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The Impact of Aid on Growth: an aid disaggregation approach

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Abstract

This paper investigates the impact of aid on growth. A clear departure from the vast majority of the existing literature is that we a disaggregate aid by functional classification. Using the GMM-SYS approach to dynamic panel estimator we test the three main competing specifications in the aid and growth literature for a sample of aid recipient countries over the 1974-2001 period. Our results clearly show that the different categories of aid exert different effects on growth. Indeed, we find that project aid exerts a positive and significant impact on growth whilst financial programme aid generally impacts on growth negatively. Our results also show that the impact of non-financial aid, technical assistance grants and food aid, is statistically insignificant. We found, however, no evidence to suggest that policy enhances the growth effect of the aid categories. Our non-linearity tests suggest that only project aid is associated with diminishing returns. Finally, our results confirm the finding that climate related conditions affect the working of aid (project).

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Section I: Introduction

The role of foreign aid in fostering economic growth and development in poor countries continues to be a subject of debate among policy makers and researchers. This debate has become important in the light of the development challenges facing the international community in meeting the Millennium Development Goals (MDGs). Indeed, the Monterrey conference organised by the United Nations in 2002 was held to find ways in which the international community can address the means and constraints to poverty reduction and to stress the role of the internationally-agreed development goals as a tool to measure progress towards these objectives. The scaling up of foreign aid has been highlighted by the Monterrey Consensus as one of the important financing tools to achieve the new development goals.

However, there are still some scepticisms regarding the effectiveness of aid. Indeed, the question "Does aid work?" (Cassen, 1994) has led to little resolution. Earlier studies found the relationship between aid and growth to be inconclusive (see Papanek, 1973; Voivodas, 1973; Mosley, 1980, Mosley et al., 1987; Boone, 1994). More recent studies seem to, in contrast, agree that aid does exert a positive impact on growth. However, there is a disagreement on how this positive impact is achieved. For Burnside and Dollar (2000) the positive impact of aid on growth is conditional on the policy environment of the recipient country. In practical terms, this means that countries with low inflation, low budget deficit, and more open economies are more likely to benefit from receiving aid than countries who exhibit opposite policies. The finding that aid works better in countries with better policy regimes was also confirmed by other investigators (see Collier and Dollar, 2001 and 2002; Collier and Dehn 2001; Collier and Hoeffler, 2002). However, there also exists evidence to suggest the working of aid is not contingent on the policy environment of the recipient country (see Durbarry, Gemmell and Greenaway, 1998; Hansen and Tarp, 2000 and 2001; Dalgaard and Hansen, 2001; Lensink and White, 2001; Chauvet and Guillaumont, 2002; Easterly, Levine and Roodman , 2003; Dalgaard, Hansen, and Tarp, 2004).

The current paper contributes to the aid-growth literature by assessing the effectiveness of various aid modalities. In particular the study seeks to investigate whether project financing or budget financing (financial programme aid) is more effective in stimulating growth. Additionally, the paper looks at the growth effect of the non financial component of aid namely technical assistance grants and programme food aid. The rationale for assessing the individual effect of aid components is based on several factors. Importantly, these different categories of aid are disbursed in different forms and for different purpose. For example, project financing is aimed at financing specific projects, which are generally concerned with the development and improvement of infrastructures in the recipient country. In contrast, programme financing by definition is provided for general, non-project-based financial support for the development policy and development programmes of a recipient country. Financial programme aid is, in contrast, given to encourage ownership by the recipient country and is more closely related with its policy and its budget and financial management systems. Finally, the non-financial form of aid, technical assistance is generally provided to bridge skill gaps between donor and recipient in the form of consultancy, technical support, and the like; whereas food aid, the non-financial form of programme aid, is generally provided to recipient governments who then sell it on local markets (process known as "monetisation") to raise the necessary funds to support their budget.

Indeed, some authors (see Cassen (1986); White (1992 and 1998)) have already voiced the importance of aid dissagregation arguing that different types of aid are likely to exert different macroeconomic effects on the recipient economies and these concerns have been substantiated by a number of recent empirical studies. For example, Mavrotas (2002) disaggregates aid to India into programme aid, project aid, and technical assistance grants and finds that all three types affected growth negatively during the 1970-92 period. In the context of Uganda, Mavrotas (2003) finds, in contrast, that programme aid exerted more significant effect on growth than project aid over the period 1980-2000. Moreover, some of the literature examining the impact of different types of aid

on aspects other than economic growth also suggests that aid heterogeneity is important. For example, applying a fiscal response model to Côte d'Ivoire, Mavrotas and Ouattara (2006) find that public investment is affected positively by all types of aid, except for project aid-government consumption is negatively associated with the programme based modality and positively associated with the other three types. Also, Ouattara (2003) finds that in general project aid flows tend to reduce public savings and worsen Côte d'Ivoire's dependence on aid more than the other categories of aid flows. In a more recent study, Ouattara (2005) re-examines the savings "displacement" hypothesis using both aggregated and disaggregated aid and discovers that aid disaggregation could provide a better understanding of its development effects.

