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To Aid or Not to Aid: Foreign Aid and Productivity in Cross-Country Regressions

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Abstract

The paper reexamines empirically the robustness of competing theories of foreign aid effectiveness. By shifting the focus from the effects of aid on income to to effects of aid on productivity, it is possible to put to test 3 existing theories of foreign aid effectiveness. The results provide support for the hypotheses that (i) aid has a positive effect in fostering growth of average productivity, (ii) aid doesn't operate with diminishing returns, and (iii) the magnitude of the total effect depends on climate-related circumstances. The results support the policy recommendation previously made in the literature to seriously reconsider the conditionality rule for foreign aid disbursements.

1 Introduction

Mexico hosted in March 2002 the UN International Conference on Financing for Development, which was carried out to confront in a global forum the challenge of finding the best way to finance development. One of the outcomes of the conference was a report containing the guidelines that any comprehensive and coordinated response to this problem should follow. This report, the Monterrey consensus, contains a section on the role that foreign aid (official development assistance) plays, and highlights its relevance as "a complement to other sources of financing for development, especially in those countries with the least capacity to attract private direct investment" (UN, 2002).

The central role foreign aid has been recognized in various occasions before and after the Monterrey consensus. In many of those occasions, the recongnition of aid's importance was even complemented with commitments to increase the amount of resources from donor countries, and with commitments to coordinate the actions of recipients, donors and

international institutions to make foreign aid more effective instrument (see for example the G8 Gleneagles communiqué, 2005).

A remarkable feature of this whole process is, however, that even though the idea of coordinating actions and making foreign aid more effective is widely accepted as a priority now, there doesn't exist yet a relatively high degree of consensus about the way that foreign aid works, at least not one that allows to assert a conclusive argument about the capacity of foreign aid to promote faster economic growth. As noted in a recent work trying to encompass the conclusions from a number of empirical papers using cross-country data to assess the effects of aid on growth, it is necessary to recognize that "[...] one can find significant impacts of aid on growth—positive and negative—but these do not hold up when we check their robustness to the considerable choice of specifications at the researcher's disposal. In short, it is difficult to discern any systematic effect of aid on growth in the panel context also" (Rajan and Subramanian, 2005).

The objective of this paper is to reexamine empirically the capacity of foreign aid to imporove the economic performance, but concentrating this time on an angle that has received virtually no attention. The empirical literature has basically tried to find an estimate of the effect of aid on the average growth rate of GDP per capita (interpreting it as a measure of change in the average level of income or as a broad indicator of the change in the country's general economic conditions). Here the aim is trying to refine the understanding of the connection between aid and growth, by moving the focus to the impact of aid on *productivity*. The yardstick for the effectiveness of aid throughout the paper will be then the average rate of growth in GDP per worker.

This change of measure is relevant for several reasons. First, GDP per worker is a direct measure of the average productivity of labor but can still be interpreted as a proxy for average income. With an appropriate scalation of prices, the measure becomes useful to make proper comparisons of productivity and efficiency across countries. Growth in real GDP per worker is, for example, one of the central criterion to judge business productivity in the annual report from the World Competitiveness Center (see IMD, 2005). Second, as pointed by Jones (1997), if one is interested in making some sort of welfare comparison across countries, it is preferable to use GDP per worker instead of GDP per capita since "one does not want to follow the national accounts data in drawing a distinction between market production and home or nonmarket production". Third, according to Durlauf, Johnson and Temple (2004), the use of GDP per worker is sometimes the best alternative when trying to test the predictions of formal growth models, since these are generally "based on production functions and their implications relate more closely to GDP per worker than GDP per capita". And fourth, Durlauf et al. (2005) also recall that when there is an unmeasured non-market sector in the economy, such as subsistence agriculture, GDP per worker could be a more accurate index of average productivity than GDP per capita. This argument extends immediately to the activities in the unmeasured market

sector, and particularly so in developing countries where unmeasured economic activity tends to account for an important fraction of the overall level of product in the economy.

The objective throughout the paper will be basically twofold. By using a panel of data at the country level, the initial goal is to tell something about the capacity of aid to increase productivity. The assessment will be done within the borders that the existing literature on foreign aid effectiveness has set, because this would allow also to see if some of the existing theories on foreign aid effectiveness can stand up to a change in the data used to support them.

