

All Aid Is Not The Same: Different Purpose, Different Impact

Abstract

This paper analyses the relation between development aid and economic growth. It draws on OECD data on development aid in order to disaggregate aid along the time dimension of its growth effect. The necessity for such disaggregation has largely been missed in the aid-growth literature which may be the reason why past results were heavily instable with respect to changes in the specification, sample and time period. I divide aid into several sub-aggregates of total official development aid which are tested for their growth impact over five year periods from 1980-1999. Due to the inability to produce meaningful instrumental variable regressions the results remain 'work in progress'. The OLS results indicate that aid unambiguously enhances growth. They also provide support to the hypothesis that aid flows into sectors or for purposes which are likely to show a growth impact in the short run are more growth-enhancing over a five-year period. For clearer results, it remains to establish meaningful 2SLS results and disaggregate aid additionally along the dimension of project or program aid.

Key words: Development aid, growth

JEL classification: J35

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I. INTRODUCTION

Until recently, the rationale for foreign aid has been questioned for its alleged ineffectiveness in spurring economic growth in recipient countries (Gunning 2004). This is even though various studies published in the period 1970-1998 found a positive growth impact of aid, according to the survey by Hansen and Tarp (2000), while few empirical investigations supported the view that aid was not effective. In particular, the widespread perception that aid had failed to help overcome poverty traps in Sub-Saharan Africa resulted in the so-called aid fatigue of many donor countries.

It is for several reasons that aid may prove less effective than hoped for. First of all, aid is not only driven by developmental concerns but also by selfish motivations of donors (Canavire et al. 2005). For example, if aid is meant to promote the donor's exports, it tends to be less useful for the recipient. Furthermore, the earlier approach of donors to "buy" economic reforms in recipient countries by granting aid did not work (Collier 1997). This insight has led to the request for donors to improve the effectiveness of aid by adhering to the principle of selectivity, rather than imposing conditionality.

Accordingly, the focus of the aid effectiveness debate has shifted to the question under which circumstances aid could reasonably be expected to promote economic growth in the recipient countries. It continues to be heavily disputed whether the economic policy and institutional framework prevailing in recipient countries critically determines whether or not aid has the desired effects (Section II). What has been largely ignored by both the proponents and the critics of this view is that aid comprises different components that are unlikely to have the same growth impact, whatever local conditions may prevail.

In this paper, the heterogeneous nature of aid is explicitly taken into account. I draw on disaggregated aid data provided by the Development Assistance Committee of the OECD in order to test the hypothesis that different aid categories do not have the same growth impact. I perform OLS and IV estimates using four alternative aid definitions, ranging from total aid to

narrowly defined aid for directly productive purposes, in addition to conventionally applied independent variables in aid-growth regressions (Section III). Results are presented in Section IV. Section V concludes and offers some avenues for future research.

II. THE RECENT DEBATE ON AID EFFECTIVENESS

The analysis of Burnside and Dollar (2000), the working paper version of which appeared in 1996 already, marked an important turning point in the debate on the effectiveness of foreign aid. These authors rejected the perception that aid is inherently flawed and made the point that aid has the desired growth effects in recipient countries which pursue sound economic policies or have a favourable institutional environment. In other words, any ambiguity in the aid-growth relation across all recipient countries was supposed to be because aid works in countries with development friendly economic policies, whereas it does not work in countries with unfavourable domestic policy conditions (World Bank 1998). Recent studies providing further support to this finding, which various donors claim to have shaped aid allocation decisions, include Collier and Dollar (2001; 2002) as well as Burnside and Dollar (2004). Underlying this influential view is the econometric result that the interaction of aid with either policy variables (e.g., inflation, budget deficits and openness to trade) or institutional variables (e.g., indexes on the rule of law and/or corruption) is found to have a significantly positive impact on growth in the recipient countries.

Yet, Harms and Lutz (2004: 4) argue that the World Bank's new message, according to which aid matters in a good policy environment, "has started to unravel as more and more studies question the validity of the Burnside-Dollar paper." The critique comes in three major respects¹:

- The interaction term between aid and local policies or institutions is said to be highly sensitive to changes in the sample of recipients (Roodman 2003), the period of

¹ For more detailed recent reviews of the relevant literature, see Clemens et al. (2004) and Harms and Lutz (2004).

observation (Easterly 2003) and the exact test format (e.g., regional dummies versus country-specific fixed effects; Jensen and Paldam 2003).

- Several authors show that aid may also be effective under unfavourable policy conditions. Other country characteristics rendering aid effective include the vulnerability to external shocks (Guillaumont and Chauvet 2001), post-conflict conditions (Collier and Hoeffler 2004) and deeply rooted structural factors such as climate-related circumstances (Dalgaard et al. 2004).
- The third strand of the critique stresses the non-linear relationship between aid and economic growth. According to Hansen and Tarp (2001: 547), “aid in all likelihood increases the growth rate, and this result is not conditional on ‘good’ policy”, once it is taken into account that aid is subject to diminishing returns.

All these critics have in common with those who insist on the overriding role of policy and institutional conditions that they miss another important reason for the ambiguous relation between aid and growth. All above mentioned studies draw on highly aggregated aid figures in assessing the growth impact. This is even though some authors have called for a disaggregated analysis. For instance, Harms and Lutz (2004) conclude: “It is also not surprising that a variable as aggregate as official development assistance does not have a robust effect on growth.”

It is fairly obvious that aid granted as emergency relief or for promoting democratic institutions, enhancing gender equality, building infrastructure or financing directly productive activities is unlikely to have the same growth effects. Nevertheless, the question of how to account for the heterogeneity of aid has received little attention in the empirical literature. Ram (2003) emphasizes the differences between bilateral and multilateral aid and, somewhat surprisingly, finds that the aid-growth nexus is positive for the former but negative for the latter. However, Ram does not differentiate aid by the purpose it is meant to serve. The same is true for Gupta et al. (2003), who separate foreign grants from concessional loans in

order to assess whether the impact on aid on domestic revenue mobilization depends on the composition of aid.

Clemens et al. (2004) offer a path breaking cross-country study based on a detailed account of the heterogeneity of foreign aid. These authors isolate the portion of aid which they consider likely to affect growth within the relatively short period of four to five years typically examined in cross-country studies on the aid-growth nexus. They exclude not only aid items such as emergency relief, which can be expected to be negatively related with growth, but also items such as aid to support democratic institutions, the environment or education, whose (possibly strong) impact on long-term growth cannot be captured within a period of four to five years.²

Clemens et al. (2004) find the so-called short-impact aid to exert a strong and robust effect on economic growth in the recipient countries. Compared to studies relying on aggregate aid figures, the effect of short-impact aid turns out to be at least two to three times larger. Clemens et al. support Hansen and Tarp (2001) in that short-impact aid, too, reveals diminishing returns. By contrast, the evidence they present is in conflict with the view on the overriding importance of policy and institutional conditions prevailing in the recipient countries. Hence, the authors conclude that the “heterogeneity of recipients...is *not* the primary reason why growth effects of aid have been difficult to detect. Instead, we find that the heterogeneity in *aid flows* is the key reason for the mixed earlier results” (emphasis as in Clemens et al. 2004: 36).