Given that the just cited studies examining a select number of countries suggest that aid disaggregation matters for growth, there clearly is a need to substantiate this suspicion on a more comprehensive cross-country basis. Clemens, Radelet and Bhavnani (2004) divide aid into three categories: emergency and humanitarian aid, aid to support (democracy the environment, health, or education), and aid for (budget and balance of payment support, investments and infrastructure, aid for reproductive sector such as agriculture and industry). They find that the last category of aid exerts a significant impact on economic growth (with diminishing returns). The rationale for classifying aid components under these headings, according to the authors, is that the first type of aid (emergency and humanitarian aid) is likely to be negatively correlated with growth, the second group (aid to support democracy the environment, health, or education) affects growth in the long run, and the final category (aid for budget and balance of payment support, investments and infrastructure, aid for reproductive sector such as agriculture and industry) affects growth in the short run. Although this type of classification is useful in assessing the effectiveness of aid, it raises two questions, albeit related. Firstly, how do we know a priori what type of aid affects growth negatively? Secondly, who really knows a priori which aid-investments work in the "short run" versus "long run"?

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Cordella and Dell'Aricicia (2003) use a –less arbitrary disaggregation approach. They examine the effect of disaggregated aid commitments (in the form of budget support and project aid) on growth in the context of panel studies and find that both types of aid do not exert a significant impact on growth, while it is only when interacted with the policy variable that the impact of programme aid on growth becomes positive and significant and the impact of project aid remains insignificant. However, importantly their study uses commitment, rather than disbursement, values of aid, which are known to be unreliable for measuring aid flows to developing countries. More precisely, in practice not all aid commitments are disbursed and, therefore, their use to estimate the impact of aid on the recipient economy could be misleading[1]. Commitment figures would thus be appropriate if one is looking at the factors that determine aid allocation. However, to study the effectiveness of aid (on the recipient economy) one should rather look at the amount actually disbursed, i.e., that reaching the recipient's economy. It should be noted in this regard that the standard practice in the aid effectiveness literature is to use net disbursement figures.

In this paper we thus explicitly examine the impact of different types of aid disbursements on economic growth in a cross-country growth framework. Our disaggregation criteria is based on the way donors disbursed their funds. Put differently, our aim is to investigate whether the different modalities used by donors to finance development, in general, and growth, in this specific context, exert different effects. And if they do, which type appears to be more effective.

Our paper is organised as follows. In the following section we discuss in greater detail the different types of aid. Section III describes the methodology and the data. Section IV presents the results. Finally, concluding remarks are provided in Section V.

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[1] The amount disbursed is in some cases 50 percent of the total commitment.

Section II: The Different Categories of Aid

Development aid is disbursed in four main categories: project aid, financial programme aid, non-financial programme aid (food aid), and technical assistance. In this regard, project aid assistance is disbursed for specific projects, generally concerned with developing and improving infrastructures in the recipient country. Until the mid-1970s such aid flows represented more than half of all disbursements by OECD countries, of which 66 percent was allocated to the development of infrastructure: roads, railways, ports, airports, etc. (OECD, 1997). In 1973, the project aid based lending was further strengthened following the World Bank's commitment to reduce poverty. The developments of local infrastructures, and health and education sectors were extended to rural areas. By the end of the 1970s the project aid modality was widely used across all sectors in the portfolios of most donors (Mosley and Eeckout, 2000).

In contrast, financial programme aid is not linked to a specific project. It is generally disbursed to help the recipient country correcting its balance of payments problems. These disbursements consisted mainly of funds provided by the IMF[2] on commercial terms for macroeconomic stabilisation purposes, in the recipient countries (Mosley and Eeckout, 2000). However, the World Bank and bilateral donors started to disburse financial programme aid in the 1980s when many developing countries started to face severe macroeconomic imbalances.[3] According to Wilkes (2001), financial programme aid has become popular compared to project aid because the former is more in tune with poverty reduction strategies. Furthermore, as pointed by Killick (2004), the transaction costs associated with the financial programme aid modality are lower than those of the project aid based approach. A key feature of financial programme aid is that it is linked to the issue of conditionality, whereby the recipient country agrees to undertake some policy reforms, such as price deregulation, the removal of exchange controls, import quotas,

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[2] The World Bank and bilateral donors did occasionally contribute to these disbursements, but in a very insignificant manner.
[3] By the mid-1990s financial programme aid represented almost 33 percent of World Bank lending (Adjustment lending) and about 20 percent of bilateral donors disbursements by the mid-1990s (OECD 1997).

distortionary taxes, subsidies to public enterprises etc., in exchange of the financial programme aid assistance. Another of its feature, is that it is directly channelled through the recipient government budget. However, White (1998) argues that because this type of aid is not separable from the recipient budget it can easily be fungible.

Food aid (excluding emergency and relief food aid) is the non-financial form of programme aid.[4] This form of aid is provided mainly for budget support purposes. It includes supplies and transport of food, cash for food, intermediate products (fertilisers, seeds etc.) medicines, etc., provided as part of a food aid programme. The donor provides food aid to the recipient government specifically to be sold to generate counterpart finances (in local currency[5]). Notably the food is generally sold on local markets at a price lower than the cost of purchasing and transporting it. Transport, storage and the process of selling the food rely on the recipient. One problem with food aid is that it is difficult for the donor to ensure that the proceed of food sales are actually remitted to the appropriate government department (e.g. the treasury) and not used for off-budget expenditure.