The paper is organized as follows. Section 2 shortly reviews some of the main theories in the recent effectiveness debate. Section 3 discusses methodological issues invloved on the estimation part. Section 4 presents results of the estimations and the tests applied, and offers a general discussion. Section 5 ends the paper with some concluding remarks.

2 Competing theories of foreign aid effectiveness

Most recent formal models of aid effectiveness have their foundations on different types of augmented growth models. Burnside and Dollar (2000), a seminal contribution to this literature, based their empirical results on the framework of a modified neoclassical growth model. They relied on the following two reduced-form equations for the rate of growth in GDP per capita and the allocation of aid:

$$g_{it} = y_{it}\beta_y + \mathbf{p}'_{it}\boldsymbol{\beta}_p + a_{it}\beta_a + a_{it}\mathbf{p}'_{it}\boldsymbol{\beta}_p + \mathbf{z}'_{it}\boldsymbol{\beta}_z + g_t + \varepsilon^g_{it}, \tag{1}$$

$$a_{it} = y_{it}\gamma_y + \mathbf{p}'_{it}\boldsymbol{\gamma}_p + \mathbf{z}'_{it}\boldsymbol{\gamma}_z + a_t + \varepsilon^a_{it}, \tag{2}$$

where i indexes countries and t time, g_{it} is the growth rate in GDP per capita, y_{it} is the initial level of (log) GDP per capita, a_{it} is the amount of aid received relative to the GDP, $\mathbf{p}_{it}$ is a $P \times 1$ vector of policies that affect growth, $\mathbf{z}_{it}$ is a $K \times 1$ vector of other exogenous variables that might affect growth and the allocation of aid, g_t and a_t are fixed time effects, and ε^g_{it} and ε^a_{it} are mean zero random errors.

A system of these two equations allows them to treat growth, aid and the quality of macroeconomic policies as endogenous regressors in the equations they estimate. The basic regression-equation in Burnside and Dollar (2000) looks like

$$g_{it} = y_{it}\beta_y + \mathbf{p}'_{it}\boldsymbol{\beta}_p + a_{it}\beta_a + a_{it}(\mathbf{p}'_{it}\mathbf{b}_p)\theta_1 + \mathbf{z}'_{it}\boldsymbol{\beta}_z + g_t + \varepsilon^g_{it}, \tag{3}$$

where $\mathbf{b}_p$ is a vector containing the specific weights for the policy index. The coefficients of interest in these regressions are the ones related to the aid variable and the aid-interacted terms.

Using a panel of data for 56 countries, with observations averaged over 4 years during the period between 1966 and 1993, Burnside and Dollar's (2000) find that aid accelerates growth in developing countries with fiscal budget surpluses, low inflation and policies of open trade (a combination of "good" policies); but also that aid has "less or no effect in countries in which institutions and policies are poor" (Burnside and Dollar, 2004). In terms of their regression results, they find that aid itself has a small and statistically insignificant effect, but once interacted with the policy variable aid has a significantly positive coefficient. The result is reported to be robust to different sampling and the endogenous nature of aid. This is illustrated in columns (1) and (2) in the Table 1, where the results of regressions (5.OLS) and (8.2SLS) in Burnside and Dollar (2000) are recreated.

The basic result from Burnside and Dollar (2000) has been quite controversial within the academia (it has received strong criticism from a number of researchers) but has been strongly influential in environments where donors design their aid policies. The World Bank, for example, based some of the central conclusions of its policy research report on aid effectiveness (WB, 1998) on the policy recommendations following from Burnside and Dollar's work.

One of the important critics to Burnside and Dollar (2000) was made by Dalgaard and Hansen (2001). The critic attacks essentially the selectivity rule that follows from Burnside and Dollar's work, namely the implication that donors should direct the aid resources to countries with "good" economic policy.

Dalgaard and Hansen (2001) use a Ramsey-Cass-Koopmans type of model extended in two dimensions. First, they introduce aid transfers and consider them as pure income transfers to the budget of the representative consumer. Second, they introduce a source of risk for firms, assuming that with probability $(1-p)$ output is destroyed as a consequence of social unrest, riots, etc. This source of risk is parameterized under the assumptions that p varies positively with both the level of consumption and the relative size of the government expenditure (equal to the size of tax revenues under the assumption of a balanced fiscal budget).