Even though the study by Clemens et al. is clearly most advanced in terms of disaggregating aid, the classification of different aid categories raises several questions. The classification of aid is only along the time dimension, i.e., whether or not a *potentially* positive growth effect can be expected within four years. Under short-impact aid, the authors subsume aid for directly productive purposes (in sectors such as agriculture and industry), investments in

² Note that extending the period of observation gives rise to more noise and, thus, renders it increasingly difficult to establish a causal relationship between aid and growth.

infrastructure, as well as budget and balance of payments support. The heterogeneity within this broad category, accounting for almost half of total aid, is ignored:

- The full growth effects of aid for investments in infrastructure may take considerably longer to materialize than those of aid for directly productive purposes. For instance, linking remote areas to economic centres by building a road does not only take time in itself, but may have substantially delayed effects with regard to the establishment of productive businesses in this area.
- Balance of payments support in the form of debt relief may have immediate potential effects on government finances, but the actual effects may be negligible if debt relief amounts to nothing else than clearing the books from non-performing debt.
- Most importantly, the time dimension does not capture the aid recipient's incentives to use aid in a productive way. As noted by Roodman (2004:1), "some dollars and euros of foreign aid do more good than others". Hence, the growth effects of aid cannot be expected the same even if the time frame in which potential effects can reasonably be detected is taken into account. More precisely, incentive effects are likely to differ between elements included in short-impact aid, e.g., between program and project aid.

My analysis aims at overcoming the traditional problem of estimations with aggregated aid figures. In comparison to Clemens et al. (2004) I also classify aid along the time dimension of its impact, however into more than one category in order to compare the different types of aid and their impact.

III. DATA AND METHODOLOGY

Data and Sample

The estimation I carry out covers a cross-country panel of four five year averages for the years 1980-1999. For 93 countries there is enough data to estimate the aid-growth relation for at least one five year period.³

With regard to the aid variables I use official aid commitment figures from the OECD International Development Statistics Database, more specifically the DAC Creditor Reporting System.⁴ Table 2 shows how the DAC classifies aid flows by different purposes into fundamental categories. It is intuitively logical that aid for very different purposes will neither have the same growth impact nor will it unfold its growth impact over the same period of time. The traditionally used aggregate of “total aid” contains aid which is given for very heterogeneous sectors and purposes, such as health, education, construction, environmental protection, structural adjustment etc.

Consider the case of aid into “energy generation and supply” (type II.3), e.g. aid which allows to finance the construction of an energy plant. This aid will immediately unfold a growth impact, e.g. by employing local workers, buying local construction materials, etc. Also, the finished energy plant will over its lifetime allow for higher GDP growth through the supply of energy which can be used elsewhere. The growth impact should clearly be perceived within a five year time window. On the other hand, consider aid flowing into environmental programmes, such as reforestation. This kind of aid might also have a growth impact which

³ See table 1 for the country sample and included periods.

⁴ Aid commitments report the face value of an aid grant or loan at the time of the agreement while aid disbursements report the actual flow of funds over the life cycle of a project. There is an academic debate about the use of commitments versus disbursements. Proponents of disbursements argue that they more accurately track the actual amount and timing of aid flows. (Clemens et al. 2004) However, the DAC does not report aid disbursements for much of the 1980s. Furthermore, the DAC notes that disbursements are not available for all donors at the activity level. In any case, results are unlikely to be affected to a considerable degree by the choice for one or the other as the two are highly correlated (Clemens et al. 2004 and Neumayer 2003).

however will be extremely small in the first five years since a forest will not regenerate and be of productive use within five years.

Thus, I use the DAC classification in order to group aid into four categories, starting from aggregate aid and excluding types of aid in a step-wise manner until ending up with aid which will most likely produce a direct growth effect within five years. Overall, the distinction is often not very clear-cut and one might make an effort to go deeper into the DAC classification to create finer categories. Thus, for my purposes it will be most interesting to see how growth effects differ between the most short-impact form of aid and aggregate aid.

As mentioned, aggregate aid is the figure most prominent in aid-growth regressions. I use this type of aid (*aid_tot*) as a starting point but it is important to subtract components right away which are of no explanatory power: administrative expenses of donors, support to non-governmental organisations and unallocated/unspecified aid.⁵

In order to create the next type of aid (*aid_lt*), I subtract components which most blatantly will have no positive growth effect in the short-run: emergency aid flows (type VIII). This kind of aid is most probable to be granted in situations of crisis, i.e., negative growth shocks. Subtracting these aid types from aggregate aid leads to a measure of total productive aid flows which should result in a higher aid coefficient. It may already be that past aid-growth research is flawed because of this very obvious reason: mixing up growth-enhancing aid with aid to minimize the effect of negative growth shocks might be one reason for the fragility of the results of aid-growth estimations in the past.

Yet, *aid_lt* still includes components which are not likely to unfold much of its growth impact within five years but are most likely to enhance growth in a long-term manner. Among these I count projects in the sector of social infrastructure and services (type I) and multisector

⁵ Even though aid to NGO's and unspecified aid might have a growth effect (opposite to administrative costs) it cannot be classified along the time dimension. As it makes up for less than one percent, the effect should be negligible.

projects (type IV), such as environmental protection. Subtracting them yields an aid component *aid_mt* which is probable to show a strong growth impact over the first five years. Still, *aid_mt* includes components which I expect to release different kinds of growth dynamics. It has components which may be expected to enhance growth now and in the future, such as aid for economic infrastructure (type II), commodity aid or general program assistance (type VI) and flows for the purpose of debt action (type VII), such as rescheduling or relieving debt.⁶ It also includes aid which flows directly into productive sectors (type III), such as agriculture, industry, construction and tourism. By subtracting type II, type VI and type VII aid from *aid_mt*, one ends up with this very direct aid of type III only, what I call *aid_st*. The link between aid and growth should show up with the strongest coefficient for this type of aid. To summarize, I construct aid flows as follows:

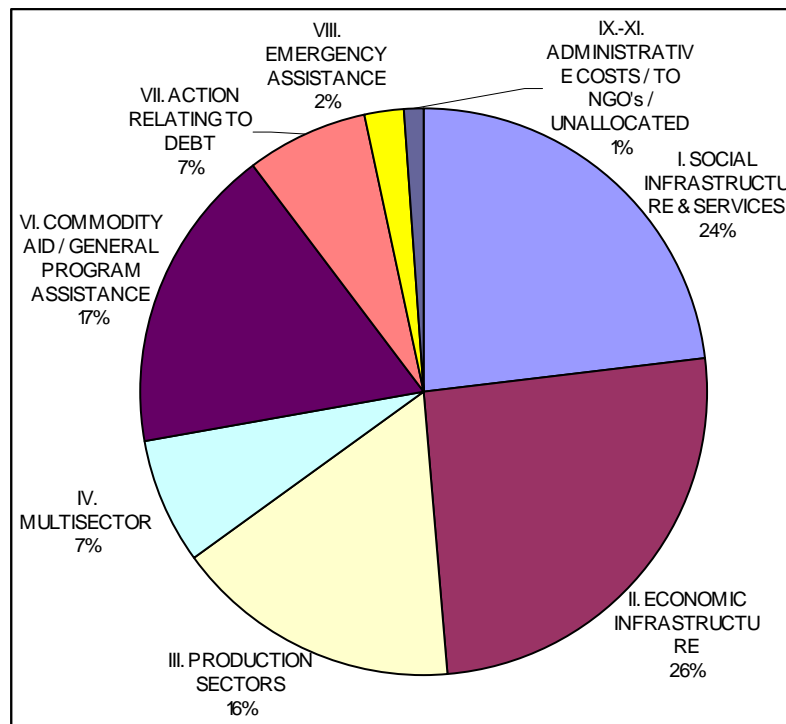
$$(j1)aid_tot = XII - XI - X - IX$$

$$(j2)aid_lt = XII - XI - X - IX - VIII$$

$$(j3)aid_mt = XII - XI - X - IX - VIII - I - IV$$

$$(j4)aid_st = XII - XI - X - IX - VIII - I - IV - II - VI - VII$$

Figure 1: Aid Commitments by Purpose 1980-2002



⁶ If debt relief is not the writing off of bad debt it should be treated as budget support/general program assistance.