Finally, there are also technical assistance grants. These (free standing and investment related) are generally disbursed to fill skill gaps in the recipient country. Free-standing technical assistance comprises 'the provision of resources where the main aim is to augment the stock of human capital i.e. the level of knowledge, skills, technical know-how or productive aptitudes of the population of aid recipients' (OECD, *DAC Statistical Reporting Directives*, 2000, p.47). Investment related technical assistance, on the other hand, is provided to help in the design and implementation of projects or programmes undertaken in the recipient country. This type of technical assistance takes the form of consultancy, technical support, supply of human resources (e.g. mangers, engineers, skilled labour, etc.), capital expenditure and the financing of heavy machinery and equipment. However, it must be realised that it is difficult to assess the true impact of technical

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[4] Some have argued that food aid is an inferior form of programme aid.
[5] This process is called monetisation of food aid.

assistance grants on the recipient economy since a potentially large part of these grants never reach the recipient country.[6]

Section III: Methodology and Data Issues

Specification of the growth equation

In his survey and examination of the recent aid and growth studies Roodman (2004) argues that three main stories emerge from this literature. The first story is the one told by Burnside and Dollar (2000) i.e. aid works in countries with sound policies. The second story is that of Hansen and Tarp (2001) who found that on average foreign aid affects positively and significantly growth and this effect is not contingent on policy. However, Hansen and Tarp (2001) found that this effect occurs with diminishing returns, i.e., after a certain threshold the effect of aid on growth becomes negative. Finally, Daalgard, Hansen and Tarp (2004) found that foreign aid works better in countries outside the tropics but not in them. Roodman (2004), after submitting these three specifications to a battery of tests, concludes that the working of aid conditional on policy is the weakest of all specifications while the finding that "aid works better in countries outside the tropics" appears to be the most robust. The present paper will therefore test these three main specifications highlighted by Roodman (2004) using disaggregating aid. The basic specification adopted in these three studies can be represented by the following reduced-form equation:

$$g_{it} = \alpha_{it} + \beta X_{it} + \delta Aid_{it} + \varepsilon_{it} \tag{1}$$

where g represents the growth rate of GDP per capita, X is a set of control variables, Aid is the set form formed by the different components of foreign aid, ε is an i.i.d residual term.

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[6] Great part of technical assistance is in fact salaries to experts which can be banked in the donor country.

The Data

For all variables except our aid measures, we use the exact data set as in Roodman (2004), which is an expanded data set of the original one used by Easterley *et al.* (2003). These data contain a number of time invariant and time varying variables, where the time varying variables are averaged over four year periods from 1974-2001.[7] The data on technical assistance and food aid are obtained from the OECD-DAC online statistics. The data on project aid and financial programme aid disbursements are obtained from Ouattara (2005). Specifically, the author constructed a new database on project and programme aid (net disbursements) by converting the commitment values in the OECD-Credit Reporting System into disbursements.[8] The author does so by first deriving the respective share of project aid and programme aid commitments in total (project aid + programme) commitments obtained from the OECD-CRS database. These shares are then applied to the total of ODA disbursements (less technical assistance grants). The obtained figures give project aid disbursements and programme aid disbursements (which include programme food aid). To obtain financial programme aid disbursement values, programme food aid disbursement figures, which exist in the OECD-DAC database, are subtracted from the programme aid disbursement values.[9] Figures 1 and 2 (in Appendix) show a graph of the different categories of aid. A general conclusion that can be drawn from these figures is that project aid seems to dominate much of aid disbursements to developing countries. It is also worth noticing that during the 1980s and early 1990s financial programme disbursements have witnessed an increase. In terms of the non-financial form of aid, technical assistance seems to be the dominant type. However, as pointed earlier much technical assistance never reached the recipient country.

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[7] Project and programme aid commitment figures are only available from 1974.
[8] One should note that project aid and programme aid only exist in commitment form in the OECD database.
[9] One advantage in estimating these disbursement figures using this methodology is that the sum of the estimate disbursements plus technical assistance grants and food aid values, obtained form the OECD-DAC database, exactly equal net oda disbursements values reported in the DAC database (see http://www.socialsciences.man.ac.uk/economics/research/discuss.htm for more details).

Econometric Method

In estimating the growth equation (1) Burnside and Dollar have adopted the OLS and the 2SLS techniques where for the latter all variables in X are assumed to be exogenous. However, Hansen and Tarp (2001) and Daalgard *et al.* (2004) point out that many of the variables in X are likely to be endogenous. More importantly, one can easily make an argument that even if aid itself is contemporaneously pre-determined with regard to the growth rate, it may still be endogenous simply by its construction into time averages as is done in the Burnside and Dollar (2000) and Easterley *et al.* (2003) data sets (see Daalgard *et al.*, 2004). What is more, the variables used to construct the Policy measure are also likely to be endogenous.[10]

In order to avoid biased estimates resulting from using OLS or 2SLS as Burnside and Dollar (2000) and Easterley *et al.* (2003), we thus follow Hansen and Tarp (2001) by adopting the General Method of Moments (GMM) estimation procedure. This technique allows us to purge time invariant country specific effects and to control for the endogeneity of the explanatory variables.[11,] [12] We assume here that all explanatory variables are potentially endogenous, including those in the regression used to construct the Policy variable, which is an important element of the Burnside and Dollar story. One should also note that all time invariant variables are purged from (1) since under our estimator the data is first differenced. The GMM approach adopted here is the GMM-system, developed by Blundell and Bond (1998). The GMM-SYS technique uses internal instruments both in levels and difference. The Sargan/Hansen-J test is then used to check the validity of the instruments. We also use the Windmeijeir demise correction option to control for small sample bias (see Windmeijeir, 2000).