The theoretical model provides a number of interesting results, among them that (1) aid has an *unconditional* positive effect on the long-run; (2) after a certain level, more aid operates with diminishing returns (its positive effect on capital accumulation becomes smaller); and (3) the connection between aid and good policies is a priori ambiguous. The third result arises by bearing in mind that good policies do have an influence if they affect the way in which aid maps into growth, i.e., policies matter if they change the *marginal effect* of consumption on the return probability p, $\partial p/\partial c$. In this setting, if aid and good policies are "substitutes" (in the sense that better policies reduce $\partial p/\partial c$), better policies are good for growth but at the same time can be bad for aid (i.e. they reduce aid effectiveness). Conversely, if aid and policies are "complements", better policies are good

for both growth and aid when the initial level of expenditures is low, or good for growth but bad for aid when the initial level of expenditures is high.

The empirical work in Dalgaard and Hansen (2001) fully supports their theoretical model. Using the Burnside and Dollar (2000) data set, they show that (1) aid has a positive unconditional impact on income per capita; (2) aid operates with decreasing returns; and (3) the coefficient on the aid-policy interaction term is small and positive but statistically highly insignificant. These results are shown in columns (3) and (4) in Table 1, where the results from equations (7) and (8) in Dalgaard and Hansen's (2001) Table 4 are recreated.

Burnside and Dollar (2000) and Dalgaard and Hansen (2001) are taken here as representing two opposed and competing views on foreign aid effectiveness. However, it is also worthy to include the work by Dalgaard, Hansen and Tarp (2004), since they take explicitly into account the role that deep structural characteristics of the economy play (climate-related circumstances).

Dalgaard, Hansen and Tarp (2004) use an overlapping-generations model extended with an aid influx and show that "[1] policies matter by themselves, and sufficiently bad policies can make aid ineffective for growth, [2] the marginal impact of aid on productivity seems to diminish as the size of the inflow increases, [3] the interaction between aid and policies turns out to be insignificant, [and 4] fundamental (non political) structural characteristics matter for the return to foreign aid". The empirical results from Dalgaard, Hansen and Tarp (2004) are shown in column (5) in Table 1, where the results in their regression (6), Table 1, are recreated.

The different results following from the 3 competing theories of aid effectiveness just presented here can be displayed in a transparent way by using Dalgaard, Hansen and Tarp's (2004) eq. 5. This is a reduced form equation for productivity in the long run, modeled as a function $\Theta(\cdot)$ of foreign aid x, policies π, and other relevant variables δ (which comprises among others the fundamental structural characteristics in the economy):

$$y^* = \Theta(x, \pi, \delta). \tag{4}$$

According to the 3 papers reviewed here, $\partial y^*/\partial a > 0$. The debate has basically been concentrated on the relative importance of second order effects, i.e., the size and significance of $\partial^2 y^*/\partial x \partial \pi$ and $\partial^2 y^*/\partial x^2$. Burnside and Dollar (2000, 2004) claim that $\partial^2 y^*/\partial x \partial \pi > 0$. Dalgaard and Hansen (2001) and Dalgaard, Hansen and Tarp (2004) on the other hand claim that $\partial^2 y^*/\partial x \partial \pi \approx 0$ but $\partial^2 y^*/\partial x^2 < 0$.

These are the conceptual problems that I will concentrate on throughout the rest of the paper.

3 Methodological issues in aid-growth regressions

One of the central methodological issues in aid-growth regressions is the endogenous character of aid: it's true that aid can be seen as a key input for the growth process, but it's necessary to recognize that aid is determined to a large extent by the growth process itself. All the recent empirical literature of foreign aid effectiveness has recognized this problem, and almost all have responded to it recurring to instrumental variables (IV) estimation. An advantage of IV is that it provides a general solution to the problem (of course it's not the only available solution), and that various tests for the validity of the instruments and the quality of fit can be performed within this framework. For the sake of comparability with the results in the reviewed literature, the paper relies on instrumental variables estimation.

The tables reported in the paper display standard errors that are robust to autocorrelation and heteroskedasticity, but also to arbitrary intra-group correlation (clustering). The tables also present some measures to assess the quality of the instrumentation procedures.

