



Aid and Debt Relief in Africa: Have They Been Substitutes or Complements?

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Summary. — Much attention has been paid to helping economies in sub-Saharan Africa (SSA) to achieve the Millennium Development Goals (MDGs). The conventional instruments for providing assistance have been foreign aid disbursements and debt relief. But have debt relief initiatives complemented or substituted for other aid? Has debt relief been additional? This paper examines the evolving relationship between debt relief and other foreign aid in SSA using recently constructed and improved data. Estimating a model of aid allocation for 42 SSA countries using panel data for 1988–2006, it finds that the relationships between debt, debt relief, aid, and resource transfers have changed over time. This paper interprets how policy changes may have modified the underlying relationship between aid and debt relief.

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1. INTRODUCTION

The 2009 global financial crisis is likely to have a significant impact on poor countries, increasing attention on earlier donor promises of higher aid, even as pressures on industrial country budgets increase. The Millennium Development Goals (MDGs) focused attention on the various mechanisms for engineering resource transfers to low-income countries. Much of the discussion has concentrated on assisting sub-Saharan Africa (SSA); the UK's Africa Commission reflected this interest in the region.¹ Although consideration has been given to new methods of financing development, actual policy has concentrated on two conventional instruments, direct foreign aid (including budget support, project grants, and concessional loans) and debt relief. Policy initiatives have tended to address both of them simultaneously; a case in point is the Gleneagles G-8 summit in 2005, where the large donor countries stated their intention to both double aid to Africa by 2010 and write off the debts of a number of low-income countries under what became the Multilateral Debt Relief Initiative (MDRI).

While it might seem that the objectives of scaling up foreign aid and scaling down debt are being pursued in tandem, the relationship between aid and debt has not been widely studied. Did the debt relief initiatives of the late 1980s, 1990s, and 2000s complement other aid flows? Or did they substitute for them? What has been the effect on overall resource transfers to Africa? Has debt relief crowded out other foreign aid flows? And has the relationship between debt relief and other aid flows changed over time? If so, in what way?

This paper sets out to examine empirically the evolving relationship between debt relief and other foreign aid in SSA since the late 1980s. It estimates a model of aid allocation for a sample of 42 SSA countries using panel data for 1988 through 2006. We present regressions based on both OLS and the

general method of moments (GMM) system estimator to allow for unobservable country-specific factors and to control for possible endogeneity of the explanatory variables. The findings suggest that the aid allocation process and the relationship between aid and debt relief have indeed evolved over time.

In what follows, Section 2 clarifies some terminology, particularly the definition of “additionality.” Ambiguous use of this term has often led to confusion. Without providing formal theoretical analysis, Section 3 examines the a priori relationship between aid and debt relief and examines the literature on aid allocation. It concludes that there is no reason in principle to expect either a positive or a negative relationship; hence the emphasis in the rest of the paper is on empirical investigation. Section 4 describes the data, the econometric methodology, and the results. It also offers an interpretation of the findings. Finally, Section 5 considers the implications of the findings and the attendant policy design issues.

2. TERMINOLOGY: AID, DEBT RELIEF, AND ADDITIONALITY

The terms used in this paper are not straightforward and unambiguous. Aid may come in different forms and with different degrees of concessionality. It can take the form of

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concessional loans or grants, and can be tied or untied. Debt relief is one of several aid delivery modalities reported by donors, along with emergency aid, project aid, and program aid (also known as budget support). It is difficult to reduce aid flows to a common denominator. Similarly, the size and nature of debt difficulties can be measured in various ways including the stock of debt relative to GDP (or exports, or population), the present value of debt stock to GDP (or exports), and various debt service ratios.

In this paper we take official development assistance (ODA) as our measure of aid. Although, as we describe later, we use a modified series of ODA based on a methodology devised by Roodman (2005) which excludes the impact of debt relief operations included in ODA data but that do not lead to a concurrent transfer of resources. This measure is called net aid transfers (NAT).

The other terminological issue relates to additionality in situations where debt relief is being provided by governments that are also donors. Is debt relief genuinely additional? One approach would consider whether the countries that individually receive official debt relief also receive lower other aid flows *as a consequence*. If there is no such crowding-out of other aid, the debt relief can be considered additional. However, even if it is additional in this sense, it does not necessarily follow that a country receiving debt relief will experience an increase in net resource transfers, since it may not have been meeting its contractual debt obligations, or the donors may have chosen to reduce other aid flows to the country regardless of debt relief. This additionality is difficult to establish empirically without a clear counter-factual.

A second, more readily observable, approach to additionality examines the relationship of debt relief to the actual net transfer of donor resources to the country concerned. In this approach debt relief is considered additional if it is associated with a concurrent increase in net overall resource flows from the donor-creditor concerned, or from the donor-creditor group as a whole.

The discussion so far looks at debt relief to individual countries. But there will be other countries in the region that have historically received aid but that, for some reason, are either

ineligible to receive debt relief or have not participated in debt relief schemes. What is the implication of debt relief initiatives for SSA as a whole, including the countries that do not receive debt relief? It may be that, although resource transfers to countries receiving debt relief are maintained or increased, aid to other countries is reduced. This raises serious equity issues. Debt relief for Africa according to this measure would only be additional if it strengthened the net resource position of SSA countries as a group. Even then, there may be individual countries within the group that are disadvantaged, with the result that debt relief is not additional for them, even though it is for the group as a whole.