Figure 1 shows how aid flows were distributed for different purposes in the years 1980-2002. Aid into production sectors (*aid_st*) constituted 16.5%, *aid_mt* 66.2% and *aid_lt* 96.6% of total official development assistance (ODA).

Absorptive capacity and dependence on good policies

In addition to the simple aid flows there are two other aid variables important for aid-growth regressions: aid-squared and aid interacted with policy or institutions.

Aid-squared is a term which introduces a non-linear relationship between aid and growth implying diminishing returns to aid if estimated with a negative coefficient. The reason for such diminishing returns may be a limited absorptive capacity of recipients to invest in good projects or to manage them, the risk of corruption or Dutch disease⁷, as well as the undermining of alternative revenue sources.⁸

Aid interacted with policy/institutions is the key object of investigation for authors such as Burnside/Dollar (1997, 2000, 2004). It represents the hypothesis that the growth effect of aid may depend on good policies or institutions, i.e., if estimated significant with a positive coefficient while the simple aid is estimated as zero or negative. If this is the case, donors would be advised to give aid selectively, i.e., to countries with good policies because they will use aid most productively. Obviously, it is of utmost importance for the international donor community to resolve the issue if aid selectivity leads to higher productivity of aid.

In their paper of 2000, Burnside and Dollar used aid interacted with a policy index which they constructed using inflation, budget discipline and openness. However, in their paper of 2004 they argued that their policy index restricted the country sample too much due to missing observations. Thus, they switched to using aid interacted with a comprehensive institutions indicator for the year 1996 by Kaufmann/Kraay/Zoido-Lobatón (1999) in order to

⁷ One of the main concerns of development aid is to strengthen the recipient's export sector in the hope that future revenues generated through exports will reduce a country's dependence on foreign aid flows. However, aid may have unwanted side effects such as an upward pressure on the real exchange rate and thus in fact weaken the export sector. The term "Dutch disease" originated in Holland after the discovery of North Sea gas.

⁸ Compare Heller/Gupta (2002).

approximate institutional quality in the 1990s. While this approximation already seems a little imprecise, it is definitely no option for my data which starts in 1980. Thus I use the Rule of Law component from the International Country Risk Guide Indicator. The KKZ rule of law index for 1996 and the ICRG indicator for the fourth period correlate by 75 percent.

Estimation methodologies

For the investigation of the problem at hand I follow Hansen/Tarp (2000: 377) in the view that “whether aid is effective or not is an empirical question”. My specification does not satisfy the claim of a growth equation properly derived from theory. The innumerable interacting variables and influences on economic growth are not the focus of my investigation but the effectiveness of different forms of disaggregated aid. Thus, I stick to the rather simple specification laid out by Burnside/Dollar (2004), using the above explained different types of aid to estimate the following equations via OLS⁹:

$$\dot{y}_{i,t} / y_{i,t} = \alpha + \beta_1 \ln \bar{y}_{i,t} + \beta_2 inst + \beta_{3,j} aid_{j,i,t} + \beta_{4,j} aid * inst_{j,i,t} + \beta_{5,j} aid_{i,t}^2 + \beta_{6,k} geo_k + \varepsilon_{i,t}$$

where i denotes country, t period in time, $y_{i,t}$ is GDP per capita in constant 1995 US dollars, \bar{y} is GDP per capita at the beginning of the respective period, $inst$ denotes institutional quality measured by the ICRG, aid denotes the different types j of aid, $aid*inst$ denotes aid interacted with institutions, and geo denotes dummies k for different regions.¹⁰

As Burnside/Dollar (2004: 14) state: “Without instrumental variables, growth regressions involving aid are suspect.” OLS estimations might suffer from a problem of endogenous

⁹ Since the data is organized as a panel there is the possibility to estimate a fixed effects or random effects model. However, OLS estimation is the most common estimation method in aid-growth regressions, as e.g. in Burnside/Dollar (2000, 2004). Also, I account for part of the features of a panel model by allowing for inter-regional variation (using regional dummies). Inter-temporal variation does not seem to have a big effect as the use of period dummies turned out to be not successful, i.e. neither did they improve the fit of the model, nor became they significant.

¹⁰ The following regional dummies were used according to World Bank classification: SSA (Sub-Saharan Africa), MENA (Middle East and North Africa) and LAC (Latin-America and Caribbean). ECA (Eastern Europe and Central Asia) and EAP (East Asia and Pacific) were dropped as the most insignificant regional dummies throughout all regressions. Another geographical variable, the percentage of a country situated in the tropics, was used alternatively but provided less significance and a worse fit of regression (lower R^2).

explanatory variables. Thus, I also estimate Two Stage Least Squares (2SLS) using instruments for the aid and institution variables.

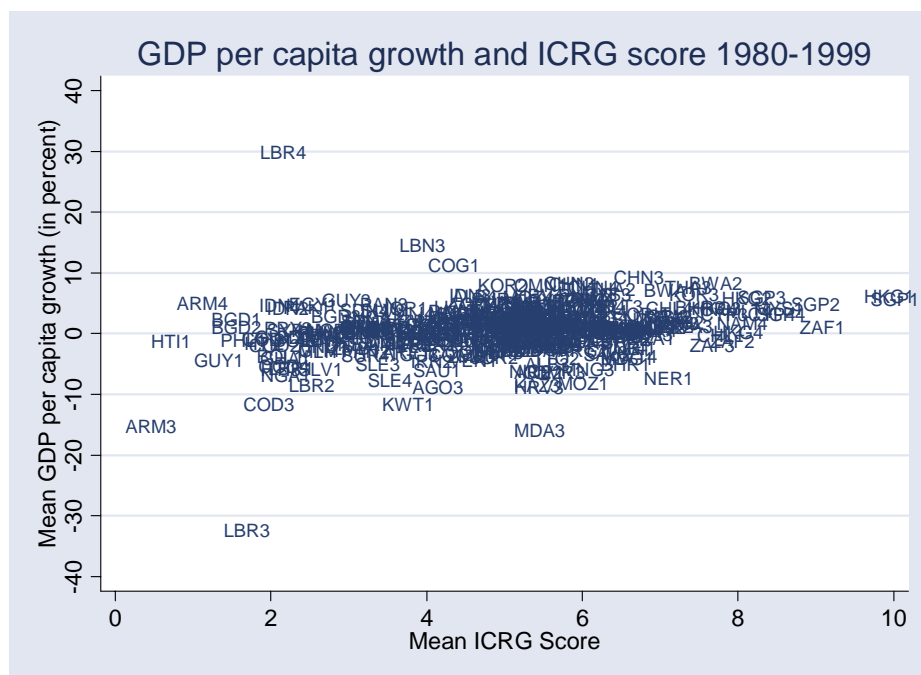
IV. EMPIRICAL ANALYSIS

Estimation results for the full regression over all countries are shown in table 3. The overall fit with an R^2 of about 14 percent is not bad, considering that many relevant variables for growth estimations have been left out. However, surprisingly among the aid variables only aid-institutions is significant twice in two out of the four types, the rest never becomes significant. There are two potential reasons for this: influential observations and multicollinearity among aid variables.