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[10] See also Daalgard (2004).

[11] Actually, Hansen and Tarp (2001) used the GMM estimator suggested by Arellano and Bond (1991). We use here the GMM systems estimator since it has been shown to be perform better for small samples; see Blundell and Bond (1998).

[12] The validity of these instruments can be tested using Arellano and Bond's (1991) Sargan test in all specifications we found support for our instruments. One should also note that this estimator crucially depends on the lack second order autocorellation. The AR(2) test, as proposed by Arellano and Bond (1991), produced no evidence of such. Both of these tests are reported in the tables.

Section IV: Results

Before discussing the results on the estimated coefficients it is crucial to analyse our diagnostic tests. The first test concerns the validity of the instruments; it is worth recalling that the GMM approach to dynamic panel uses internal instruments. It can be seen from Table (1) though toTable (3) that the Hansen test p-value is greater in all cases than the 5 percent significance level, thus implying that one can not reject the null hypothesis that our instruments are valid.[13] The second test concerns the question of serial correlation. The p-values of the Arellano and Bond AR(2) statistics in Tables (1), (2), and (3) are all above the 5 percent significance level and, therefore confirming the absence of second-order serial correlation, which would render our results inconsistent.

Turning to our estimated coefficients, Table (1) presents results using the Burnside and Dollar (2000) specification. With respect to our policy index it is worth pointing out that it is constructed using a similar approach as in Burnside and Dollar (2000), although the derivation of our estimates are done using the dynamic panel technique (and not the OLS technique).[14] Turning now to our results, it can be seen from Column (1) of Table (1) that project aid affects positively and significantly growth. The impacts of financial programme aid and technical assistance grant appear to be negative but only significant at the 10 percent level. Food aid does not appear to exert any statistically significant effect on growth. The result also indicates that policy exerts a positive significant effect on growth. In Column (2) through to Column (5), we interact our policy variable each time with one of the aid variables. Although the effects of policy and project aid remain positive and significant throughout none of the interaction terms are found to be statistically significant, except the food aid-policy interaction term which is negative and significant at the 10

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[13] It is important to note however that although the instruments are found to be valid there is an important question in the empirical literature regarding the strength of the instruments. To our knowledge no such test has been provided so far. Therefore, like most studies adopting the GMM approach we only focus on the validity of these instruments.

[14] The policy variable was computed with the coefficient 28.35, -2.89 and 0.182 for budget surplus, inflation and openness, respectively.

percent level. Moreover, financial programme aid appears, in general, to exert a negative effect on growth. In column (6) we include all the different interaction terms. Again none of them is found to be statistically significant.

To summarise these findings, based on the Burnside and Dollar (2000) specification, one finds that project aid financing seems to spur economic growth whilst budget financing is associated with a reduction in growth. As far as the non-financial category of aid is concerned, the effect of technical assistance appears generally negative but significant only at the 10 percent level whilst food aid does not bear any effect on growth. Also, the evidence does not support the finding that the working of aid is contingent on policy, as none of interaction terms are found to be statistically significant.

Table (2) portrays the results related to the Hansen and Tarp (2001) specification. One should recall that the story of the study by Hansen and Tarp (2001) is that aid increases growth on average but with diminishing returns. In column (1) through to Column (4) we thus entered each aid category in non-linear form. What emerges from these regressions is that, as with the previous specification, the effect of project aid is positive and statistically significant. The impact of financial programme aid is negative but only significant in one regression. As far as diminishing returns are concerned results in Column (1) suggest that project aid increases growth with diminishing returns. In Column (2) where financial programme aid is entered in non-linear form, we find no evidence of diminishing returns, which is consistent with the fact financial programme aid affects negatively growth.[15] Results in Column (3) indicate that although technical assistance does not exert any significant effect on growth, high levels of it can be detrimental to the recipient economy. Column (4) suggests that food aid does not lead to diminishing returns. In the final column of Table (2) we enter all the aid categories in non-linear form. Again the only type of aid associated with diminishing returns is project aid.

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[15] The concept of diminishing returns requires that aid first increases growth and after a certain threshold level this effect become negative. However, in the present case we find that financial programme aid affects negatively growth and therefore if one finds diminishing returns there would be some inconsistency.

The results derived from the Hansen and Tarp (2001) specification can be summarised as follows. Project aid flows contribute positively to growth, on average whilst the effect of financial programme aid is a negative one. Non-financial aid in the form of technical assistance and food aid do have any significant effect on growth. Our results also show that project financing affects growth with diminishing return. This can be attributed to co-ordination problems among the donors in one hand and, on the other hand between recipient governments and individual donors. The results also show that, although the impact of technical assistance on growth is positive and insignificant, too much of it can be detrimental to the recipient countries.

