

THE MILLENNIUM DEVELOPMENT GOALS: DOES AID HELP?

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ABSTRACT

Although poverty-eradication has always been a priority in many governments' agenda, one in four people in the developing world still live in poverty. This study examines how foreign aid, human capital and economic policies, among others, affect real GDP growth and other dimensions of poverty, measured in terms of the Millennium Development Goals (MDGs). Our empirical results suggest that while aid appears to be a significant, albeit negative indicator of real GDP per capita growth, it is a positive determinant of other MDG outcomes. Human capital and good economic policies do not appear to have unique and significant effects on the MDG outcomes, but allowing for interactions with aid, these become more robust indicators of the effectiveness of aid in achieving the MDG.

JEL Classifications: I30, O10, P33

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INTRODUCTION

During the 2000 United Nations Millennium summit, 189 world leaders committed themselves and their nations to ending extreme poverty and hunger by 2015. Despite the fact that poverty-eradication has always been a priority in many governments' agenda and with industrialised country leaders pledging 0.7% of their GDP to official development assistance (or foreign aid), one in four people in the developing world still live in poverty (Chen and Ravallion, 2008). Given this, there have been numerous studies on the effectiveness of aid in recipient countries.¹ Among the most influential is Burnside and Dollar (2000) who conclude that aid given to countries with good economic policies does promote economic growth, but aid given to countries with poor policies has no impact. As controversial as it is influential, Burnside and Dollar's paper has elicited further studies that cast doubt on the robustness of their results, e.g., Hansen and Tarp (2001), Lensink and White (2001) and Easterly et al. (2004).

More recently, Asra et al. (2005) and Fielding et al. (2006) put forward the idea that the effectiveness of aid need not be measured in terms of economic growth alone (i.e., in terms of growth in real GDP per capita). Asra et al. (2005) use poverty reduction as a criterion for assessing the effectiveness of aid and find that aid is effective (in poverty reduction) at moderate volumes, but that it becomes ineffective when the size of aid exceeds a critical value set by the absorptive capacity of the country concerned. Fielding et al. (2006) examine how aid impacts on different human development indicators including measures of health, education and fertility, and acknowledge various

possible interactions among these variables. They observe that, in general, aid has a substantial positive impact on many development outcomes.

This study attempts to contribute to this literature in two ways. First, we examine how aid, human capital and economic policies, along with other explanatory variables affect different dimensions of poverty based on the MDG² agreed upon by world leaders in 2000. This is because, as part of nations' commitment to work in partnership to reduce extreme poverty in the world, it is necessary that aid effectively addresses the many dimensions of poverty. Hence, indicators for the goal of eradicating extreme poverty and hunger identified by the MDG project are used as measures of aid effectiveness, as well as the conventionally used measure, the growth of real GDP per capita. Second, we examine the effectiveness of aid conditional not only on good economic policies (as in previous literature), but also on initial human capital in the aid-receiving countries. In many countries, while real GDP per capita has improved over the years, this improvement is not always reflected in terms of poverty reduction, improvements in income equality or improvements in health and nutrition.

On the second objective relating to the role of human capital, Ferreira (1996) in a study of poverty and inequality in Tanzania finds that adjustment reforms in that country had a substantial impact on growth and the poor, but that the people with better education benefited more and were better able to respond to new opportunities.

This suggests that without adequate human capital to begin with, the benefits from any reform, or even aid, may not be fully realised. Most theories of economic growth and development do recognise the importance of human capital, either as a separate factor of production, as in Mankiw et al.'s (1992) human-capital-augmented neoclassical model of economic growth and development; or as a factor that affects growth by facilitating improvements in total factor productivity via "imported technology" as in the technological progress view (see for instance, Nelson and Phelps, 1966; Benavot, 1989 and Islam, 1995). However, although there are different ways of incorporating human capital in economic growth models, there is no definite consensus regarding which of these is the most appropriate. As Islam (1995) writes, "empirical work has so far clearly established that human capital plays a very important role in the growth process. However, the question that remains still unresolved is, *In What Exact Way?*" (p.1154).

Based on the premise that human capital plays an important role in growth and development, we include a measure of initial human capital in the aid-receiving countries in our empirical analysis. We also include interaction terms between aid and the initial human capital measure, and aid and an economic freedom index (a proxy for good economic policies) to examine whether the effect of aid on the dependent variable is significantly affected by human capital and good economic policies.