Influential Observations

The literature has shown that aid-growth estimation results can largely change with the inclusion or exclusion of influential observations. Graph 1 plots a scatter of GDP per capita growth and the institutions ranking for all countries in the sample over the four periods.

Figure 2: Influential Observations



By using the Hadi procedure¹¹ for detecting outliers in multivariate estimations the following observations are identified as influential: Liberia 1990-94 and 1995-99, and Lebanon, Moldova and Armenia all in the period 1990-94.

As one can see in table 4, when excluding the outliers in the whole sample the R^2 jumps to about 21 percent. The fact that only five out of 342 observations were dropped provides a hint that these few observations unfavourably drive the results of the whole sample. They might thus be disregarded in order to obtain a result which reflects a relationship for the majority of the sample.

The results are still not fully encouraging: only aid-institutions is significant in two out of four regressions, the others are not. However, we may still be faced with a problem of multicollinearity between different forms of aid.

Multicollinearity

Table 5 depicts correlation coefficients between aid/gdp, aid-squared and aid interacted with institutions. Over all types of aid the correlations between all forms of aid are very high, between 74 and 93 percent. This presents a serious problem for our regression which we cannot encounter with better data. However, it seems from the OLS regression with and without outliers that aid-institutions is the more important term. Thus, I decide to drop aid-squared from the regressions as it is not our main variable of interest but rather a control variable which in the literature has partly been found to be relevant. Exclusion of this variable means that I cannot make a prediction if aid works with diminishing returns to scale.

Table 6 contains OLS estimation results for all countries but the outliers without the aid-squared term. Now, both aid variables of interest are significant even though they are highly correlated.

The results seem surprising at first sight: while aid/gdp is significant with a positive sign, aid interacted with institutions is so with a negative sign and three to five times smaller than

¹¹ I use the standard significance level for outlier cut-off of five percent. Compare Hadi (1994).

simple aid. For a similarly simple specification and a twenty year horizon this is the exact opposite of the Burnside/Dollar (2004) results. However, it is not hard to interpret that: many authors have found that aid unconditionally spurs growth, such as most recently Clemens et al. (2004). For the negative coefficient of aid-institutions it of course does not seem logical to suspect that for a given amount of aid better institutions result in lower growth (this finding would be unique in the literature). However, it seems reasonable that for a given level of institutions countries with lower growth may receive more international support through aid. Another possible explanation is that the negative influence of aid*institutions is a downward bias of the effect of aid on growth which may reflect the influence of absorptive capacity which I was not able to establish with aid-squared.

It is remarkable that for both aid and aid-institutions the coefficient changes considerably from total to short-impact aid. With regard to the simple aid term it is about five times higher for short-impact aid, underlining the hypothesis that short-impact aid enhances growth stronger in the short run than other forms of aid. For the aid-institutions term the change in coefficients is harder to interpret. With the same logic as above it could be that for a given level of institutions lower-growth countries receive more short-impact aid. Or, the downward bias stemming from aid-squared implies that there is a more limited capacity to absorb aid in sectors where the growth effect is stronger.

It should be noted that most of the 'jump' in coefficients occurs between aid_mt to aid_st. The coefficients of aid_tot, aid_lt and aid_mt overall do not change drastically: there is a notable jump from aid_lt to aid_mt, but the difference between aid_tot and aid_lt seems too small to be significant.

My interpretation is the following: humanitarian and emergency aid constitutes about 2.5 percent of total aid, which is not a lion's share but still amounts to more than one billion USD per year on average. Given that there seems to be no difference in the growth impact of the

two aggregates aid_tot and aid_lt even though emergency aid is clearly of a short-term nature, the emergency aid flows seem to exactly outweigh the negative growth shock from a disaster. As for the bigger jump: aid_tot, aid_lt and aid_mt are similar to the degree that they incorporate aid flows which probably do show some growth impact in the very short-run but which produce most of its growth effect not within one or two years. The aid flow into production sectors, aid_st, is different in that regard. It is more likely to show most of its growth effect in the very short-run (one to two years), and the least part in a medium to long-term frame. Now, when creating five-year averages one loses the time-related dynamics of this information which is treated as occurring within one year. Thus it seems obvious that the aid-growth relation shows up most strongly when the time between aid commitment and growth effect is the shortest.

Low-Income Countries

It is a common object of investigation in aid-growth estimations to closely examine the poorest countries only because they are in most need of positive growth shocks. They might constitute a sub-set which shows a different aid-growth relationship than aid recipient countries in general. Such a difference would have to be considered in the donor community with regard to their aid distribution policies.

When dropping middle-income countries 140 observations from 44 low-income countries remain for estimation. As the problems of influential observations and multicollinearity remain in the sub-sample it makes sense to estimate the OLS model again without outliers and aid-institutions. The results in table 7 confirm the findings from the full sample with a considerably increased fit of the model, the R^2 now being about 28 percent. The simple aid term is highly significant over all aid types, the aid-institutions variable misses being significant for aid_tot and aid_lt. The coefficients show comparable patterns to what was observed before: the impact of aid to production sectors is almost six times higher as

compared to aggregate aid. The estimated coefficients of the aid-institutions link show the same behaviour as for the whole sample.

Size of coefficients

Clearly, it would be important to interpret not only the significance but in fact the size of the coefficients estimate in order to derive the marginal effect of aid. This is however not risk-free as my growth equations are of a very reduced form, and not directly derived from economic theory. Also, the negative aid-institutions interaction is hard to interpret.

Comparison with the majority of the literature examining the aid-growth link is only possible for the category of total aid since most do not disaggregate aid any further. My estimates of about 0.15 are clearly in the range of other authors such as Clemens et al. (2004) and Hansen/Tarp (2000, 2001) who come up with coefficients of 0.1 to 0.4. As for my short-impact aid *aid_st* there are no comparable variables in the literature. The more disaggregated short-impact aid of Clemens et al. 2004 comprises more aid flows than my *aid_st*. Their core result of 0.96 is slightly higher than my estimate for the whole sample [0.8] and exactly equal to my estimate for the low-income sub-sample. Since these values are very comparable I content myself with referring to Clemens et al. (2004) who use their estimates to conservatively calculate a present value of \$1.64 for every dollar of short-impact aid given.

Instrumental Variable Estimation

There is reason to believe that some of the explanatory variables in OLS growth regressions suffer from the endogeneity problem, which renders OLS estimates inefficient. As stated before, higher growth countries are likely to attract less aid flows than lower growth countries, thus resulting in a causality which runs from growth to aid.