These distinctions are more than just semantic: debt relief that is additional according to one definition may not be according to another. Thus when one piece of research claims that debt relief has been additional and another claims that it has not, they may both be right but simply be using different definitions of additionality.

In the empirical section of this paper we focus largely on the second approach to additionality, which considers recipients and examines the implications of debt relief for actual resource flows from donor-creditors as a group to the individual countries that have received relief since the late 1980s. We concentrate on sub-Saharan Africa, and since there are some SSA countries that have not received significant debt relief, we also briefly consider how donor flows to these countries may have been affected by the debt relief granted in the region.

Figure 1 shows net aid transfers from Development Assistance Committee (DAC) donors to all SSA countries in aggregate from 1960 through 2007, and for two separate groups of countries within the region. The first consists of the 20 countries that had completed the full debt relief process with Paris Club and multilateral creditors and reached the HIPC completion point by the end of 2008.² The other group represents the other 29 SSA countries and territories.

While these two groups received roughly equal net aid transfers from DAC donors from the early 1960s through the mid-1980s, the group that has now obtained comprehensive debt relief has clearly received a greater share of the total net aid transfers going to Africa since debt relief initiatives com-

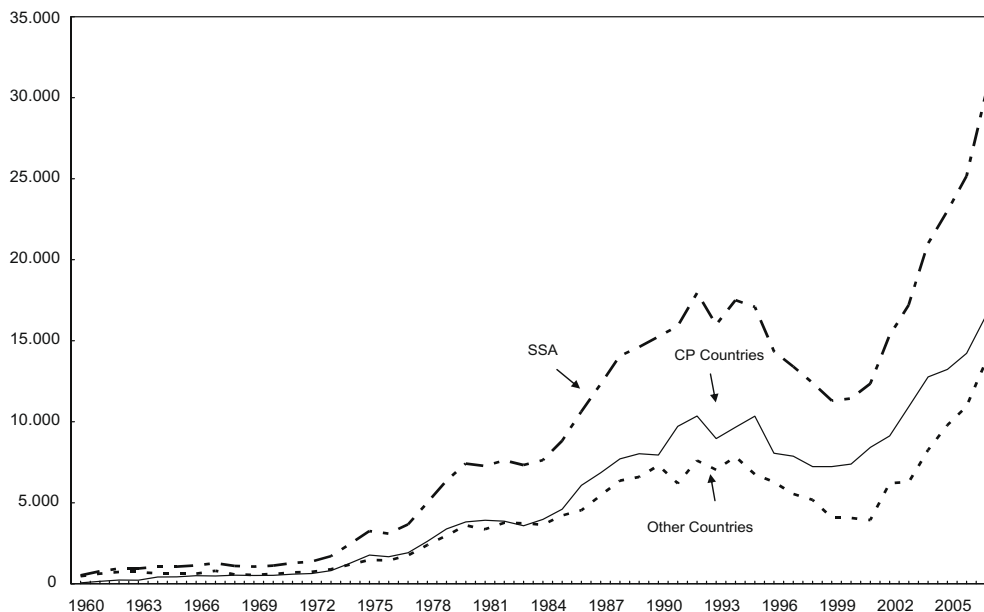


Figure 1. Net aid transfers to sub-Saharan Africa, 1960–2007 (US\$ millions). Source: QECD/DAC adjusted using methodology of Roodman (2005).

menced in the late 1980s. Total donor aid transfers for SSA fell through the 1990s but increased considerably after 2000. Within the overall donor budget for SSA, those countries obtaining comprehensive debt relief have done relatively better than they did earlier, obtaining a larger share of the available resources throughout the debt relief period. From an overall donor perspective the debt relief efforts in the late 1980s and through the 1990s do not seem to have been additional because aggregate net aid transfers were falling during this decade. However, following agreement on the enhanced HIPC initiative and ultimately the Gleneagles declaration and MDRI in the mid-2000s, overall transfers to SSA through 2007 do seem to have increased significantly, so debt relief in the 21st century should be characterized as additional in that sense.

3. AID ALLOCATION AND DEBT: A BRIEF REVIEW OF THE LITERATURE

How are aid, debt, and debt relief connected in principle? The short answer is that there is no reason to believe that there will be a single connection. Different factors may in principle pull in opposing directions.

From one point of view, the relationship between aid and debt may be expected to be positive. Countries with more debt may be thought by aid donors to be encountering greater economic difficulties. The donors may respond by increasing aid flows. Aid is then perceived as a means of making higher debt sustainable. Both *Birdsall, Claessens, and Diwan (2003)* and *Marchesi and Missale (2004)* find evidence that countries with higher debt received higher aid flows, suggesting that part of past aid may have taken the form of defensive lending. If aid to a country is positively associated with its level of debt, the symmetrical expectation would be that a reduction in debt achieved by debt relief would lead to a fall in aid and more donor selectivity.

