

## **Aid Allocation and Poverty Reduction**

Paul Collier and David Dollar  
Development Research Group, World Bank

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### Abstract

This paper derives a poverty-efficient allocation of aid and compares it with actual aid allocations. We build the poverty-efficient allocation in two stages. We first utilize new World Bank ratings of twenty different aspects of national policy to establish the current relationship between aid, policies and growth. Onto this we add a mapping from growth to poverty reduction which reflects the level and distribution of income. We compare the effect of using the headcount and poverty-gap measures of poverty.

We find that the actual allocation of aid is 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 on countries with severe poverty and adequate policies: a category of country in which 75% of the world's poor people live. In the actual allocation such countries receive a much lower share of aid (53%) than their share of the world's poor. We show that even with the present allocation, aid is effective in lifting around 16 million people per annum sustainably out of absolute poverty. With a poverty-efficient allocation this would increase to around 30 million people. Even with the introduction of political constraints keeping the allocation for India constant, poverty reduction would increase to around 25 million. While the reallocation of aid is politically difficult, it may be considerably less difficult than the tripling of aid budgets which we estimate would be necessary to achieve the same impact on poverty reduction given the existing aid allocation.

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## ***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 16 million people out of poverty each year, whereas a fully poverty-efficient allocation would have 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 organized 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. As a measure of policy we utilize a new World Bank measure that rates twenty aspects of the policy environment for 144 countries as of 1997/98. We also find evidence of diminishing returns to aid. Thus, the marginal efficiency of aid in terms of increases in income depends on the quality of policies and on the amount of aid that a country is receiving.

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-period increase

in the aid flow will raise the growth rate for one period, thereby sustainably increasing the *level* of income. A sustained increase in the level of income will, conditional upon the initial level of income and its distribution, 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 equalized 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 \$1,626. 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 \$40bn would be

30 million people, so that the average cost of taking a person permanently out of poverty would be only \$1,333. 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 \$2,516, or around twice 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 14.1 million people would be lifted out of poverty through this improvement in the allocation. With the current allocation, a three-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 tripling 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.<sup>1</sup> If, for each inhabitant linked to the mainland around ten 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 \$600. Hence, the true decision facing Norwegian society is whether linking one inhabitant to the mainland is more or less desirable than removing 25 people permanently out of severe poverty.

## ***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.<sup>2</sup> However, their study – and in particular the policy measure that they use -- 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 as our measure of the policy environment the World Bank's Country Policy and Institutional Assessment. This measure has 20 different components covering macroeconomic, sectoral, social and public sector policies. Each of the twenty components is rated ordinally 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.<sup>3</sup> Appendix table 1 lists the 20 components of the CPIA.

Secondly, the Burnside-Dollar data set is for the period 1970-93, and so is dominated by the Cold War period. The World Bank policy ratings are available for the period 1974-97 and from this we construct four-year averages beginning in 1974-77 and ending in 1994-97.

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 over a larger number of observations (we have 349 growth-aid-policy episodes of four years each, compared to Dollar-Burnside's 272). Ultimately we can estimate poverty-efficient aid allocations for more than 100 countries.

We now use the new data set to revisit the core Burnside-Dollar results. These are (1) 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) and (2) that aid is subject to diminishing marginal returns. 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 ( $A$ ), the level of aid squared, and the interaction of policy and aid:<sup>4</sup>

$$G = c + b_1.X + b_2.P + b_3.A + b_4.A^2 + b_5.A.P \quad (1)$$

The coefficient on the interaction term,  $b_5$ , addresses that the hypothesis that the effectiveness of aid depends on the policy environment, while the coefficient on the quadratic,  $b_4$ , will pick up any diminishing returns to aid. The coefficient on aid,  $b_3$ , may be positive, negative or zero depending upon the importance of policy for growth. When it is zero it implies that in the best policy environments, scored as 6, the initial contribution of aid to growth is six times as large as in the worst policy environments, scored as 1. When it is positive it implies that the growth differential is less than six, and

when it is negative it implies that the differential is greater than six. Thus, unlike the other variables, neither its sign nor its significance constitute tests of the hypotheses.