Finally we turn our attention to the Daalgard, Hansen and Tarp (2004) specification. Results are summarised in Table (3). Looking through Column (1) to Column (5) it can be seen that the finding that project aid affects positively and significantly growth is confirmed. This impact appears to be even stronger in this specification. The evidence also points to the negative effect of financial programme aid on growth. However, this negative impact is only significant at the 10 percent level, on average. Again non-financial aid (technical assistance and food aid) does not appear to affect growth. We now check the hypothesis of whether aid works in countries outside the tropics but not in them. In Column (1) of Table (3) we interact project aid with the with tropical area fraction variable (which measures the share of a country's area that is in the tropics). The coefficient of the interaction term is negative and statically significant. In Columns (2)-(4), we repeat the same exercise for financial programme aid, technical assistance and food aid, respectively. The results show the coefficients of the interaction term to be negative and significant for financial programme aid and technical assistance whilst that of food aid is only significant at the 10 percent level. However, in Column (5) were we include all the interaction terms only the project aid*tropical is statistically significant, albeit at the 10 percent level. In terms of total impact of the different categories of aid on growth in the tropics it could be seen that our results are consistent

with the findings and Daalgard *et al*. (2004) i.e. the impact of aid on growth in the tropics is not statistically significant.

The results using Daalgard, Hansen and Tarp (2004) specification suggest, again, that on average project aid works in terms of enhancing growth in the recipient countries. Financial programme aid appears to be associated with a reduction in growth although the estimated coefficient is statistically significant only at the 10% level. The results also show that technical assistance and food aid do not exert any significant effect on growth. Moreover, the results appear to indicate that the total effect of project aid (and also other aid categories) on growth in the tropics is statistically insignificant.

Section III: Concluding Remarks

This paper investigated the impact of the different categories of aid on growth. uOur results appear to suggest that project aid financing exerts a positive significant impact on growth, whilst the impact of financial programme aid is negative. As far as the non-financial form of aid is concerned, we found no strong evidence that technical assistance and food aid contribute to growth.

Although we find that policy affects growth positively and significantly, there was no evidence to support the hypothesis that the working of aid is contingent on policy. We also found evidence of a non-linear relationship between project aid and growth in which the positive and significant impact of project aid on growth is subject to diminishing returns. Our evidence also suggests that, although the impact of technical assistance is positive and insignificant, too much of it can be detrimental to the recipient economy. Financial programme aid and food aid do not exhibit any non-linear relationship with growth. As far as the Daalgard, Hansen and Tarp (2004) "story" is concerned, i.e., aid works in countries outside the tropics not in them, our results appear to support their findings. Indeed, we found that the total effects of the different categories of aid in the tropics are not statistically different from zero.

Although our results appear to suggest that project aid stimulates growth more than the other types of aid one should not jump to the conclusion that the project base lending should not the financing instrument adopted by donors, as these findings are based on cross-country analysis. To avoid repeating past mistakes in the design of new aid policies it is important for the aid effectiveness research community to substantiate the recent findings in the context of country specific studies. This task has become, ever, critical given the emphasis on using aid to achieve the MDGs by the year 2015.

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Table (1) Burnside and Dollar Specification

	(1)	(2)	(3)	(4)	(5)	(6)
Log initial real GDP/capita	1.787	2.016	1.885	1.908	1.218	0.064
	(1.75)*	(2.87)***	(2.19)**	(2.46)**	(1.61)	(0.04)
Assassination	-0.672	-0.528	-0.626	-0.580	-0.669	-0.963
	(1.46)	(0.98)	(1.34)	(1.29)	(1.30)	(2.09)**
Ethno-linguistic fractionalisation*Assassination	0.970	0.643	0.881	0.837	1.002	1.581
	(1.10)	(0.56)	(0.99)	(0.95)	(1.00)	(1.65)
M2/GDP	0.023	0.021	0.023	0.017	0.030	0.042
	(0.95)	(0.94)	(0.89)	(0.74)	(1.36)	(1.69)*
Project Aid	0.425	0.366	0.388	0.429	0.406	0.322
	(4.10)***	(1.43)	(4.02)***	(4.13)***	(3.89)***	(0.25)
Financial Programme Aid	-0.372	-0.360	-2.087	-0.419	-0.401	-2.129
	(1.68)*	(1.89)*	(1.64)	(2.10)**	(1.98)*	(1.05)
Technical Assistance	-0.828	-0.751	-0.768	-1.560	-1.012	0.456
	(1.99)*	(1.91)*	(1.72)*	(1.58)	(2.40)**	(0.12)
Food Aid	0.169	0.117	0.125	0.124	-6.256	-3.148
	(0.20)	(0.12)	(0.17)	(0.11)	(1.58)	(0.66)
Policy	0.635	0.617	0.705	0.739	1.043	0.628
	(2.68)***	(2.17)**	(2.87)***	(2.33)**	(3.75)***	(1.89)*
Policy*Project Aid		-0.005				-0.003
		(0.23)				(0.02)
Policy*financial Programme Aid			-0.183			-0.178
			(1.44)			(0.83)
Policy*Technical Assistance				-0.076		0.164
				(0.81)		(0.41)
Policy*Food Aid					-0.656	-0.369
					(1.72)*	(0.77)
Constant	-4.893	-10.030	-4.841	-7.895	3.317	7.617
	(0.54)	(1.43)	(0.62)	(0.99)	(0.45)	(0.65)
Observations	*414*	*414*	*414*	*414*	*414*	*414*
Number of countries	*69*	*69*	*69*	*69*	*69*	*69*
Arrelano-Bond test for AR(1) (p value)	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Arrelano-Bond test for AR(2) (p value)	*0.637*	*0.663*	*0.978*	*0.707*	*0.704*	*0.753*
Hansen test (p value)	*0.743*	*0.883*	*0.892*	*0.894*	*0.895*	*1.000*

Notes: Robust t statistics in parentheses;* significant at 10%; ** significant at 5%; *** significant at 1%.