However, countervailing factors may be at work. Accumulating debt may be seen as an indicator of poor macroeconomic management, and as debt rises donors may become increasingly reluctant to provide new aid.

There are other possible explanations for the relationship between aid and debt relief. Each may be politically driven, but with separate lobbyists for each. Ultimately the relationship between aid, debt, and debt relief becomes an empirical question, and the relationships may change over time.

Over the years a relatively conventional approach to modeling aid allocation has evolved. Building on early research by *McKinley and Little (1977)*, *McKinley and Little (1978a)*, *McKinley and Little (1978b)*, *McKinley and Little (1979)* this approach distinguishes between recipient needs and donor interests as potential determinants of aid allocation. *McKinley and Little* found that the needs of recipients made no statistically significant contribution to explaining the distribution of aid among the donors they studied, but donor interests provided a relatively good explanation. Extending the application of the basic model, *Maizels and Nissanke (1984)* found that, unlike bilateral aid, multilateral aid could be better explained by recipient need. *Gang and Khan (1990)* found evidence of a humanitarian and human rights motivation among some donors in the period up to 1986.

However, there are doubts about the modeling methodology used in some early studies that involved estimating two separate regression equations containing proxies for either recipient need or donor interests, but not for both. If both groups of factors are relevant, there may be an omitted variable bias

in the OLS estimations. In a more recent paper that surveys the modeling of aid allocation, *McGillivray (2003)* stresses the potential problem of sample selection bias when the dependent variable can only be either zero or positive. Including the zero observations will bias the coefficient estimates, but excluding them may mean that observations with large errors are eliminated, and the expected value of the error term will be a function of the explanatory variable, thus violating the normal OLS assumption that its expected value is zero. *McGillivray* advocates estimating comprehensively specified equations using limited dependent variable techniques.

Some studies, such as *Alesina and Dollar (2000)*, have adopted this type of approach. Their results confirm the small-country bias found in earlier research. They also find that political-strategic variables, such as colonial links, had more explanatory power than measures of poverty, democracy, and economic policy. More recent work by *Berthélemy and Tichit (2004)* looking at data for 1980–99 suggests that the bias toward former colonies may have weakened and that donors now favor trading partners, and more recently countries with sound economies.

Earlier, *Grilli and Riess (1992)* attempted to include debt variables. While confirming for the European Community the differences between bilateral and multilateral aid, they also discovered a significant positive association between the stock of debt and aid in the 1980s. *Bird and Milne (2003)* found a similar association. If the relationship is symmetrical, this may imply that reducing the stock of debt through debt relief will be associated with a decline in aid, so that the effect on net transfers will be to some extent neutralized. *Birdsall et al. (2003)* provide direct evidence of this for 35 SSA countries for 1977–98. Splitting their sample into high- and low-debt countries, they find that for the high-debt group, debt reduction does not lead to an increase in net transfers. Their findings do suggest defensive lending with respect to the multilateral debt burden in SSA during the period observed. Following debt reduction there is less motivation for aid, which may decline as a consequence. Both *Ndikumana (2002)* and *Powell (2003)*, however, fail to find evidence that debt relief significantly affected aid transfers for individual countries before 2000.

Making a distinction between highly indebted poor countries (HIPCs) and non-HIPCs among 50 low-income countries, *Marchesi and Missale (2004)* find that higher debt is associated with higher net transfers in the case of HIPCs but with lower transfers in the case of non-HIPCs. This finding is consistent with the notion of defensive lending as well as the contention, put forward by *Bird and Milne (2003)*, that the theory of debt overhang is less relevant for some low-income countries where aid has been increased to help them meet their debt obligations. *Ruiz-Arranz, Cordella, and Ricci (2005)* confirm that from 1970 through 2002 the relationship between net transfers and the level of debt is negative only for non-HIPCs. Looking at a large sample of 147 recipient countries for 1970–2004, *Claessens, Cassimon, and Van Campenhaut (2007)* find that bilateral aid responds more to economic need and institutional environment and less to debt size and colonial linkages. In particular, they suggest that once a country receives comprehensive debt relief, defensive lending becomes less prevalent and aid allocation becomes more selective.

The empirical evidence is informative but not definitive. Studies have only recently begun to examine the relationship between aid and debt, and the aid allocation behavior of donors may be changing over time. To what extent do results depend on the way variables are defined and time periods selected? This paper addresses these questions.

4. A MODEL OF AID ALLOCATION, ESTIMATION, AND RESULTS

(a) Data

The methodology of Roodman (2005) has been used to adjust OECD/DAC data on ODA to extract the impact of interest payments and debt relief operations for non-ODA debt. Roodman notes that relief granted on ODA debt (loans that met the DAC's definition of concessional development aid when they were disbursed) does not affect the level of gross ODA reported by DAC donors because the debt relief grant (included under "grants") is matched by an off-setting entry with a negative sign that represents the immediate return of that grant in the form of amortization. This mechanism prevents double counting of forgiven ODA loans, which were already counted as aid when they were disbursed.³ However, for debt that was not counted as ODA when it was originally disbursed (because it was either not sufficiently concessional or not for development purposes), the debt forgiveness grant does not have an off-setting entry for the repayment. This is how debt relief increases recorded ODA even without a new cash resource transfer.⁴ Moreover, when creditors reschedule debt, the capitalization of unpaid interest is treated as a new aid flow and included under ODA loans extended. The DAC sub-heading for this is "rescheduled debt." Hence following Roodman (2005), we define

$$\begin{aligned} \text{Gross aid transfers (GAT)} \\ &= (\text{grants} - \text{debt forgiveness grants}) \\ &\quad - \text{offsetting } (-\text{ve}) \text{ entries for debt relief} \\ &\quad + (\text{ODA loans extended} - \text{rescheduled debt}). \end{aligned}$$