Table 1 column 1 presents the OLS results for the estimation of (1) on the new data set. To capture initial conditions we have initial income, a measure of institutional quality from Knack and Keefer (1995), and regional dummies (not reported). There are also period dummies to account for the world business cycle. The most significant variable in the regression is the interaction of aid and policy, with a positive coefficient, significant at the 1 percent level. Hence, the core Burnside-Dollar result was not due to its particular choice of policy variables and is robust to the inclusion of more countries and of more recent years. The CPIA measure of policy also enters directly with a positive coefficient, and marginal significance. Aid and aid squared both enter with negative coefficients and are jointly significant. However, the coefficient on aid itself,  $b_3$ , is not significantly different from zero, and since the variable is not intrinsic to the hypothesis it is dropped in the interests of parsimony. In this second regression, reported in column 2, the t-statistics on policy, the policy-aid interaction, and aid squared all increase, with the two latter being significant at 1%. Thus, the policy environment determines how rapidly diminishing returns eliminate the marginal contribution of aid to growth. Specifically, the marginal impact of aid on growth is estimated to be:

$$G_a = 0.185P - 0.072A \quad (2)$$

In Table 2 we evaluate the derivative at different levels of aid and of policy. The mean level of aid is about 2 percent of real PPP GDP. The mean level of CPIA in the



1994-97 period is 3.3. For a country with mean policy and mean aid, an additional 1 percent of GDP in aid would add .47 percentage points to the growth rate (equivalent to a 30-40% rate of return, after adjusting for depreciation). As can be seen in the table, this impact increases with policy and decreases with the level of aid.

### 3. *The Poverty-Efficient Allocation of Aid*

The results above suggest that donors can affect growth through their allocation of aid; growth in turn will typically lead to poverty reduction in low-income countries. 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.

To formalize these ideas, we consider a world in which aid is given with the purpose of maximizing the reduction in poverty. Aid affects growth, but we take it that policy and the distribution of income within recipient countries are exogenous from the point of view of aid donors. That is, the objective function of donors is to allocate aid among countries so as to:

$$\begin{aligned} \text{Max Poverty Reduction} &= \sum_i G^i a^i h^i N^i \\ \text{Subject to} \quad \sum_i A^i y^i N^i &= \bar{A}, \quad A^i \geq 0 \end{aligned} \quad (3)$$

where

- $y$  is per capita income  
 $A$  is the total amount of aid  
 $h$  is a measure of poverty (for example, the headcount index)  
 $\mathbf{a}$  is the elasticity of poverty reduction with respect to income  
 $N$  is population, and

the superscript “i” indexes countries. As in the previous section, growth is a function of a country’s policy and the amount of aid it receives.

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

$$G_a^i \mathbf{a}^i h^i N^i = \mathbf{I} y^i N^i \quad (4)$$

Where  $\mathbf{I}$  is the shadow value of aid. Using the estimate of  $G_a$  from (2) 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:

$$A^i = 2.6 p^i - \frac{\mathbf{I}}{.07\mathbf{a}^i} \left( \frac{h^i}{y^i} \right)^{-1} \quad (5)$$

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 divided by per capita income) shown in figure 1a. 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 1b). For a given poverty level, on the other hand, the optimal relationship between aid and policy is linear but kinked (figure 1c). 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. The reason for this is that, with poverty constant, the relationship shows combinations of aid and policy that maintain  $G_a$  at a constant level. This maps a linear relationship. Increasing the level of poverty shifts the schedule to the left.

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 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):

$$\alpha_{pg} = (pg-h)/pg. \quad (6)$$

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 India to its actual level of aid, and investigate poverty-efficient allocation among remaining countries. Table 3 reports four different “poverty-efficient” allocations of aid, based on the four different poverty measures. (The total amount in the allocations is the \$28 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 little 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 .98, while for the \$2 poverty line it is .86. It also makes only a small difference which poverty line is used: the correlation between the

allocation based on the \$1 headcount and that based on the \$2 headcount is .93. 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 3 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 India to its actual level of aid, and otherwise allocate aid to maximize the reduction in poverty based on the \$2 per day headcount.

The marginal effect of aid on poverty reduction, given the current allocation of aid, varies enormously (Table 4). For seven 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 \$600 per person in Ethiopia, and is almost as low in Bangladesh, India, and Uganda. In these countries an additional \$1 million of aid would permanently lift between 700 and 1,700 people out of poverty. The poverty-efficient allocation of aid 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 \$3,026. 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 \$1,626.

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 .75, 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 (CPIA). The actual allocation of aid in 1996 across 106 countries has a broadly appropriate relationship to poverty (Table 5, 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).<sup>5</sup>

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 4, evaluated at the median 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, one 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 high opportunity cost. As can be seen from Figure 2, the

optimal relationship between aid and policy is the opposite of the actual. While aid has apparently been ineffective at inducing sustained policy change in poor policy environments, it is proving highly effective in reducing poverty in the newly reformed environments.