First, a test for relevance of the instruments is presented using the Anderson canonical correlations LR test of whether the equation is identified. The test is basically a check of relevance of the excluded instruments (the exogenous variables not included in the second stage regression). The test statistic is built under the null hypothesis that the rank of the coefficients matrix in the reduced form equation is $K-1$, where K is the total number of –included and excluded– regressors. The statistic is a measure of the instruments relevance (i.e. the correlation with the part of the endogenous regressors that cannot be explained by other instruments), so a rejection of the null indicates that the model is identified and that the instruments are relevant. (It is important to bear in mind all the caution notes provided in Hall, Rudebusch and Wilcox, 1996, concerning the application of this test.)

Second, a test for the validity of the instruments is also applied (a test for no correlation of the instruments with the error term), by means of a Sargan test of overidentifying restrictions. The null hypothesis is that the excluded instruments are not correlated with the error term (i.e. that they are "correctly" excluded from the equation). Under this null the statistic is distributed as chi-squared with degrees of freedom equal to the number of overidentifying restrictions. Rejection of the null hypothesis points to the presence of not valid instruments.

Finally, partial R^2 measures for the first stage regressions are reported, taking into account the presence of more than one endogenous regressors in many of the equations. This is done by applying the procedure described in Shea (1997). The partial R^2 measures complement the information about relevance of the instrumentation procedures.

4 Foreign aid and productivity

Tables 2 and 3 present the results from the estimation of the effects of aid on productivity. The data set employed is the same as in Burnside and Dollar (2000), augmented by the variable on the proportion of tropical land in the country used in Dalgaard, Hansen and Tarp (2004). The new feature in this paper is the use of growth in productivity as the dependent variable, instead of growth in GDP per capita. It was possible to use two different measures for the countries' productivity: the first based on the GDP per person in the labor force (a common proxy for productivity), and the second on the GDP per employed person (following the criteria adopted by the World Competitiveness Center). Both variables were constructed using the data from the World Development Indicators 2004 (World Bank, 2004).

Table 2 presents the results of the equations where the dependent variable is the average growth in *GDP per person in the labor force*.[1] Columns (6) and (7) correspond to the specification of Burnside and Dollar (2000, eq. 5.OLS and 8.2SLS). Column (8) corresponds to the specification in Dalgaard and Hansen (2001, eq. 8), and column (9) corresponds to the specification in Dalgaard, Hansen and Tarp (2004, eq. 6).

Results for the coefficients of interest in Table 2 are very similar in the orders of magnitude to the ones presented in Table 1, where the results of the original models are recreated. Columns (6) and (7), which in some sense put Burnside and Dollar's (2000) model to test, support essentially the same type of conclusions as in their paper: aid doesn't seem to foster productivity by itself, but only when combined with the index of "good" policies. This result holds under the same type of circumstances as in the original paper, namely, the results appear to be robust to a change in the estimation method, and to a strong change in the sample (equations [1] and [6] use the full original Burnside and Dollar sample of 56 low and middle income countries, while equations [2] and [7] use a sample of 40 low income countries). The statistics reported to assess the quality of the instrumentation reveal that the aid and the aid*policy variables loose some of their power as valid and relevant instruments (lower partial R^2 coefficients, lower statistics for the Sargan and Anderson tests), but fundamentally they remain as strong instruments as they are in the original model.

In columns (8) and (9), that confront the original results in Dalgaard and Hansen (2001) and Dalgaard, Hansen and Tarp (2004), the new results show again that the results in the original models stand up well to a change in the dependent variable. The most important change appears to be concentrated on the hypothesis of diminishing returns. The coefficient on aid squared looses some statistical significance in the Dalgaard and Hansen (2001) specification, and turns to be statistically insignificant under the Dal-

[1] GDP per person in the labor force is constructed as the ratio between real GDP measured in constant 1995 USD and the total size of the labor force. The data source is the World Development Indicators 2004 data set from the World Bank.

gaard, Hansen and Tarp (2004) setup. The coefficient on the aid term however remains significant and positive, suggesting that aid by itself has positive effects in terms of fostering productivity. The new results don't show any substantial change in the role that structural or climate-related factors in the economy play, i.e., the coefficients on the term on the fraction of tropical land in the country and the term interacted with aid remain highly significant. This suggests that "deep" structural characteristics in the country are a central determinant for the pace at which average productivity in the country grows.