Net aid transfers are defined as gross aid less cash debt service payments actually made including interest.⁵ Hence,

$$\begin{aligned} \text{Net aid transfers (NAT)} \\ &= \text{gross aid transfers} - \text{ODA loan repayments} \\ &\quad - (\text{interest received} - \text{interest forgiven}). \end{aligned}$$

Roodman argues that net aid transfers is the best measure we can make of actual aid resource transfers to individual countries, the cost to donor treasuries, and the benefit to the aid recipient.⁶ Figure 1 shows NAT to SSA for 1960–2007. Aggregate NAT to SSA increased from the mid-1980s to the early 1990s before declining through 1999. Since 2000 the flow of resources to SSA has increased substantially. In the following econometric analysis, NAT is the dependent variable, scaled by population.

Explanatory variables considered come from the World Bank's Global Development Finance (GDF) and World Development Indicators (WDIs) and the IMF's World Economic Outlook database (WEO). These include population (pop), openness (exports plus imports as a share of GDP), and GDP *per capita*. A measure of political and economic freedom that comes from Freedom House, with a lower score meaning greater political and economic freedom, was investigated but found not to be significant. For a measure of the strength of macroeconomic policies, the World Bank's Country Policy and Institution Assessment Index (CPIA) is used. This is an index of scores on various aspects of country policy designed to guide decisions on IDA lending. Debt stock data (debt) are from the IMF and debt reduction (debtred) data from the GDF. We present two sets of results, the first using debt reduction data and the second using dummy variables instead for countries that have reached the decision and comple-

tion points for the HIPC initiative. The full dataset is an unbalanced panel of the 42 SSA countries for 1988–2006 because annual estimates of debt relief are only available from 1988, the date when the Paris Club first agreed on concessional rescheduling on Toronto Terms and when most data series on debt relief start.

We focus on SSA in part in recognition that donor decisions on allocating aid to African countries may be qualitatively different from those for other regions, where, for example, politics and other donor interest variables are likely to play a greater role. The methodology used in the panel data analysis presented uses both OLS and regressions based on the general method of moments (GMM) system estimator (Arellano & Bover, 1995, and Blundell & Bond, 1998). This dynamic panel data technique controls for unobservable, or omitted, country-specific factors and reduces the potential for bias in the estimated coefficients.

(b) Results

The general equation, to which lagged dependent variables were also added, is

$$\begin{aligned} \log(\text{NAT}/\text{pop})_{it} &= \beta_0 + \beta_1 \log(\text{NAT}/\text{pop})_{it-1} \\ &\quad + \beta_2 \log(\text{NAT}/\text{pop})_{it-2} + \beta_3 (\text{debtred}/\text{gdp})_{it} \\ &\quad + \beta_4 (\text{debtred}/\text{gdp})_{it}^2 + \beta_5 \log(\text{debt}/\text{gdp})_{it} \\ &\quad + \beta_6 \log(\text{openness})_{it} + \beta_7 \log(\text{GDP}/\text{pop})_{it} \\ &\quad + \beta_8 \log(\text{pop})_{it} + \beta_9 \log(\text{CPIA})_{it} + \mu_{it} \end{aligned}$$

The results of estimating the log of NAT *per capita* equation for 42 SSA countries are shown in Table 1 for four different periods in order to investigate how the relationship between the variables may have changed over time.⁷ In the GMM equation that covers the full period of debt relief (1988–2006), a significant and positive effect on NAT *per capita* comes from the first two lags of the dependent variable, consistent with the fact that aid is typically planned and disbursed in the context of multiyear plans, which adjust only gradually. The population variable is also highly significant and negative, confirming that population bias has been a significant factor in donor decisions, with donors systematically giving more aid *per capita* to countries with smaller populations. The *per capita* income variable is significant and of the expected negative sign, indicating that poorer countries in Africa, which might be considered to have greater need, have received more aid transfers *per capita* over the period. Good macroeconomic policy, as measured by the CPIA index, is also significant at the 5% level. The debt stock-to-GDP ratio in column (1) is not significant; on average during the full period higher debt has not been consistently associated with a higher, or lower, level of resource transfers from donors when controlling for other factors. However, there is a significant positive impact from the debt relief variable scaled as a share of GDP, suggesting that on average debt relief has been associated with making more cash resources available to recipient countries. The negative and significant coefficient on the square of the debt relief variable suggests a concave function—a diminishing impact from more debt relief.