I thus use the specification without outliers and without aid-squared in an Instrumental Variable Two Stage Least Squares regression, instrumenting for institutions, aid/gdp and aid-

institutions.¹² The instruments are the same as in Clemens et al. (2004): lagged arms imports, the lagged Burnside/Dollar (2000) policy index and its square¹³, population interacted with policy, GDP and its square interacted with policy, the respective lagged aid and aid squared variables and the lagged aid variables interacted with policy. The regression is performed on 185 observations, excluding outliers. The Pagan-Hall test strongly rejects heteroscedasticity of the disturbance so that IV is preferable to the Generalized Method of Moments (GMM).¹⁴ Aid and aid-institutions are significant throughout all four regressions. The results are surprising, assigning a high negative coefficient to the respective simple aid term and a much smaller positive coefficient on the aid-institutions term. The value of the negative coefficient on aid is even increasing strongly from overall to short-term aid. If these results were true, aid would always have a negative impact on growth. The effect would be the more detrimental, the more aid serves short-term purposes.

Clearly, this result is not easily acceptable. I suppose that the choice of instruments strongly influences these results. In fact, the Hansen J statistic implies that the equation is overidentified in at least three out of four aid regressions, i.e., the instruments are not orthogonal to the error process and thus do not satisfy the basic condition for instrumental variables. However, I have also been unable to identify proper instruments. For example, the instrument set of Burnside/Dollar (2004) has extremely weak explanatory power with Shea R-squareds of less than 10 percent for all aid variables.

Finally, I believe that the strong negative coefficients result from a restriction of the data sample to 185 observations for which all information on instrumental variable data is available. In this restricted sample, the correlation between growth and various forms of aid is

¹² Endogeneity of GDP per capita at the start of the period is strongly rejected by the C test (Compare Baum et al. (2000) for a detailed discussion of various tests and issues concerning instrumental variables estimation.

¹³ The index is constructed using a linear combination of inflation, budget surplus/deficit and openness. For weights see Burnside/Dollar (2000).

¹⁴ Compare Baum et al. (2000).

negative. It thus seems not surprising that the results come out very different from what I could observe before.

To conclude, I am unable to resolve the issue of instrumenting properly for possibly endogenous aid terms within my original full sample. In order to come to a more profound conclusion the restricted sample should be examined in its entirety.

V. CONCLUDING REMARKS

All in all, I was not able to clearly resolve some of the issues involved in aid-growth regressions. Out of these, the most serious concern is that I was unable to find instrumental variables which satisfy the basic conditions for good instruments. Thus I could not verify my OLS results in a 2SLS regressions even though are strong doubts to the exogeneity of aid variables.

Considering my OLS results only, the estimations show a similar pattern to those of Clemens et al. (2004). When accounting for few outliers aid turns out to be unambiguously growth-enhancing. The more aid is disaggregated and only more short-term components of aid are taken into account, the stronger is the growth impact estimated. This result holds for all developing countries as well as low-income countries only. The main difference in results to Clemens et al. (2004) arises since I must drop the aid-squared term due to multicollinearity in order to find useful results. This does not mean that aid is not subject to diminishing returns to scale - I just cannot make a statement about that. In comparison to Burnside/Dollar (2004) whose simple specification I used for a longer time horizon my results show a different view on the aid-institutions interaction: while they find aid to work in a good institutional environment only, I interpret my results in the way that given a certain level of institutions countries with lower growth will receive more aid.

The pattern of coefficients for different aid aggregates estimated in this paper is a first step into the direction of examining the aid-growth relation by using properly disseminated aid

figures. However, I myself have only disaggregated aid along the time dimension, and not according to whether it is program or project aid.

Mavrotas (2003) as well as Cordella and Dell'Aricecia (2003) show that the distinction between program and project aid matters. According to Mavrotas, who analyses the effects of aid on key fiscal variables in Uganda, the government's behaviour depends on the type of aid; for example, project aid causes a reduction in public investment, whereas program aid is positively related with public investment. The cross-country study of Cordella and Dell'Aricecia augments the model of Burnside and Dollar (2000) by interacting both project financing and budget support with policy conditions in the recipient countries. The empirical evidence presented in this study supports the proposition that government policies shape the effectiveness of aid in promoting growth in a different manner for project financing and budget support. Budget support is found to be less (more) effective than project financing in an environment with poor (good) macroeconomic policies.¹⁵ However, the *non-interacted* coefficients of both types of aid turn out to be insignificant, which, according to authors, shows that "aid alone does not have an average positive effect on growth" (Cordella and Dell'Aricecia 2003: 16). The latter finding is probably because their study ignores the time dimension stressed by Clemens et al. (2004). Project aid, as defined by Cordella and Dell'Aricecia, ranges from aid in directly productive sectors to aid in social infrastructure which may take long to have positive growth effects.

It thus remains as an avenue for future research to disaggregate aid into the time dimension and according whether it is project or program aid.

¹⁵ Budget support, according to these authors, comprises program aid whose provision is explicitly linked to agreed policy packages (in particular World Bank and IMF programs) and debt-related actions.

REFERENCES

- Banks, A. (2002). *Cross-National Time-Series Data Archive*, Bronx, NY: Databanks International.
- Barro, R. J. and Lee, J. (2000). International Data on Educational Attainment: Updates and Implications, Working Paper 7911, National Bureau of Economic Research, Cambridge, MA (September).
- Baum, C.F., Schaffer, M.E., and Stillman, S. (2003). Instrumental variables and GMM: Estimation and testing, *Stata Journal* 3 (1): 1-31.
- Burnside, C. and Dollar, D. (2000). Aid, Policies, and Growth, *American Economic Review*, vol. 90(4) (September), pp. 847–68.
- Burnside, C. and Dollar, D. (2004). Aid, Policies, and Growth: Revisiting the Evidence, Policy Research Paper O-2834, The World Bank, Washington, DC (March).
- Burnside, C. and Dollar, D. (1997). Aid, Policies, and Growth. World Bank, Policy Research working paper No. 1777.
- Canavire, G., P. Nunnenkamp, R. Thiele and L. Trinevo (2005). Assessing the Allocation of Aid: Developmental Concerns and the Self-Interest of Donors. Institute for World Economics, mimeo.
- Clemens, M., Radelet, S. and Bhavnani, R. (2004). ‘Counting Chickens When They Hatch: The Short-Term Effect of Aid on Growth’, Working Paper 44, Center for Global Development, Washington, DC.
- Collier, P. (1997). The Failure of Conditionality. In: C. Gwin, E.J. Berg and J.M. Nelson (eds.), *Perspectives on Aid and Development*. Overseas Development Council, Policy Essays 22. Washington, D.C.
- Collier, P., and D. Dollar (2001). Can the World Cut Poverty in Half? How Policy Reform and Effective Aid Can Meet International Development Goals. *World Development* 29 (11): 1787–1802.
- Collier, P., and D. Dollar (2002). Aid Allocation and Poverty Reduction. *European Economic Review* 46 (8): 1475–1500.
- Collier, P., and A. Hoeffler (2004). Aid, Policy, and Growth in Post-Conflict Societies. *European Economic Review* 48(5): 1125–1145.
- Cordella, T., and G. Dell’Ariccia (2003). Budget Support Versus Project Aid. International Monetary Fund, Working Paper WP/03/88. Washington, D.C.
- Dalgaard, C. and Hansen, H. (2001). ‘On Aid, Growth and Good Policies’, *Journal of Development Studies*, vol. 37(6) (August), pp. 17–41.