The results in Table 2 seem to indicate that the three competing theories for aid effectiveness are essentially robust, in the sense that they hold despite the measure of aid's "effectiveness" is shifted from average income (GDP per capita) to average productivity. This is, however, not a very surprising result. Levels of GDP per person in the labor force and levels of GDP per capita tend to vary in a similar way, basically because they are both determined by demographic variables that tend to move rather slowly. The correlation between the two variables in the data set used is 0.93; and the means of average growth in GDP per capita and growth in GDP per person are around 1.16% and 1.13% per year.

The basic demographic determinants behind the two variables are the ones determining the changes in the labor force participation across countries (among the most direct ones: fertility decisions and mortality rates). So, in some sense, the evidence presented indicating that aid is as effective in fostering growth as it is in fostering productivity, can also be used to support the idea that aid has been ineffective to change the course of central demographic variables, in particular the ones determining the rates of *participation in the labor force*.

Coming back to the initial question of whether aid has an effect on the growth rate of productivity, it is possible to repeat the estimations made in Table 2, but using this time as the endogenous variable the growth rate of *GDP per person employed*.[2] Table 3 presents the new results.

Columns (10) and (11) tell basically that the results in Burnside and Dollar (2000) fade away when the dependent variable is replaced by the growth in GDP per person employed: none of the coefficients of interest appear to be significant now, and the statistics to assess quality of the instruments show that the set of instruments chosen is significantly valid now only at the 6% level (before it was significantly valid at the 1% level). Results from column (12) represent something similar for the story in Dalgaard and Hansen (2001).

Nevertheless, results from column (13) show support for the basic results in Dalgaard, Hansen and Tarp (2004). The only change compared to the original model is that the coefficient on aid squared turns out to be insignificant (the same as in regression [9] in

[2] GDP per person employed is the ratio between real GDP (measured in constant 1995 USD) and total employment. Total employment is defined as the part of the total population that is not unemployed. The definition of unemploymnt used in the WDI refers to the "share of the labor force that is without work but available for and seeking employment". The WDI also notes that definitions of labor force and unemployment differ by country. See WB, 2004, for details on the series of total unemployment.

Table 2).

Results from Table 3 must be handled with care. The new dependent variable (GDP per person employed) is not observed in many countries, which results in a large attrition of the sample (basically 80% of the sample becomes unavailable). However, the data is still available for half the number of countries, so results from Table 3 can still be considered as containing some information.

That said, results in column (13) can be taken as pointing to validate the conclusions from models where aid has a positive and significant impact in the economy in terms of fostering, unconditionally, the growth in average income as well as in average productivity. An interesting result is also that the hypothesis of diminishing receives no support from the data when the focus of aid effectiveness is put on average productivity rather than average income. Finally, one of the central features turns to be the robustness of the variable proxying for structural characteristics in the economy. The coefficients for the fraction of tropical lands and the fraction of tropical lands interacted with aid increase in magnitude when the measure of aid effectivness is a more accurate measure of average productivity. These, combined with an increased coefficient on the aid term, basically support and emphasize the idea that good structural characteristics and institutional quality are some of the channels that foreign aid uses to produce results.

5 Conclusion

By focusing on a different variable to judge the macro effects of foreign aid, it has been possible to test the reobustness of three competing theories in the aid effectiveness literature, namely the theory that aid works conditionally on good policies (Burnside and Dollar, 2000), the theory that aid works unconditionally but with diminhing returns (Dalgaard and Hansen, 2001), and the theory that aid works, but the magnitude of the effect depends on climate-related factors (Dalgaard, Hansen and Tarp, 2004).

The results in Tables 2 and 3 in this paper give support to the argument in Dalgaard, Hansen and Tarp (2004) results. The results indicate that, based on cross-country data, aid appears to have a positive impact in terms of fostering growth of average *income* as well as growth of average *productivity*. The effetc is shown to be independent of the role that policies and institutions play, but dependent on the structural characteristics of the economy (climate-related circumstanes). These results must be taken with care, given the nature of the data used, but also because they don't necessarily extrapolate to the future. The results esentially tell hat aid has worked for the average country, and it has worked better in countries with better institutional quality and structural characteristics.

An implication from the results is that the aid policy of *conditionality* on "good" policies (policies promoting fiscal budget surpluses, low inflation and openess to trade) doesn't receive support from this paper.

