389	0.04%	0.00%
SLOVAK REPUB	85.10%	4,524,904	0.35%	0.00%
NAMIBIA	50.32%	738,253	2.27%	0.00%
LITHUANIA	18.90%	704,189	0.54%	0.00%
ST. KITTS & NEV	36.20%	14,991	2.19%	0.00%
KOREA, REP.	30.36%	13,393,366	-0.02%	0.00%
COSTA RICA	43.80%	1,416,364	-0.03%	0.00%
MALAYSIA	26.60%	5,111,283	-0.20%	0.00%
PERU	50.09%	11,462,327	0.37%	0.00%
ST. LUCIA	34.12%	52,188	4.62%	0.00%
SOUTH AFRICA	50.20%	17,961,207	0.13%	0.00%
TRINIDAD & TOB.	32.31%	408,928	0.19%	0.00%
COLOMBIA	21.70%	7,708,792	0.10%	0.00%
LATVIA	30.27%	782,870	0.86%	0.00%
URUGUAY	34.12%	1,074,147	0.20%	0.00%
CZECH REP.	55.10%	5,691,302	0.11%	0.00%
MAURITIUS	33.61%	368,290	0.19%	0.00%
PANAMA	46.20%	1,172,560	0.46%	0.00%
ARGENTINA	35.98%	12,184,026	0.08%	0.00%
BOTSWANA	61.00%	843,912	0.71%	0.00%
TUNISIA	22.70%	1,968,131	0.29%	0.00%
ESTONIA	32.50%	494,276	0.91%	0.00%
POLAND	15.10%	5,801,369	0.36%	0.00%
HUNGARY	10.70%	1,100,773	0.26%	0.00%
CHILE	38.50%	5,299,686	0.12%	0.00%

Table 4**Dependent variable: ODA as a percent of GDP -- 1996**

	(1)	(2)	(3)	(4)
Constant	.37 (.80)	13.1 (6.58)	10.3 (7.38)	10.8 (7.73)
POV	78.2* (3.90)	81.9* (4.85)	61.9* (5.21)	57.0* (4.78)
POV ²	-217.2 (1.73)	-213.8** (2.02)	-143.2 (1.93)	-122.3 (1.66)
CPIAS	0.17 (0.58)	0.28 (1.13)	0.13 (0.75)	0.03 (0.16)
CPIAS ²	--	--	--	-0.25** (2.02)
Ln (POP)	--	-0.008* (6.52)	-0.006* (7.10)	-0.006* (7.29)
N	106	106	103	103
R ²	0.35	0.54	0.60	0.62

*Significant at the 1 percent level.

**Significant at the 5 percent level.

Note: t-statistics in parentheses.

Table 5
Dependent variable: IDA as a percent of GDP -- 1996

	(1)	(2)	(3)	(4)
Constant	-0.07 (1.26)	0.74 (2.82)	1.50 (3.26)	1.35 (4.01)
POV	11.6* (5.02)	11.9* (5.36)	10.5** (2.29)	14.2* (3.56)
POV ²	-20.9 (1.45)	-20.9 (1.51)	-14.6 (0.59)	-56.0** (2.43)
CPIAS	0.06 (1.81)	0.07** (2.10)	0.15** (2.12)	0.11** (2.07)
Ln (POP)	--	-0.05* (3.15)	-0.09* (3.09)	-0.09* (3.97)
N	104	104	53	50
R ²	0.57	0.61	0.48	0.42

*Significant at the 1 percent level.

**Significant at the 5 percent level.

Note: t-statistics in parentheses.

Appendix: Reweighting the Components of the CPIA

The Country Policy and Institutional Assessment has 20 different components, receiving equal weight in the overall index. The components are grouped into four categories: macroeconomic policies, structural issues (trade, financial sector, property rights), poverty and safety net policies, and public sector efficiency and accountability (including absence of corruption). A natural question to explore is the sensitivity of results to reweighting the components of the index.

One version of reweighting is to put all of the weight on one of the four categories, trying each in turn. Taking each category as the measure of policy, the basic results are broadly the same: the coefficient on policy ranges from .38 to .58, while the coefficient on the interactive term, aid times policy, ranges from .22 to .29 (and is always significant at the 2% level) (appendix table 1).

This finding should not be too surprising since the correlations among the components are quite high (appendix table 2). The lowest correlation is .72 between the structural policies and the poverty/safety net measures. Nevertheless the two perform nearly identically in the growth regressions.

A more extreme version of reweighting is to put all of the weight on each of the twenty components in turn. In this case, 10 of the 20 measures of policy produce a significant coefficient on the interactive term (the 10 are starred in appendix table 3). A simple average of these 10 is correlated .97 with the overall CPIA. This suggests that these 10 contain almost all of the information in the 20. In the growth regression, the average of the 10 produces nearly identical results to the CPIA – except that the t-statistic on both the policy term and the interactive term is larger when all 20 components are used.

The basic finding that aid has more impact in a good institutional-policy environment comes through with different measures of policy focusing on macroeconomic management, the business environment, social policy, or public services and accountability. This should increase confidence in the result. On the other hand, there is no basis for excluding any of these components from the measure of policy, and we prefer to work with a simple average of all 20 components.

Appendix Table 1
Use of Alternative Policy Measures

	<i>Coefficient on Policy</i>	<i>Coefficient on Aid x Policy</i>
CPIAS	0.63** (2.18)	0.27* (3.31)
Macro Components	0.38 (1.01)	0.22* (2.37)
Structural Components	0.58 (1.47)	0.26** (2.37)
Poverty/Safety Nets	0.55 (1.37)	0.22** (2.34)
Public Sector Management	0.56 (1.58)	0.29** (2.60)
Big 10 ^a	0.72 (1.52)	0.33* (2.95)

Note: t-statistic in parentheses.