Columns (2)–(4) presented in Table 1 break the period under consideration into three sub-periods: 1988–94, 1995–99, and 2000–06. The breaks are where a change in the aggregate behavior of donor-creditors is suggested by the total NAT shown in Figure 1.

Column (2) uses data from the early period of debt relief when the Paris Club was implementing first Toronto and then

Table 1. Dependent variable (log of) net aid transfers per capita

	GMM				OLS			
	1988–2006 (1)	1988–94 (2)	1995–99 (3)	2000–06 (4)	1988–2006 (5)	1988–94 (6)	1995–99 (7)	2000–06 (8)
L	0.488 (11.15)***	0.492 (4.01)***	0.377 (4.58)***	0.371 (4.84)***	0.657 (10.62)***	0.734 (4.63)***	0.597 (6.52)***	0.557 (7.01)***
L2	0.302 (7.96)***	0.295 (6.82)***	0.359 (11.02)***	0.405 (5.92)***	0.206 (3.75)***	0.161 (1.44)	0.235 (2.82)***	0.330 (3.75)***
Debt red/gdp	0.017 (4.32)***	0.013 (1.64)	0.034 (2.83)***	0.013 (2.61)***	0.014 (3.89)***	0.012 (1.62)	0.009 (0.60)	0.010 (2.30)**
Debt red/gdp-squared	-0.000 (3.76)	-0.000 (1.19)	-0.001 (2.49)**	-0.000 (2.76)**	-0.000 (3.53)***	-0.000 (1.04)	-0.000 (0.40)	-0.000 (2.78)***
Ln(debt/gdp)	-0.058 (1.63)	0.059 (1.29)	-0.040 (0.41)	-0.073 (1.11)	-0.015 (0.68)	0.047 (1.44)	-0.030 (0.67)	-0.041 (0.91)
Ln(openness)	0.028 (1.92)	-0.020 (0.37)	0.044 (0.32)	0.073 (2.97)***	0.013 (1.19)	-0.022 (1.07)	0.013 (1.10)	0.050 (2.67)***
Ln(GDPpercap)	-0.110 (3.34)***	-0.045 (0.85)	-0.046 (0.61)	-0.225 (3.54)***	-0.064 (2.59)***	-0.028 (0.76)	0.000 (0.00)	-0.186 (3.30)***
Ln(population)	-0.092 (5.30)***	-0.102 (1.69)	-0.115 (3.11)***	-0.079 (2.54)**	-0.053 (2.69)***	-0.049 (1.10)	-0.072 (1.93)*	-0.026 (1.09)
Ln(cpia)	0.188 (1.97)**	0.123 (0.80)	0.315 (1.73)**	0.352 (2.55)**	0.162 (2.24)**	0.074 (0.57)	0.291 (2.27)**	0.126 (1.03)
Constant	2.824 (6.46)***	2.366 (1.84)*	2.557 (2.78)***	3.159 (3.34)***	1.540 (3.30)***	1.129 (1.16)	1.335 (1.60)	1.926 (2.68)***
Observations	707	240	210	257	707	240	210	257
Number of countries	42	40	42	42	42	40	42	42
R-squared					0.86	0.85	0.88	0.85
Hansen P-value	0.988	0.697	0.692	0.911				
AR(2) P-value	0.778	0.707	0.799	0.655				

Robust *t* statistics in parentheses.

Robust *z* statistics in parentheses.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

London terms (1988–94). Population is negative and significant (at the 10% level), but the CPIA, GDP *per capita*, and openness are all insignificant, suggesting that donors were paying less attention to the strength of macroeconomic policies and poverty need in this earlier period. As in the full sample equation, the total debt-to-GDP ratio is insignificant. However, the debt relief variable suggests a significant positive association between debt relief and aid transfers.

Column (3) looks at the five-year period after the implementation of Naples terms and the HIPC Initiative (1995–99). It also coincides with a period of fiscal consolidation in many donor countries, with overall aggregate flows to SSA falling in nominal terms. The CPIA becomes significant at the 10% level in this period, and population is also significant, with the expected sign. GDP *per capita* is not significant. The debt-to-GDP ratio remains insignificant, but the debt relief variable is significant (and concave), suggesting that while overall flows to SSA were falling, those countries receiving debt relief did receive more resources, holding other factors constant.

Finally column (4) considers the seven-year period, 2000–06, when the enhanced HIPC initiative starts to be implemented along with a tighter donor focus on encouraging preparation of poverty reduction strategies. Again, population bias is confirmed and the CPIA is significant and is of the expected sign. The equation also suggests that countries with more open economies and lower *per capita* income receive significantly more aid *per capita*. While the debt stock variable remains insignificant, the debt relief variable is again significant, suggesting that those countries receiving debt relief since 2000 have indeed been obtaining resources additional to those they might otherwise have expected.

Columns (5)–(8) show the OLS results, which are generally consistent with the GMM results for the full sample of 1988–2006.