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Table 1

Aid-growth regressions on GDP per capita growth

	(1)	(2)	(3)	(4)	(5)
Estimation method	OLS	2SLS	2SLS	2SLS	2SLS
Initial per capita GDP (log)	-0.60	-0.83	-0.01	0.01	-0.07
	(0.50)	(0.77)	(0.56)	(0.54)	(0.43)
Ethnic fract.	-0.42	-0.67	0.55	0.57	1.01
	(0.88)	(0.84)	(0.96)	(0.93)	(0.80)
Asssasinations	-0.45 **	-0.76 *	-0.46 *	-0.45 *	-0.37 *
	(0.21)	(0.44)	(0.24)	(0.24)	(0.20)
Asssasinations * Ethnic fr.	0.79 **	0.63	0.89 *	0.88 *	0.72 *
	(0.40)	(0.90)	(0.46)	(0.46)	(0.40)
Institutional quality	0.69 **	0.84 **	0.85 **	0.86 **	0.79 **
	(0.17)	(0.19)	(0.26)	(0.26)	(0.22)
M2 / GDP, lagged	0.01	0.02	0.01	0.01	-0.02
	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Sub-Saharan Africa	-1.87 **	-2.11 **	-2.95 **	-2.98 **	-2.65 **
	(0.74)	(0.73)	(1.17)	(1.14)	(1.04)
East Asia	1.31 **	1.46 **	1.31 *	1.32	1.94 **
	(0.66)	(0.71)	(0.77)	(0.80)	(0.68)
Burnside-Dollar policy index	0.71 **	0.59	0.93 **	0.97 **	0.84 **
	(0.20)	(0.38)	(0.30)	(0.19)	(0.17)
Policy index squared			0.01		
			(0.06)		
Aid (EDA / GDP, %)	-0.02	-0.24	1.31 **	1.34 **	2.46 **
	(0.18)	(0.26)	(0.64)	(0.63)	(0.58)
Aid squared			-0.13 **	-0.13 **	-0.10 *
			(0.05)	(0.05)	(0.06)
Aid * policy index	0.19 **	0.25 **	0.01		
	(0.08)	(0.12)	(0.07)		
Fraction of land in tropics					-1.47 **
					(0.69)
Aid * Fraction of land in tropics					-1.34 **
					(0.62)
Shea partial R2:					
Aid (EDA / GDP, %)		0.39	0.53	0.53	0.71
Aid squared			0.49	0.46	0.62
Aid * policy index		0.58	0.69		
Aid * Fraction of land in tropics					0.73
Identification/IV relevance test:					
Anderson canon. corr. LR statistic		88.92	136.41	131.70	123.06
p-value		0.00	0.00	0.00	0.00
Overidentification test of all instruments:					
Sargan-Hansen J statistic		10.48	1.92	1.88	1.11
p-value		0.23	0.75	0.87	0.95
Countries	56	40	54	54	54
Observations	270	184	223	223	223
R2	0.39	0.47	0.36	0.36	0.42

Note: The dependent variable is average growth in real GDP per capita. Robust standard errors in parenthesis. All regressions include time dummies. Instruments in regressions (2) - (5) listed as in Table 5 in Dalgaard and Hansen (2001).