^aSimple average of the 10 components starred in Appendix Table 3.

Appendix Table 2
Correlations among Different Measures of Policy

	<i>Big 10</i>	<i>Macro</i>	<i>Structural</i>	<i>Poverty</i>	<i>Public Sector</i>
CPIAS	0.97	0.94	0.95	0.86	0.93
Big 10		0.93	0.87	0.92	0.93
Macro			0.84	0.76	0.84
Structural				0.72	0.81
Poverty					0.85
Public Sector					

Appendix Table 3
Components of the CPIA Measure

A. Macroeconomic Management and Sustainability of Reforms

1. General Macroeconomic Performance*
2. Fiscal Policy*
3. Management of External Debt*
4. Macroeconomic Management Capacity
5. Sustainability of Structural Reforms*

A. Structural Policies for Sustainable and Equitable Growth

1. Trade Policy
2. Foreign Exchange Regime
3. Financial Stability and Depth
4. Banking Sector Efficiency and Resource Mobilization*
5. Property Rights and Rule-based Governance
6. Competitive Environment for the Private Sector
7. Factor and Product Markets
8. Environmental Policies and Regulations

A. Policies for Reducing Inequalities

1. Poverty Monitoring and Analysis*
2. Pro-poor Targeting and Programs*
3. Safety Nets*

A. Public Sector Management

1. Quality of Budget and Public Investment Process*
2. Efficiency and Equity of Revenue Mobilization
3. Efficiency and Equity of Public Expenditures
4. Accountability of the Public Service*

* Signifies that the t-statistic on Aid x Policy is 1.90 or greater if this component alone is taken as the measure of policy.

Policy Research Working Paper Series

Title	Author	Date	Contact for paper
WPS2019 The Effects on Developing Countries of the Kyoto Protocol and Carbon Dioxide Emissions Trading	A. Denny Ellerman Henry D. Jacoby Annelene Decaux	December 1998	T. Tourougui 87431
WPS2020 Trade Liberalization, Fiscal Adjustment, and Exchange Rate Policy in India	Delfin S. Go Pradeep Mitra	December 1998	C. Bernardo 31148
WPS2021 Balance, Accountability, and Responsiveness: Lessons about Decentralization	Anwar Shah	December 1998	A. Shah 37687
WPS2022 The Implications of Foreign Aid Fungibility for Development Assistance	Shantayanan Devarajan Vinaya Swaroop	December 1998	C. Bernardo 31148
WPS2023 Capital Inflow Reversals, Banking Stability, and Prudential Regulation in Central and Eastern Europe	Samuel Talley Marcelo M. Giugale Rossana Polastri	December 1998	M. Geller 85155
WPS2024 Re-Engineering Insurance Supervision	Lawrie Savage	December 1998	H. Arbi 34663
WPS2025 Dynamic Capital Mobility, Capital Market Risk, and Exchange Rate Misalignment: Evidence from Seven Asian Countries	Hong G. Min	December 1998	K. Labrie 31001
WPS2026 <i>Circuit</i> Theory of Finance and the Role of Incentives in Financial Sector Reform	Biagio Bossone	December 1998	B. Bossone 33021
WPS2027 Child Labor: Cause, Consequence, and Cure, with Remarks on International Labor Standards	Kaushik Basu	December 1998	M. Mason 30809
WPS2028 Access to Markets and the Benefits of Rural Roads	Hanan G. Jacoby	December 1998	M. Fernandez 33766
WPS2029 Small Manufacturing Plants, Pollution, and Poverty: New Evidence from Brazil and Mexico	Susmita Dasgupta Robert E. B. Lucas David Wheeler	December 1998	Y. D'Souza 31449
WPS2030 The Political Economy of Financial Repression in Transition Economies	Cevdet Denizler Raj M. Desai Nikolay Gueorguiev	December 1998	T. Hailu 44396
WPS2031 Addressing the Education Puzzle: The Distribution of Education and Economic Reform	Ramón López Vinod Thomas Yan Wang	December 1998	T. Shiel 36317

Policy Research Working Paper Series

Title	Author	Date	Contact for paper
WPS2032 Institutional Investors and Securities Markets: Which Comes First?	Dimitri Vittas	December 1998	A. Yaptenco 38526
WPS2033 Diversification and Efficiency of Investment by East Asian Corporations	Stijn Claessens Simeon Djankov Joseph P. H. Fan Harry H. P. Lang	December 1998	R. Vo 33722
WPS2034 Information, Accounting, and the Regulation of Concessioned Infrastructure Monopolies	Phil Burns Antonio Estache	December 1998	G. Chenet-Smith 36370
WPS2035 Macroeconomic Uncertainty and Private Investment in Developing Countries: An Empirical Investigation	Luis Servén	December 1998	H. Vargas 38546
WPS2036 Vehicles, Roads, and Road Use: Alternative Empirical Specifications	Gregory K. Ingram Zhi Liu	December 1998	J. Ponchamni 31022
WPS2037 Financial Regulation and Performance: Cross-Country Evidence	James R. Barth Gerard Caprio, Jr. Ross Levine	January 1999	A. Yaptenco 38526
WPS2038 Good Governance and Trade Policy: Are They the Keys to Africa's Global Integration and Growth?	Francis Ng Alexander Yeats	January 1999	L. Tabada 36896
WPS2039 Reforming Institutions for Service Delivery: A Framework for Development Assistance with an Application to the health, Nutrition, and Population Portfolio	Navin Girishankar	January 1999	B. Casely-Hayford 34672
WPS2040 Making Negotiated Land Reform Work: Initial Experience from Brazil, Colombia, and South Africa	Klaus Deininger	January 1999	M. Fernandez 33766