While the regressions in Table 1 capture the impact of debt relief in a given year on actual resource transfers, they do not capture the effect of how donors react in the longer term to debt relief. Tables 2a and 2b show the results using a dummy variables approach to assessing the impact of debt relief. One dummy takes a value of 1 in a year when debt relief is granted to a country, and 0 otherwise. A second dummy takes a value of 1 for all years after a country reaches the HIPC decision point. A third dummy takes a value of 1 for all years after a country reaches HIPC completion point. While the debt relief dummy is positive, it is not significant in any of the equations. However, the post-completion- point dummy is highly significant in the full sample (1988–2006) and in the 2000–06 equation, and the impact is seen in both GMM and OLS equations.

(c) Interpretation

The results reported in Table 1 provide a plausible and reasonably robust set of equations to explain net aid transfers to SSA countries. They tend to be consistent with much of the literature in reaffirming a small-country bias. They also suggest that aid transfers in the recent years have been encouraged by sound economic policies and good governance of recipients. It appears that relative poverty has exerted a significant influence on aid to SSA countries since the mid-1990s. There is also some evidence that since 2000 more open economies have received more aid.

Turning to debt variables, the position is more nuanced. The estimations clearly suggest that debt relief has been complementary to other aid in the sense that those countries receiving debt relief have generally been receiving larger net aid transfers, holding constant factors such as economic performance

Table 2a. *Dependent variable (log of) net aid transfers per capita*

	GMM				
	1980–2006 (1)	1988–2006 (2)	1988–94 (3)	1995–99 (4)	2000–06 (5)
L.	0.452 (11.75) ^{***}	0.457 (11.22) ^{***}	0.477 (3.91) ^{***}	0.314 (3.36) ^{***}	0.278 (3.87) ^{***}
L2.	0.323 (9.71) ^{***}	0.290 (7.83) ^{***}	0.249 (5.67) ^{***}	0.374 (11.48) ^{***}	0.424 (7.29) ^{***}
Ln(debt/gdp)	−0.060 (1.56)	−0.106 (2.29) ^{**}	−0.007 (0.07)	0.085 (0.33)	−0.084 (1.30)
Ln(openness)	0.022 (1.25)	0.034 (1.78) [*]	−0.047 (0.46)	0.334 (1.03)	0.077 (2.65) ^{***}
Ln(GDP/pop)	−0.134 (3.21) ^{***}	−0.188 (3.76) ^{***}	−0.061 (0.65)	−0.171 (1.00)	−0.223 (3.66) ^{***}
Ln(population)	−0.124 (7.08) ^{***}	−0.136 (6.20) ^{***}	−0.140 (2.56) ^{**}	−0.123 (2.38) ^{**}	−0.126 (4.04) ^{***}
Ln(CPIA)	0.109 (1.57)	0.131 (1.31)	0.056 (0.37)	0.590 (1.36)	0.217 (1.36)
Postcp	0.183 (3.49) ^{***}	0.140 (2.39) ^{**}			0.169 (2.77) ^{***}
Postdp	0.035 (1.03)	0.049 (1.43)			0.117 (2.12) ^{**}
debt_red_dummy	0.074 (2.25) ^{**}	0.048 (1.38)	0.045 (1.16)	0.130 (1.35)	0.026 (0.45)
Constant	3.650 (6.86) ^{***}	4.457 (6.71) ^{***}	3.766 (3.80) ^{***}	1.673 (0.87)	4.264 (4.20) ^{***}
Observations	996	779	278	210	291
Number of countries	42	42	40	42	42
Hansen <i>P</i> -value	0.922	0.977	0.025	0.345	0.418

Robust *z* statistics in parentheses.

^{*} Significant at 10%.

^{**} Significant at 5%.

^{***} Significant at 1%.

Table 2b. *Dependent variable (log of) net aid transfers per capita*

	OLS				
	1980–2006 (1)	1988–2006 (2)	1988–1994 (3)	1995–1999 (4)	2000–2006 (5)
L	0.676 (13.29) ^{***}	0.653 (11.28) ^{***}	0.745 (5.19) ^{***}	0.600 (6.80) ^{***}	0.539 (7.59) ^{***}
L2	0.194 (4.25) ^{***}	0.201 (3.91) ^{***}	0.131 (1.28)	0.222 (2.67) ^{***}	0.325 (4.46) ^{***}
Ln(debt/gdp)	−0.018 (1.11)	−0.028 (1.33)	0.036 (1.28)	−0.044 (1.05)	−0.052 (1.26)
Ln(openness)	0.014 (1.64)	0.015 (1.51)	−0.015 (0.90)	0.013 (1.09)	0.053 (2.98) ^{***}
Ln(GDP/pop)	−0.069 (3.62) ^{***}	−0.075 (3.22) ^{***}	−0.035 (1.08)	0.001 (0.02)	−0.188 (3.59) ^{***}
Ln(population)	−0.065 (4.04) ^{***}	−0.066 (3.41) ^{***}	−0.060 (1.60)	−0.088 (2.19) ^{**}	−0.048 (2.08) ^{**}
Ln(CPIA)	0.061 (1.31)	0.098 (1.49)	0.033 (0.31)	0.248 (2.08) ^{**}	0.090 (0.74)
Postcp	0.158 (3.75) ^{***}	0.151 (3.42) ^{***}			0.120 (2.34) ^{**}
Postdp	0.032 (0.87)	0.036 (0.98)			0.037 (0.66)
debt_red_dummy	0.031 (1.15)	0.048 (1.66) [*]	0.076 (1.81) [*]	0.120 (2.05) ^{**}	−0.009 (0.16)
Constant	1.867 (5.26) ^{***}	1.970 (4.34) ^{***}	1.468 (1.85) [*]	1.674 (1.93) [*]	2.441 (3.49) ^{***}
Observations	996	779	278	210	291
<i>R</i> -squared	0.89	0.87	0.86	0.89	0.86
<i>R</i> -squared	0.89	0.87	0.86	0.89	0.86

Robust *t* statistics in parentheses.