Table (2) Hansen and Tarp Specification

	(1)	(2)	(3)	(4)	(5)
Average annual per capita growth lagged	-0.088	-0.028	-0.100	0.004	-0.119
	(0.87)	(0.36)	(1.14)	(0.04)	(1.56)
Log initial real GDP/capita	-4.816	-5.558	-3.701	-0.389	-6.405
	(1.80)*	(2.24)**	(1.56)	(0.10)	(2.13)**
Log(1+inflation)	-3.273	-3.233	-4.503	4.287	-3.908
	(1.11)	(1.48)	(2.05)**	(1.43)	(1.25)
Sachs-Warner	1.667	2.595	1.168	2.340	1.073
	(2.66)***	(3.89)***	(1.61)	(3.61)***	(1.54)
Assassination	-0.400	-0.477	-0.580	-0.513	-0.540
	(1.12)	(1.43)	(1.74)*	(1.17)	(1.43)
Ethno-linguistic fractionalisation*Assassination	0.925	1.150	1.230	0.841	1.021
	(1.46)	(1.72)*	(1.68)*	(1.15)	(1.48)
Project Aid	0.659	0.062	0.299	0.074	1.033
	(2.15)**	(0.31)	(2.84)***	(0.12)	(4.43)***
Financial Programme Aid	-0.552	-0.217	-0.419	-0.514	-1.627
	(2.37)**	(0.30)	(1.58)	(1.33)	(2.77)***
Technical Assistance	0.282	0.221	0.310	-0.062	-1.298
	(0.54)	(0.40)	(0.21)	(0.05)	(1.08)
Food Aid	0.040	0.379	1.045	2.257	0.377
	(0.09)	(0.68)	(1.14)	(1.42)	(0.30)
(Project Aid)^2	-0.022				-0.029
	(3.63)***				(5.72)***
Δ(Project Aid)	-0.361				-0.226
	(1.54)				(1.22)
Δ(Project Aid)^2	0.010				0.009
	(1.84)*				(2.40)**
(Financial Programme Aid)^2		-0.000			0.122
		(0.00)			(1.89)*
Δ(Financial Programme Aid)		0.155			0.363
		(0.36)			(0.75)
Δ(Financial Programme Aid)^2		-0.038			-0.025
		(0.82)			(0.47)
(Technical Assistance)^2			-0.026		0.072
			(0.18)		(0.74)
Δ(Technical Assistance)			-3.394		-0.288
			(2.66)***		(0.39)
Δ(Technical assistance)^2			0.192		0.026
			(2.10)**		(0.45)
(Food Aid)^2				0.064	0.012
				(0.15)	(0.06)
Δ(Food Aid)				-1.374	-2.172
				(0.57)	(1.53)
Δ(Food Aid)^2				-0.085	0.151
				(0.16)	(0.90)
Observations	*350*	*350*	*350*	*350*	*350*
Number of countries	*75*	*75*	*75*	*75*	*75*
Arrelano-Bond test for AR(1) (p value)	*0.022*	*0.05*	*0.001*	*0.018*	*0.043*
Arrelano-Bond test for AR(2) (p value)	*0.059*	*0.223*	*0.179*	*0.359*	*0.310*
Hansen test (p value)	*0.236*	*0.172*	*0.543*	*0.419*	*0.945*

*Notes: Robust t statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table (3) Dalgaard, Hansen and Tarp Specification

	(1)	(2)	(3)	(4)	(5)
Log initial real GDP/capita	0.218	0.630	0.794	1.982	0.542
	(0.09)	(0.20)	(0.27)	(1.11)	(0.34)
Budget Surplus	17.126	13.008	11.822	18.696	23.687
	(2.28)**	(1.60)	(1.23)	(1.86)*	(2.14)**
Log(1+inflation)	-0.572	-0.211	-0.056	1.081	-0.242
	(0.26)	(0.08)	(0.02)	(0.60)	(0.14)
Sachs-Warner	2.325	2.357	2.204	2.280	2.069
	(4.14)***	(4.32)***	(3.34)***	(4.14)***	(3.09)***
Project Aid	0.560	0.318	0.341	0.363	0.573
	(4.97)***	(2.72)***	(2.19)**	(3.15)***	(5.01)***
Financial Programme Aid	-0.327	0.288	-0.374	-0.423	0.091
	(1.82)*	(0.76)	(1.69)*	(2.28)**	(0.30)
Technical Assistance	0.157	-0.366	2.323	-0.428	1.207
	(0.45)	(0.94)	(1.67)*	(1.32)	(0.61)
Food Aid	0.375	-0.379	-0.397	4.604	-0.343
	(0.50)	(0.57)	(0.57)	(1.85)*	(0.09)
Project Aid*Tropical	-0.594				-0.463
	(2.41)**				(1.80)*
Financial Programme Aid*Tropical		-0.950			-0.351
		(2.48)**			(1.01)
Technical Assistance*Tropical			-2.888		-1.465
			(2.07)**		(0.67)
Food Aid*Tropical				-5.185	0.904
				(1.91)*	(0.21)
Constant	3.651	-0.950	-3.095	-16.400	0.265
	(0.14)	(0.03)	(0.09)	(0.77)	(0.01)
Total Impact of Project Aid in the Tropics	-0.034				0.110
	(0.18)				(0.46)
Total Impact of Financial Programme Aid in the Tropics		-0.662			-0.260
		(2.27)**			(0.99)
Total Impact of Technical Assistance in the Tropics			-0.665		-0.258
			(1.25)		(0.55)
Total Impact of Food Aid in the Tropics				-0.580	0.561
				(0.80)	(0.69)
Observations	*425*	*425*	*425*	*425*	*425*
Number of countries	*71*	*71*	*71*	*71*	*71*
Arrelano-Bond test for AR(1) (p value)	*0.022*	*0.05*	*0.001*	*0.018*	*0.043*
Arrelano-Bond test for AR(2) (p value)	*0.059*	*0.223*	*0.179*	*0.359*	*0.310*
Hansen test (p value)	*0.236*	*0.172*	*0.543*	*0.419*	*0.945*