- Dalgaard, C.-J., H. Hansen and F. Tarp (2004). On the Empirics of Foreign Aid and Growth. *Economic Journal* 114 (June): F191-F216.
- Easterly, W. (2003). Can Foreign Aid Buy Growth? *Journal of Economic Perspectives* 17: 23-48.
- Easterly, W., Levine, R. and Roodman, D. (2004). 'New Data, New Doubts: A Comment on Burnside and Dollar's "Aid, Policies, and Growth" (2000)', *American Economic Review*, vol. 94(2) (June).
- Guillaumont, P., and L. Chauvet (2001). Aid and Performance: A Reassessment. *Journal of Development Studies* 37: 66-92.
- Gunning, J.W. (2004). Why Give Aid? Paper for the 2nd AFD-EUDN Conference "Development Aid: Why and How?" Paris, November 25, mimeo.
- Gupta, S., B. Clements, A. Pivovarsky and E.R. Tiongson (2003). Foreign aid and Revenue Response: Does the Composition of Aid Matter? International Monetary Fund, Working Paper WP/03/176. Washington, D.C.
- Hadi, A. (1994). A Modification of a Method for the Detection of Outliers in Multivariate Samples. *Journal of the Royal Statistical Society, Series (B)*, 56, 393-396.
- Hall, R. and Jones, C., (1999). Why Do Some Countries Produce So Much More Output Per Worker Than Others? *The Quarterly Journal of Economics*, MIT Press, vol. 114(1), pages 83-116.
- Hansen, H. and Tarp, F. (2000). Aid Effectiveness Disputed, *Journal of International Development*, vol. 12(3) (April), pp. 375-98.
- Hansen, H. and Tarp, F. (2001). Aid and Growth Regressions, *Journal of Development Economics*, vol. 64(2) (April), pp. 547-70.
- Harms, P., and M. Lutz (2004). The Macroeconomic Effects of Foreign Aid: A Survey. University of St. Gallen, Discussion Paper 2004-11. St. Gallen.
- Heller, Peter S. and Sanjeev Gupta (2002). Challenges in expanding development assistance, IMF Policy Discussion Paper PDP/02/5, Fiscal Affairs Dept., International Monetary Fund, March.
- Jensen, P., and M. Paldam (2003). Can the New Aid-Growth Models Be Replicated? University of Aarhus, Department of Economics, Working Paper 2003-17. Aarhus.
- Kaufmann, D., Kraay, A. and Zoido-Lobaton, P. (1999). Aggregating Governance Indicators. World Bank Policy Research Working Paper No. 2195.
- Mavrotas, G. (2003). Which Types of Aid Have the Most Impact? WIDER, Discussion Paper 2003/85. Helsinki.

Neumayer, E. (2003). *The Pattern of Giving Aid: The Impact of Good Governance on Development Assistance*. *Routledge Studies in Development Economics* 34. London and New York.

Ram, R. (2003). Roles of Bilateral and Multilateral Aid in Economic Growth of Developing Countries. *Kyklos* 56 (1): 95-110.

Roeder, P.G. (2001). 'Ethnolinguistic Fractionalization (ELF) Indices, 1961 and 1985', <<http://weber.ucsd.edu/~proeder/elf.htm>>, accessed April 2005.

Roodman, D. (2003). *The Anarchy of Numbers: aid, Development, and Cross-Country Empirics*. Center for Global Development, Working Paper 32. Washington, D.C.

Roodman, D. (2004). *An Index of Donor Performance*. Center for Global Development, Working Paper 42. Washington, D.C.

Sachs, J. D. and Warner, A. (1995). Economic reform and the process of global integration', in *Brookings Papers on Economic Activity*, pp. 1–118, Washington, DC: The Brookings Institution.

Wacziarg, R. and Welch, K. H. (2002). *Trade Liberalization and Growth: New Evidence*, mimeo, Stanford University (November).

World Bank (1998). *Assessing Aid: What Works, What Doesn't, and Why*. Oxford (Oxford University Press).

APPENDIX

Table 1: OLS Country Sample¹⁶

Country	p1	p2	p3	p4	LIC	Country	p1	p2	p3	p4	LIC
Albania	yes	yes	yes	yes	no	Lebanon	no	no	yes	yes	no
Algeria	yes	yes	yes	yes	no	Liberia	yes	yes	yes	yes	yes
Angola	no	yes	yes	yes	no	Madagascar	yes	yes	yes	yes	yes
Argentina	yes	yes	yes	yes	no	Malawi	yes	yes	yes	yes	yes
Armenia	no	no	yes	yes	no	Malaysia	yes	yes	yes	yes	no
Bahamas	yes	yes	yes	yes	no	Mali	yes	yes	yes	yes	yes
Bahrain	yes	yes	yes	yes	no	Malta	yes	yes	yes	yes	no
Bangladesh	yes	yes	yes	yes	yes	Mexico	yes	yes	yes	yes	no
Bolivia	yes	yes	yes	yes	no	Moldova	yes	yes	yes	yes	no
Botswana	yes	yes	yes	yes	no	Mongolia	no	yes	yes	yes	yes
Brazil	yes	yes	yes	yes	no	Morocco	yes	yes	yes	yes	no
Burkina Faso	yes	yes	yes	yes	yes	Mozambique	yes	yes	yes	yes	yes
Cameroon	yes	yes	yes	yes	no	Namibia	yes	yes	yes	yes	no
Chile	yes	yes	yes	yes	no	Nicaragua	yes	yes	yes	yes	yes
China	yes	yes	yes	yes	yes	Niger	yes	yes	yes	yes	yes
Colombia	yes	yes	yes	yes	no	Nigeria	yes	yes	yes	yes	yes
Congo, Dem. Rep.	yes	yes	yes	yes	yes	Oman	yes	yes	yes	yes	no
Congo, Rep.	yes	yes	yes	yes	no	Pakistan	yes	yes	yes	yes	yes
Costa Rica	yes	yes	yes	yes	no	Panama	yes	yes	yes	yes	no
Côte d'Ivoire	yes	yes	yes	yes	no	Papua New G.	yes	yes	yes	yes	no
Croatia	no	no	yes	yes	no	Paraguay	yes	yes	yes	yes	no
Cyprus	yes	yes	yes	yes	no	Peru	yes	yes	yes	yes	no
Dominican Rep.	yes	yes	yes	yes	no	Philippines	yes	yes	yes	yes	no
Ecuador	yes	yes	yes	yes	no	Saudi Arabia	yes	yes	yes	yes	no
Egypt	yes	yes	yes	yes	no	Senegal	yes	yes	yes	yes	yes
El Salvador	yes	yes	yes	yes	no	Sierra Leone	yes	yes	yes	yes	yes
Ethiopia	no	yes	yes	yes	yes	Singapore	yes	yes	yes	yes	no
Gabon	yes	yes	yes	yes	no	South Africa	yes	yes	yes	yes	no
Gambia	yes	yes	yes	yes	yes	Sri Lanka	yes	yes	yes	yes	yes
Ghana	yes	yes	yes	yes	yes	Sudan	yes	yes	yes	yes	yes
Guatemala	yes	yes	yes	yes	no	Suriname	yes	yes	yes	yes	no
Guinea	no	no	yes	yes	no	Syria	yes	yes	yes	yes	yes
Guinea-Bissau	yes	yes	yes	yes	yes	Tanzania	no	no	yes	yes	no
Guyana	yes	yes	yes	yes	yes	Thailand	yes	yes	yes	yes	no
Haiti	yes	yes	yes	yes	yes	Togo	yes	yes	yes	yes	yes
Honduras	yes	yes	yes	yes	yes	Trinidad & Tobago	yes	yes	yes	yes	no
Hong Kong, China	yes	yes	yes	yes	no	Tunisia	yes	yes	yes	yes	no
India	yes	yes	yes	yes	yes	Turkey	yes	yes	yes	yes	no
Indonesia	yes	yes	yes	yes	yes	Uganda	no	yes	yes	yes	yes
Iran	yes	yes	yes	yes	no	United Arab Em.	yes	yes	yes	yes	no
Jamaica	yes	yes	yes	yes	no	Uruguay	yes	yes	yes	yes	no
Jordan	yes	yes	yes	yes	no	Venezuela	yes	yes	yes	yes	no
Kazakhstan	no	no	yes	yes	no	Viet Nam	no	yes	yes	yes	yes
Kenya	yes	yes	yes	yes	yes	Yemen	no	no	yes	yes	no
Korea	yes	yes	yes	yes	no	Zambia	yes	yes	yes	yes	yes
Kuwait	yes	yes	no	no	no	Zimbabwe	yes	yes	yes	yes	yes