Table 2

Aid growth regressions on growth in GDP per person in the labor force

	(6)	(7)	(8)	(9)
Estimation method	OLS	2SLS	2SLS	2SLS
Initial per capita GDP (log)	-0.30	-0.79 **	-0.08	-0.12
	(0.32)	(0.33)	(0.37)	(0.33)
Ethnic fract.	-0.19	-1.05	0.70	1.18
	(0.93)	(0.94)	(1.06)	(0.96)
Asssasinations	-0.52 **	-0.89 **	-0.51 **	-0.41 **
	(0.23)	(0.42)	(0.25)	(0.20)
Asssasinations * Ethnic fr.	1.02 **	0.82	1.06 **	0.85 **
	(0.42)	(0.87)	(0.46)	(0.38)
Institutional quality	0.56 **	0.72 **	0.77 **	0.68 **
	(0.14)	(0.19)	(0.21)	(0.19)
M2 / GDP, lagged	0.02	0.04 **	0.02	-0.01
	(0.02)	(0.02)	(0.02)	(0.01)
Sub-Saharan Africa	-1.01	-1.32 *	-2.17 **	-1.81 **
	(0.77)	(0.77)	(0.98)	(0.86)
East Asia	0.77	1.21 *	0.64	1.24 **
	(0.57)	(0.67)	(0.67)	(0.58)
Burnside-Dollar policy index	0.83 **	0.53	1.06 **	0.94 **
	(0.22)	(0.37)	(0.19)	(0.18)
Aid (EDA / GDP, %)	0.03	-0.37	1.10 *	2.11 **
	(0.16)	(0.30)	(0.60)	(0.44)
Aid squared			-0.10 *	-0.07
			(0.05)	(0.06)
Aid * policy index	0.17 **	0.35 **		
	(0.07)	(0.13)		
Fraction of land in tropics				-1.64 **
				(0.68)
Aid * Fraction of land in tropics				-1.26 **
				(0.51)
Shea partial R2:				
Aid (EDA / GDP, %)		0.32	0.53	0.73
Aid squared			0.45	0.63
Aid * policy index		0.48		
Aid * Fraction of land in tropics				0.75
Identification/IV relevance test:				
Anderson canon. corr. LR statistic		70.36	130.81	121.32
p-value		0.00	0.00	0.00
Overidentification test of all instruments:				
Sargan-Hansen J statistic		8.06	3.04	6.98
p-value		0.43	0.69	0.22
Countries	54	38	53	53
Observations	271	185	224	224
R2	0.37	0.48	0.36	0.43

Note: The dependent variable is average growth in real GDP per person in the labor force. Robust standard errors in parenthesis. All regressions include time dummies. Instruments in regressions (7) - (9) listed as in Table 5 in Dalgaard and Hansen (2001).

Table 3

Aid-growth regressions on growth in GDP per person employed

Estimation method	(10) OLS	(11) 2SLS	(12) 2SLS	(13) 2SLS
Initial per capita GDP (log)	-1.69 **	-6.33 **	-1.04	0.29
	(0.79)	(2.00)	(0.87)	(0.84)
Ethnic fract.	-3.43	-16.03 **	-1.09	4.28
	(2.58)	(5.56)	(2.11)	(2.75)
Asssasinations	-0.34	-1.98	-0.33	0.00
	(0.34)	(1.72)	(0.34)	(0.35)
Asssasinations * Ethnic fr.	1.20	4.07	1.45	1.82 **
	(0.88)	(2.80)	(0.94)	(0.71)
Institutional quality	0.52	1.38	1.04	2.59 **
	(0.76)	(0.80)	(0.77)	(0.95)
M2 / GDP, lagged	0.05	0.06	0.02	-0.11
	(0.03)	(0.05)	(0.03)	(0.07)
East Asia	1.96	3.33	1.52	2.83 **
	(1.82)	(2.11)	(1.72)	(1.23)
Burnside-Dollar policy index	0.02	0.25	0.33	0.23
	(0.42)	(1.25)	(0.33)	(0.34)
Aid (EDA / GDP, %)	-1.40	-3.27	-0.11	6.46 **
	(1.25)	(1.91)	(1.01)	(3.13)
Aid squared			0.02	-0.11
			(0.11)	(0.11)
Aid * policy index	0.29	1.29		
	(0.44)	(0.84)		
Fraction of land in tropics				-2.82 **
				(1.15)
Aid * Fraction of land in tropics				-4.11 *
				(2.15)
Shea partial R2:				
Aid (EDA / GDP, %)		0.74	0.72	0.82
Aid squared			0.78	0.90
Aid * policy index		0.62		
Aid * Fraction of land in tropics				0.90
Identification/IV relevance test:				
Anderson canon. corr. LR statistic		24.26	71.57	30.36
p-value		0.00	0.00	0.00
Overidentification test of all instruments:				
Sargan-Hansen J statistic		13.63	9.93	9.54
p-value		0.06	0.04	0.05
Countries	25	12	26	26
Observations	54	25	56	56
R2	0.40	0.81	0.38	0.33

Note: The dependent variable is average growth in real GDP per person employed. Robust standard errors in parenthesis. All regressions include time dummies. Instruments in regressions (11) - (13) listed as in Table 5 in Dalgaard and Hansen (2001).