*Notes: Robust t statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table (4) Dalgaard, Hansen and Tarp Specification with Aid Terms Squared

	(1)	(2)	(3)	(4)	(5)
Log initial real GDP/capita	3.486	2.814	4.416	2.027	2.231
	(1.51)	(1.54)	(1.79)*	(1.19)	(0.92)
Budget Surplus	24.713	22.225	17.284	20.762	25.910
	(1.95)*	(1.87)*	(1.53)	(1.91)*	(1.96)*
Log(1+inflation)	1.628	1.660	2.802	0.979	0.486
	(0.65)	(0.82)	(1.14)	(0.51)	(0.21)
Sachs-Warner	2.446	2.440	2.835	2.435	2.481
	(3.69)***	(3.78)***	(3.72)***	(3.69)***	(3.50)***
Project Aid	0.558	0.346	0.342	0.325	0.538
	(5.79)***	(2.91)***	(2.55)**	(2.38)**	(4.50)***
Financial Programme Aid	0.024	-0.019	-0.102	-0.090	0.209
	(0.15)	(0.06)	(0.46)	(0.44)	(0.68)
Technical Assistance	0.152	-0.496	0.356	-0.322	0.105
	(0.38)	(1.60)	(0.52)	(1.09)	(0.16)
Food Aid	0.707	0.139	-0.254	-2.172	-1.485
	(1.08)	(0.22)	(0.35)	(1.32)	(0.75)
Project Aid^2*Tropical	-0.025				-0.027
	(2.91)***				(2.59)**
Financial Programme Aid^2*Tropical		-0.037			-0.001
		(0.93)			(0.02)
Technical Assistance^2*Tropical			-0.072		0.028
			(1.44)		(0.52)
Food Aid^2*Tropical				0.495	0.559
				(1.47)	(1.46)
Constant	-30.922	-24.925	-42.885	-15.790	-16.157
	(1.09)	(1.11)	(1.46)	(0.75)	(0.56)
Total Impact of Project Aid in the Tropics	0.532				0.511
	(5.68)***				(4.47)***
Total Impact of Financial Programme Aid in the Tropics		-0.055			0.208
		(0.19)			(0.74)
Total Impact of Technical Assistance in the Tropics			0.283		0.133
			(0.44)		(0.22)
Total Impact of Food Aid in the Tropics				-1.677	-0.925
				(1.25)	(0.56)
Observations	425	425	425	425	425
Number of countries	71	71	71	71	71
Arrelano-Bond test for AR(1) (p value)	0.000	0.000	0.000	0.000	0.000
Arrelano-Bond test for AR(2) (p value)	0.328	0.689	0.758	0.907	0.427
Hansen test (p value)	0.345	0.268	0.299	0.281	0.286