¹⁶ Restrictions due to data unavailability.

Table 2: Classification of Aid by Fundamental Purposes

<u>Aid purpose/sector</u>	<u>Avg. of total aid 1980-2002</u>
I. SOCIAL INFRASTRUCTURE & SERVICES	23.2%
I.1 Education, Total	5.5%
I.2 Health, Total	3.5%
I.3 Population Programmes	1.6%
I.4 Water Supply & Sanitation	6.0%
I.5 Government & Civil Society	3.0%
I.6 Other Social Infrastructure & Services	3.5%
II. ECONOMIC INFRASTRUCTURE	25.5%
II.1 Transport & Storage	11.9%
II.2 Communications	2.0%
II.3 Energy	9.2%
II.4 Banking & Financial Services	1.6%
II.5 Business & Other Services	0.8%
III. PRODUCTION SECTORS	16.5%
III.1 Agriculture - Forestry - Fishing, Total	11.4%
III.2 Industry - Mining - Construction, Total	4.6%
III.3 Trade & Tourism	0.5%
IV. MULTISECTOR	7.2%
IV.1 General Environment Protection	1.7%
IV.2 Women In Development	0.1%
IV.3 Other Multisector	5.4%
VI. COMMODITY AID / GENERAL PROGRAM ASSISTANCE	17.5%
VI.1 Structural Adjustment (with IBRD/IMF)	3.9%
VI.2 Food Aid excluding Relief Food Aid	3.8%
VI.3 Other General Programme & Commodity Ass.	9.7%
VII. ACTION RELATING TO DEBT	6.8%
VIII. EMERGENCY ASSISTANCE	2.4%
IX. ADMINISTRATIVE COSTS OF DONORS	} 1.0%
X. SUPPORT TO NON-GOVERNMENTAL ORGANISATIONS	
XI. UNALLOCATED/UNSPECIFIED	
XII. TOTAL	

Table 3: OLS Estimation Results – All Countries

Regression	aid_tot	aid_lt	aid_mt	aid_st
ln(gdp_pc_ps)	-0.952 (0.32) ***	-0.963 (0.34) ***	-1.100 (0.36) ***	-1.035 (0.36) ***
inst	1.121 (0.25) ***	1.129 (0.23) ***	1.033 (0.22) ***	1.078 (0.27) ***
aid/gdp	0.214 (0.28)	0.236 (0.15)	0.002 (0.25)	0.525 (0.95)
(aid/gdp)*inst	-0.054 (0.05)	-0.057 (0.03) *	-0.049 (0.04)	-0.232 (0.12) *
(aid/gdp) ²	0.000 (0.00)	0.000 (0.00)	0.007 (0.00)	0.037 (0.06)
ssa	-3.031 (0.68) ***	-3.014 (0.71) ***	-2.861 (0.71) ***	-2.802 (0.77) ***
mena	-0.661 (0.78)	-0.648 (0.77)	-0.733 (0.75)	-0.689 (0.75)
lac	-0.792 (0.70)	-0.783 (0.70)	-0.782 (0.69)	-0.776 (0.69)
const	3.581 (1.77) **	3.613 (2.17) *	5.387 (2.81) *	4.516 (3.10)
Observations	342	342	342	342
R ²	0.141	0.141	0.141	0.140

Note: Dependent variable is five-year aver GDP per capita growth. Heteroscedasticity robust standard errors in parentheses.
 ***p < .01, **p < .05, *p < .1.

Table 4: OLS Estimation Results – All Countries, No Outliers

	aid_tot	aid_lt	aid_mt	aid_st
ln(gdp_pc_ps)	-0.725 (0.25) ***	-0.726 (0.25) ***	-0.806 (0.24) ***	-0.773 (0.23) ***
inst	0.885 (0.16) ***	0.892 (0.16) ***	0.922 (0.17) ***	0.874 (0.17) ***
aid/gdp	0.124 (0.10)	0.136 (0.11)	0.170 (0.16)	0.340 (0.54)
(aid/gdp)*inst	-0.037 (0.02) **	-0.039 (0.02) **	-0.064 (0.03) **	-0.178 (0.10) *
(aid/gdp)^2	0.001 (0.00)	0.001 (0.00)	0.003 (0.00)	0.039 (0.03)
ssa	-3.342 (0.59) ***	-3.344 (0.59) ***	-3.305 (0.57) ***	-3.208 (0.59) ***
mena	-1.631 (0.60) ***	-1.627 (0.60) ***	-1.617 (0.60) ***	-1.649 (0.60) ***
lac	-1.522 (0.57) ***	-1.520 (0.57) ***	-1.491 (0.56) ***	-1.512 (0.56) ***
const	3.656 (1.48) **	3.622 (1.48) **	4.156 (1.46) ***	4.123 (1.44) ***
Observations	337	337	337	337
R ²	0.211	0.212	0.218	0.214

Note: Dependent variable is five-year aver GDP per capita growth. Heteroscedasticity robust standard errors in parentheses.
 ***p < .01, **p < .05, *p < .1.