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 16 million poor people. However, at present aid is not allocated very efficiently with respect to poverty reduction. The allocation in table 4 would lead to an additional 9 million people per year rising out of poverty. Recall that this is a constrained optimum in which India is held at its actual aid levels. The figure would be even larger (14 million) if the allocation were unconstrained. To put this in perspective: it would take a three-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 \$2,516 per person to only \$1,633 at the unconstrained optimum. The poverty-inefficiency of current aid allocations can be decomposed into deviations from each of the three principles of efficient allocation: diminishing returns, poverty-targeting, and policy-targeting. Suppose that the donor community wished to achieve poverty-efficiency but had no information other than the populations of the developing countries. The consideration of diminishing returns would then imply that the best strategy would be to give equal amounts of aid per capita to each country. Were the present allocation of aid replaced by this principle, the number of people lifted out of poverty would rise by 2 million. Now suppose that information on country-specific levels of poverty is also available. This enables an increase in the number of people lifted out of poverty by a

further 9 million. Finally, the addition of information on differences in policy enables the move to full poverty-efficiency as calculated in this paper, and hence lifts a further 3 million people out of poverty.

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 2 million people out of poverty. An efficient increase, on the other hand, would raise more than three times as many people -- about 7 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 partly as an inducement to policy reform and partly for a variety of historical reasons. This produces a pattern in which aid is targeted on weak policy environments and on countries which do not have severe poverty problems. The policies which appear to 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. The diversion of aid from poverty reduction to policy improvement would be justifiable were there evidence that the offer of finance is effective in inducing policy improvement. However, currently the evidence suggests that finance is ineffective as an incentive, perhaps because the income effect offsets the substitution effect, perhaps because it impairs government ownership of the process of policy reform.

We estimate that with the present allocation aid lifts around 16 million people permanently out of poverty each year. With a poverty-efficient allocation this would increase to around 30 million per year. Even with political constraints which keep India at its present allocation, there would be an increase to around 25 million per year. Hence, the attempt over the past decade to use aid to induce policy reform may actually have increased poverty relative to the counterfactual.

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. For example, aid may be effective in reducing the risk of conflict. 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.

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**Table 1**  
**Dependent variable: Growth rate of per capita GNP**

	(1)	(2)
<i>Method</i>	<i>OLS</i> <i>Panel</i>	<i>OLS</i> <i>Panel</i>
Time Periods (1974-97)		
Initial Income	0.67 (1.08)	0.85 (1.49)
Institutional Quality	0.28*** (1.67)	0.27 (1.61)
CPIA	0.46*** (1.65)	0.64** (2.26)
Aid/GDP	-0.54 (1.40)	--
(Aid/GDP) x CPIA	0.31* (2.94)	0.18* (3.06)
(Aid/GDP) <sup>2</sup>	-.02 (1.60)	-.036* (3.07)
N	349	349
R <sup>2</sup>	0.37	0.36

\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*\*\*Significant at the 10 percent level.

Note: t-statistics in parentheses. Regional and period dummies included.

**Table 2**  
**Derivative of Growth with Respect to Aid**

CPIA	Aid	Evaluated at:			
		0	2	4	6
2.6		.48*	.34*	.19	.05
3.3		.61*	.47*	.32*	.18
4.0		.74*	.60*	.45*	.31*

\* Significant at the 2 percent level.

Note: Using the coefficients from regression 2, Table 1.



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

	(1)	(2)	(3)	(4)
Constant	-0.43 (0.26)	11.8 (5.09)	9.7 (6.04)	5.26 (1.93)
POV	78.2* (3.90)	81.9* (4.85)	61.9* (5.21)	57.0* (4.78)
POV <sup>2</sup>	-217.2*** (1.73)	-213.8** (2.02)	-143.2*** (1.93)	-122.3*** (1.66)
CPIA	0.24 (0.58)	0.39 (1.13)	0.18 (0.75)	3.28** (2.11)
CPIA <sup>2</sup>	--	--	--	-0.49** (2.02)
Ln (POP)	--	-0.81* (6.52)	-0.62* (7.10)	-0.63* (7.29)
N	106	106	103	103
R <sup>2</sup>	0.35	0.54	0.60	0.62

\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*\*\*Significant at the 10 percent level.

Note: t-statistics in parentheses.

**Appendix Table 1**  
**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

B. 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

C. Policies for Reducing Inequalities

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

D. 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

## *End Notes*

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- <sup>1</sup> New York Times, August 28<sup>th</sup> 1998, p.A4, 'Norway's Awesome Nature Awesomely Overcome'.
- <sup>2</sup> 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.
- <sup>3</sup> In Collier and Dollar (1999) we show that the main results are not sensitive to reweighting the components.
- <sup>4</sup> In this formulation we make use of two other results from Burnside and Dollar. First, they 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. 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. Second, Burnside and Dollar consider the possibility that aid is correlated with the error term in the growth regression and instrument for it. Their OLS and 2SLS regressions are essentially the same, indicating that there is no significant correlation between aid and the error term. In light of this, we use OLS to estimate the growth equation.
- <sup>5</sup> 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.