*Robust t statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.*
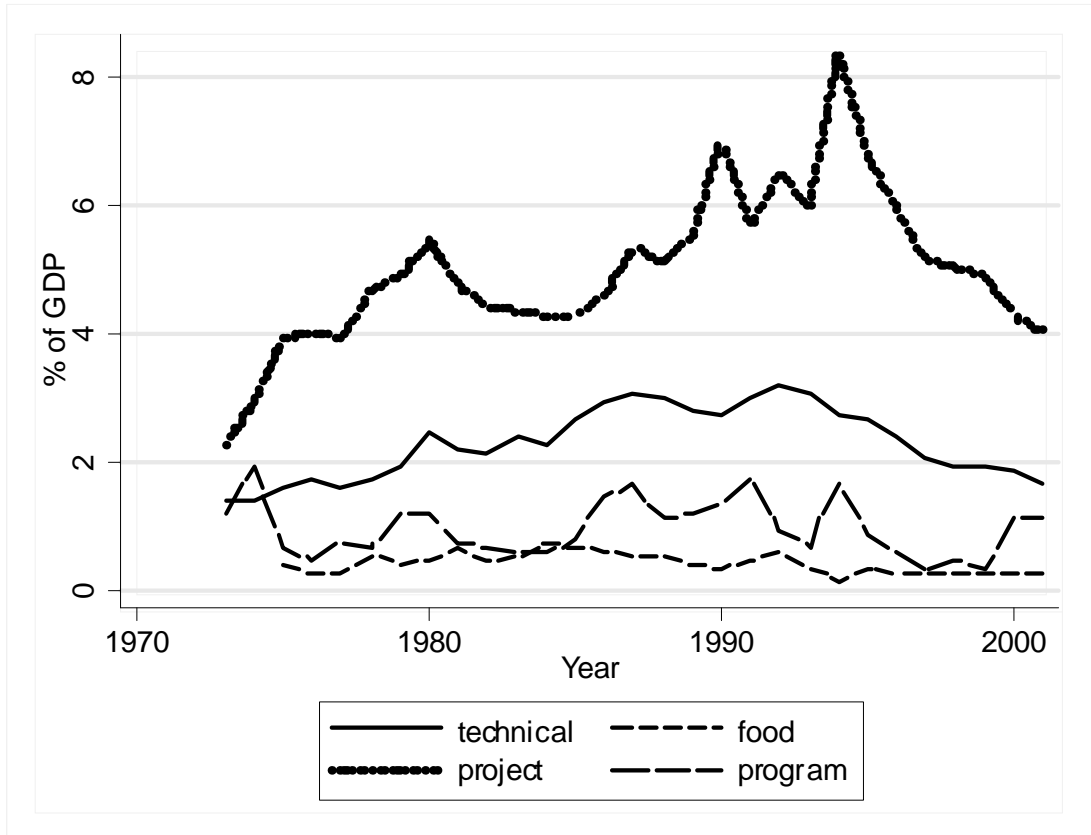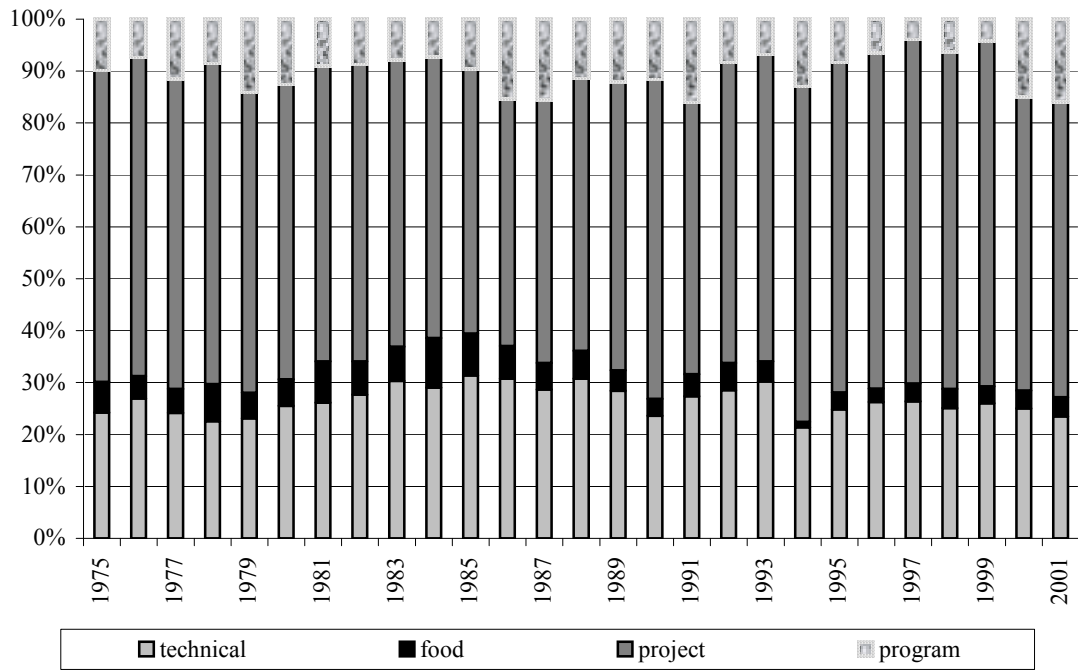
Figure 1 : Trends of Aid Categories (%GDP) 1974-2001

Figure 2: Composition of Aid 1975-2001

Dataset Construction

Variable	Data source	Notes[1]
Per-capita GDP growth	World Bank, 2003	
Initial GDP per capita	Summers and Heston, 1991, updated using GDPG	Natural logarithm of GDP/capita for first year of period; constant 1985 dol- lars
Ethno-linguistic fractionalization, 1960	Roeder, 2001	Probability that two indi-viduals will belong to dif-ferent ethnic groups
Assassinations/ capita	Banks, 2002 Assassinations/	capita
M2/GDP, lagged one period	World Bank, 2003	
Budget surplus	World Bank, 2003; IMF, 2003	World Bank primary data source. Additional values extrapolated from IMF, using series 80 and 99b (local-currency budget sur-plus and GDP)
Inflation	World Bank, 2003; IMF, 2003 Natural	logarithm of 1 + inflation rate. World Bank primary data source. Wholesale price inflation from IMF used where consumer price data unavailable
Sachs-Warner, updated	Sachs and Warner, 1995; Easterly et al., 2004; Wacziarg and Welch, 2002	Extended to 1998. Slightly revised pre-1993. Full description will be published separately
Net Overseas De-velopment Assis-tance/nominal GDP	DAC, 2002; World Bank, 2003 .	
Net Project Aid/nominal GDP	Ouattara (2005); World Bank, 2003 .	
Net Financial Programme Aid/nominal GDP	Ouattara (2005); World Bank, 2003 .	
Technical Assistance Grants/ nominal GDP	DAC, 2006; World Bank, 2003.	
Food Aid/ nominal GDP	DAC, 2006	
Tropical area fraction	Gallup and Sachs, 1999	

[1]All variables aggregated over time using arithmetic averages.
Source: Adapted from Roodman (2004)