^{*} Significant at 10%.

^{**} Significant at 5%.

^{***} Significant at 1%.

and poverty. The two approaches give slightly different answers about the impact of debt stock. Most of the evidence suggests that the debt stock-to-GDP ratio has not significantly influenced aid transfers, although when using the dummy variables to measure the impact of debt relief, that ratio in the full sample for 1988–2006 becomes significant and negative. This is consistent with the argument that by the late 1980s, donors had come to regard high-debt countries as insolvent, uncreditworthy, and unable to accommodate even concessional additional loans. Rather than opting to give additional conventional aid to compensate for higher debt, attention focused instead on reducing debt and moving to grants rather than loans.

The period from 1994 through 1999 saw falling aggregate net aid transfers to SSA (Figure 1). Debt relief may have become viewed as a means of encouraging economic reform by reducing debt overhang. Donors then started to pay closer attention to the conduct of economic policy in determining the further aid allocations. Indeed, latterly aid, in combination with sound economic policy, good governance, and debt relief has become more broadly perceived as a mechanism for meeting the needs of recipients.

Thus in the period after the implementation of Naples terms and introduction of the HIPC Initiative, there was also an increase in grants to highly indebted SSA countries, and indebtedness no longer seemed to be a significant impediment to

resource transfers. Having created an environment in which debt overhang had been mitigated, donors now placed more emphasis on policy performance, as can be seen in the significantly higher coefficient on the CPIA in column (4) in Table 1.

The results shown in Tables 1 and 2 may say something about the incentives SSA countries face in seeking debt relief. It would appear that acquiring debt relief will not, as things stand, significantly and adversely affect resource flows. Aid will not be crowded out for the recipients. Countries committed to pursuing sound economic policy and good governance can expect to receive a reward in the form of additional cash transfers even when debt relief has enabled them to reduce their external indebtedness. Looking ahead, the prospect of the crowding-out of aid flows should be even more remote given the political commitment of the G-8 at Gleneagles in 2005 to double aid to Africa in the following few years.⁸ However, while net aid transfers to SSA have been increasing since 1995, they will require a significant further boost to double by 2010.

5. CONCLUDING REMARKS

The international community is paying considerable attention to helping low-income countries achieve the MDGs. Conventional modalities for providing such assistance, like foreign aid and debt relief, have often been studied in isolation. But what is the relationship between them: are they complements or substitutes? In principle, the relationship could be positive or negative, and it could change over time. It is therefore important to use recent data to examine the empirical evidence.

In this paper we estimate a model of aid allocation using a sample of 42 sub-Saharan African countries that includes debt stock and debt relief variables over 1988–2006, using new and preferable data sources. The results confirm the significance of population, the conduct of economic policy (as proxied by the CPIA), and the need of a recipient. Debt relief schemes since 1988 all seem to have had a significant positive effect on net transfers to participating countries. HIPC debt relief has therefore, on average, been additional for recipient countries. We also discover, however, that for much of the period up to 2000, aggregate net aid transfers to SSA actually fell in both real and nominal terms. This could imply that the additionality to countries receiving debt relief was at the cost of those not receiving it, although the absence of a counter-factual warns against claiming that debt relief had this causal effect. Since our results show things have changed over time, it cannot be assumed that the most recently observed relationships we identify will continue. The global financial crisis of 2008–09 may alter both the needs of poor countries and the willingness and ability of donors to meet them.

Developments in the first half of the 2000s that saw debt relief being pursued alongside the scaling up of foreign aid suggest that net transfers were increasing for recipients of debt relief and nonrecipients alike, and issues associated with both constraints to absorbing higher aid and avoiding re-emergence of debt problems have become more prominent. Donor countries seem to be using debt relief and aid as complementary ways of providing additional resources to SSA countries in need, contingent upon sound institutions and economic policy, although what determines how they divide their assistance between these two elements remains to be investigated.

NOTES

1. See Commission for Africa (2005).
2. Countries that reached completion point include: Benin, Burundi, Burkina Faso, Cameroon, Ethiopia, The Gambia, Ghana, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Tanzania, Uganda, and Zambia.
3. Note that because grant for forgiveness of unpaid but uncapitalized interest does not get an offsetting entry, it does add to gross ODA.
4. As an extreme example, a 2003 Paris Club agreement canceled about \$5 billion in non-ODA official debt owed by the Democratic Republic of Congo. That cancellation counted as ODA but probably generated little or no additional net transfers.
5. Forgiving interest generates two opposite transactions in DAC accounting: a debt forgiveness grant and a (forgiven) interest received transaction, included in total interest received. Since we have excluded the debt forgiveness grant from our gross aid calculation, we must also exclude the offsetting item from the interest received figure.
6. These figures do not include transfers on nondevelopment assistance activities, such as commercial loans.
7. The theoretical model that motivates the reduced-form equation to be estimated is described in the Appendix.
8. OECD (2005) projects an increase of ODA in real terms from about \$25 billion in 2004 to about \$50 billion by 2010. OECD projections are based on public statements by donors. See Gupta, Powell, and Yang (2006) for a discussion of the macroeconomic challenges of scaling up aid to Africa.
9. See also Trumbull and Wall (1994).