Table 5: Correlations between types of aid

	aid_tot/gdp	aid_lt/gdp	aid_mt/gdp	aid_st/gdp
aid_tot/gdp	1			
aid_lt/gdp	0.9969	1		
aid_mt/gdp	0.9710	0.9785	1	
aid_st/gdp	0.8404	0.8539	0.8645	1

	aid_tot/gdp	(aid_tot/gdp)*inst	(aid_tot/gdp)^2
aid_tot/gdp	1		
(aid_tot/gdp)*inst	0.9317	1	
(aid_tot/gdp)^2	0.8901	0.797	1

	aid_lt/gdp	(aid_lt/gdp)*inst	(aid_lt/gdp)^2
aid_lt/gdp	1		
(aid_lt/gdp)*inst	0.9341	1	
(aid_lt/gdp)^2	0.8898	0.7898	1

	aid_mt/gdp	(aid_mt/gdp)*inst	(aid_mt/gdp)^2
aid_mt/gdp	1		
(aid_mt/gdp)*inst	0.9329	1	
(aid_mt/gdp)^2	0.9013	0.8021	1

	aid_st/gdp	(aid_st/gdp)*inst	(aid_st/gdp)^2
aid_st/gdp	1		
(aid_st/gdp)*inst	0.9221	1	
(aid_st/gdp)^2	0.8799	0.7445	1

Table 6: OLS Estimation Results without Aid² – All Countries, No Outliers

	aid_tot	aid_lt	aid_mt	aid_st
ln(gdp_pc_ps)	-0.703 (0.24) ***	-0.709 (0.24) ***	-0.771 (0.23) ***	-0.732 (0.23) ***
inst	0.894 (0.16) ***	0.901 (0.16) ***	0.945 (0.16) ***	0.906 (0.16) ***
aid/gdp	0.156 (0.06) **	0.164 (0.06) ***	0.267 (0.09) ***	0.769 (0.29) ***
(aid/gdp)*inst	-0.039 (0.02) **	-0.041 (0.02) **	-0.072 (0.02) ***	-0.218 (0.09) **
ssa	-3.365 (0.58) ***	-3.362 (0.58) ***	-3.336 (0.57) ***	-3.234 (0.59) ***
mena	-1.620 (0.60) ***	-1.617 (0.60) ***	-1.592 (0.60) ***	-1.611 (0.60) ***
lac	-1.526 (0.57) ***	-1.522 (0.57) ***	-1.490 (0.56) ***	-1.521 (0.56) ***
const	3.407 (1.30) ***	3.415 (1.30) ***	3.685 (1.29) ***	3.568 (1.29) ***
Observations	337	337	337	337
R ²	0.211	0.212	0.217	0.212

Note: Dependent variable is five-year aver GDP per capita growth. Heteroscedasticity robust standard errors in parentheses.
 ***p < .01, **p < .05, *p < .1.

Table 7: OLS Estimation Results without Aid² – Only Low-Income Countries, No Outliers

	aid_tot	aid_lt	aid_mt	aid_st
ln(gdp_pc_ps)	-1.527 (0.73) **	-1.530 (0.72) **	-1.595 (0.72) **	-1.557 (0.70) **
inst	0.729 (0.34) **	0.739 (0.35) **	0.823 (0.35) **	0.868 (0.36) **
aid/gdp	0.150 (0.09) *	0.159 (0.09) *	0.268 (0.14) *	0.959 (0.44) **
(aid/gdp)*inst	-0.033 (0.02)	-0.035 (0.02)	-0.064 (0.04) *	-0.237 (0.12) *
ssa	-4.272 (0.75) ***	-4.272 (0.76) ***	-4.204 (0.75) ***	-4.105 (0.73) ***
mena	-1.245 (1.41)	-1.242 (1.41)	-1.231 (1.42)	-1.231 (1.42)
lac	-2.948 (1.22) **	-2.948 (1.22) **	-2.834 (1.15) **	-2.936 (1.07) ***
const	9.129 (4.43) **	9.100 (4.41) **	9.184 (4.40) **	8.776 (4.35) **
Observations	136	136	136	136
R2	0.289	0.290	0.293	0.298

Note: Dependent variable is five-year aver GDP per capita growth. Heteroscedasticity robust standard errors in parentheses.
 ***p < .01, **p < .05, *p < .1.

Table 8: 2SLS Estimation Results, No Outliers

IV Regression	aid_tot	aid_lt	aid_mt	aid_st
ln(gdp_pc_ps)	-1.134 (0.59) *	-1.143 (0.58) *	-1.111 (0.56) **	-1.074 (0.58) *
inst	1.283 (0.46) ***	1.295 (0.46) ***	1.254 (0.45) ***	1.431 (0.51) ***
aid/gdp	-1.236 (0.49) **	-1.210 (0.50) **	-1.967 (0.77) **	-4.730 (1.55) ***
(aid/gdp)*inst	0.022 (0.01) **	0.021 (0.01) **	0.034 (0.02) **	0.088 (0.03) ***
ssa	-2.590 (0.82) ***	-2.587 (0.83) ***	-2.305 (0.90) ***	-2.842 (0.79) ***
mena	-0.901 (0.95)	-0.891 (0.94)	-0.885 (0.95)	-1.073 (1.02)
lac	-1.130 (0.99)	-1.139 (0.98)	-1.133 (0.96)	-1.291 (1.03)
const	4.872 (2.22) **	4.901 (2.22) **	4.861 (2.33) **	3.696 (2.11) *
Observations	185	185	185	185
R ²	0.164	0.163	0.107	0.128
Hansen J statistic (p-value)	0.003	0.003	0.008	0.154
Pagan-Hall heteroscedasticity test (p-value)	0.623	0.621	0.882	0.390
Shea partial R-squared for aid/gdp	0.246	0.255	0.210	0.269
Shea partial R-squared for (aid/gdp)*inst	0.231	0.239	0.191	0.261
Shea partial R-squared for inst	0.167	0.169	0.185	0.121

Note: Dependent variable is five-year aver GDP per capita growth. Heteroscedasticity robust standard errors in parentheses. ***p < .01, **p < .05, *p < .1. *inst*, *aid/gdp* and $(aid/gdp)^2$ are instrumented. For instruments see text/appendix. Hansen J statistic tests for overidentification of all instruments. The Pagan-Hall test tests for the H0 that the disturbance is homoskedastic. For all instrumented variables but *aid_st/gdp* F-tests for the hypothesis that the instruments are not relevant are rejected at the one percent level. For details see text.

Table 9: Data and Sources

Variable	Description	Source
GDP per capita Growth	GDP per capita growth in constant 1995 USD	World Bank World Development Indicators
GDP	GDP in constant 1995 USD	World Bank World Development Indicators
Institutional quality	ICRGE PRS Group's IRIS III data set (Revised version of variable. Computed as the average of the three components still reported after 1997)	Roodman (2004); original source: Knack and Keefer (1995)
Aid	Commitments: face value of the activity at the date a grant or loan agreement is signed with the recipient in USD	OECD International Development Statistics, Creditor Reporting System
Arms imports	lagged by one period	taken from Roodman (2004); orig. source: US Department of State

Burnside/Dollar Policy Index

Variable	Description	Source
Budget Surplus		World Bank primary data source. Additional values extrapolated from IMF, using series 80 and 99b (local-currency budget surplus and GDP)
Inflation	Natural logarithm of 1 + inflation rate	taken from Roodman (2004); orig. source: World Bank primary data source. Wholesale price inflation from IMF used where consumer price data unavailable
Openness	Extended to 1998. Slightly revised pre-1993	taken from Roodman (2004); orig. source: Sachs and Warner (1995); Easterly et al. (2004); Wacziarg and Welch (2002)