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APPENDIX

Wall (1995) develops a model that combines the decisions of many donors into a model of total aid allocation for the individual recipient country and that also reflects the impact of one donor on the decisions of others.⁹ Building on and extending this framework, this appendix develops a model of aggregate non-debt-relief aid allocation to an individual recipient that incorporates the potential impact of debt relief operations on the allocation of non-debt-relief-related net aid.

Each of the D donor countries and institutions is assumed to have the objective of maximizing the impact of its aid operations to each of R recipient countries. As viewed by each donor, the subjectively measured per person impact of aid operations, h_i is a function of cash real resources *per capita* received, a_i ; some measure of the recipients well-being, need, or poverty level, z_i ; and the recipient country's population, n_i . Impact per head, h_i , is also assumed here to be affected by macroeconomic factors that may affect a country's ability to efficiently absorb resources, which we label x_i , and by the extent of any debt relief also being provided *per capita*, d_i , so that,

$$h_i = h(a_i, z_i, n_i, x_i, d_i) \quad i = 1, \dots, R$$

If aid is spent effectively, the impact per head is assumed to increase with *per capita* cash aid flows, and the less well-off a country is (the greater the need), the greater is the expected impact of any assistance provided. The impact of debt relief can also be expected to be negative if donors see it as a substitute for other net aid flows, or non-negative if it is fully additional to other flows of assistance or considered to be a complement to other aid flows, making them even more effective. Finally, sound economic policies and good governance are considered by most donors to enhance the expected impact of aid and facilitate effective aid absorption.

The total impact of aid operations on recipient country i is assumed to be the sum of the impacts on each of its n identical residents. The objective of each donor country, subject to a given total budget for aid, is to maximize the sum of the impacts of its assistance on the R recipients. In this model, because all donors have the same objective function and because a dollar of aid from one donor is a perfect substitute for a dollar from another, donors are assumed to act cooperatively. Thus, following Wall (1995), the model assumes that donors pool their non-debt-relief-related aid funds to determine the *per capita* assistance given to the R recipients, taking into account the debt relief being provided to each country and its population, well-being, macroeconomic policy, and governance.

The maximization problem is thus

$$\begin{aligned} \max H_i &= \sum_{i=1}^R h(a_i, z_i, n_i, x_i, d_i) n_i \\ \text{s.t.} \quad &\sum_{i=1}^R a_i n_i = \sum_{j=1}^D A_j \\ &a_i \end{aligned}$$

Assume a per-person impact function specified as

$$h_i = \frac{\alpha_i^{\alpha} d_i^{\beta} x_i^{\epsilon}}{z_i^{\eta} n_i^{\gamma}}$$

Denoting λ as the Lagrangian multiplier, the $R + 1$ first-order conditions are

$$\frac{\alpha \alpha_i^{\alpha-1} d_i^{\beta} x_i^{\epsilon}}{z_i^{\eta} n_i^{\gamma}} = \lambda, \quad i = 1, \dots, R, \quad \sum_{i=1}^R a_i n_i = \sum_{j=1}^D A_j,$$

If we rearrange these equations, we obtain an expression for the cash aid allocations as a function of the recipient's population, well-being or recipient need, macroeconomic performance and governance, and debt relief received.

$$a_i = \left[\frac{\lambda z_i^{\eta} n_i^{\gamma}}{\alpha d_i^{\beta} x_i^{\epsilon}} \right]^{\frac{1}{\alpha-1}}, \quad i = 1, \dots, R, \quad \sum_{i=1}^R a_i n_i = \sum_{j=1}^D A_j$$

Finally, taking logs of the first R equations in the above-mentioned expression and adding an error term yields the general equation to be estimated in the paper, which reflects how a given amount of aggregate non-debt-relief-related donor resources would be allocated among each of the potential recipients:

$$\log a_i = \beta_0 + \beta_1 \log z_i + \beta_2 \log n_i + \beta_3 \log d_i + \beta_4 \log x_i + \mu_i, \quad i = 1, \dots, R,$$

$$\text{where } \beta_0 = \frac{1}{\alpha-1} \log \frac{\lambda}{\alpha}, \beta_1 = \frac{\eta}{\alpha-1}, \beta_2 = \frac{\gamma}{\alpha-1}, \beta_3 = \frac{\beta}{\alpha-1}, \beta_4 = \frac{\epsilon}{\alpha-1}$$

This equation shows the relative *per capita* impact of aid across recipient countries. Under the model, therefore, total non-debt-relief-related cash aid resources of the donors would be allocated in proportion to the a_i s weighted by recipient country population.

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