The next section presents the empirical framework and data used in this study. The third section presents regression results and a discussion of the main findings. The last section concludes and provides suggestions for further research.

EMPIRICAL FRAMEWORK AND DATA

Our analysis of aid effectiveness begins by examining the correlations among the different MDG outcomes. Specifically, we examine whether the average growth of real

GDP per capita from 1990 to 2003 and the different indicators for the eradication of extreme poverty and hunger are correlated with each other. These indicators include: the proportion of the population living below \$1 (1993 PPP) per day; the poverty gap ratio; the share of the poorest quintile in national consumption or income;³ the prevalence of underweight children under five years of age; and the proportion of the population below the minimum level of dietary energy consumption. These indicators are measured as the average of the percentage for each variable over the general reference period 1990 to 2004. Exploring the correlations among these measures, we find a general lack of correlation among real GDP growth and the other aid effectiveness measures (on the average, less than 0.40). This suggests that these variables are capturing different aspects of poverty. It would therefore be useful to examine how a given set of explanatory variables, in particular, aid, affects not only changes in real GDP growth, but other dimensions of poverty as well.

In the next analysis, we identify and estimate regressions explaining the different MDG indicators, as identified previously, as our alternative dependent variables. For the explanatory variables, we include the initial real GDP per capita in 1975, the total years of schooling of the population aged 15 years and over in the 1970s from Barro and Lee (2001), and Gwartney et al.'s (2006) summary index for economic freedom⁴ averaged over the 1970s, to approximate the initial conditions in the recipient countries and also to control for factors that are likely to affect the allocation of aid in our regression equations. Moreover, the use of data in the 1970s, at least two decades earlier, can help address possible endogeneity problems in our regression specifications. Aid, measured in terms of total aid as a percentage of gross national income (GNI) (averaged over the 1970s), is included as an explanatory variable in linear and quadratic forms to allow for a potential quadratic relationship between aid and the different measures of aid effectiveness. We also used the lagged aid variable to help reduce possible endogeneity problems. As mentioned previously, interaction terms between aid and human capital measures, and aid and the economic freedom index are also included as independent variables to examine whether the effect of aid on the dependent variable is significantly modified by human capital and economic freedom respectively.

There is little guidance available from theory concerning the appropriate model to use for the empirical examination of poverty (Asra et al., 2005), and much less for examining the different dimensions of poverty based on the MDGs. However, some notable empirical work on growth and poverty (for example, Burnside and Dollar, 2000 and 2004; Dollar and Kraay, 2002; Hasan et al., 2003 and Asra et al., 2005) call particular attention to the role of initial conditions, policies, and institutions in determining intercountry poverty profiles. Following the basic framework of Asra et al. (2005), we also include as explanatory variables, government expenditures as a share of real GDP, the sum of imports and exports as a share of real GDP to capture openness to trade, and the inflation rate, to represent the state of macroeconomic policies over the reference period. Finally, we also include dummy variables for Africa and Asia, the regions to which most of the world aid are directed, in order to examine whether or not aid effectiveness varies by region. We include government spending to capture the way in which governments can try to affect the rate of growth of their respective economies through various policies. These policies may be directed at improving resource allocation and overall factor productivity, encouraging the flow of investment (domestic

and foreign) into the country (e.g., through careful management of interest rates and foreign exchange rates), promoting technical progress through public and private investments in research and development and promoting the development of human capital.

In terms of openness and growth, the most common argument in support of the hypothesis that openness affects economic growth rests on the notion that openness/trade leads to improvements in total factor productivity, as a result of either static or dynamic gains from trade.⁵ In addition to the static and dynamic gains, a country can also benefit from “competitive” gains from trade. In order for an economy to maintain its position in the international market, its export industries are pressured to keep production costs low, operate in a more efficient manner, and maintain high quality export products, and/or continuously improve products (Emery, 1967). This competitive pressure from the international market also stimulates the flow of market innovations, managerial skills, etc., to the exporting country, which are likely to induce economic growth.

The relationship between inflation and growth remains open to question in spite of numerous theoretical and empirical investigations.⁶ On one side of the debate are the structuralists, who believe that inflation is crucial to growth. In particular, a low and steady rate of inflation can help lessen the negative impacts of economic recessions and can also provide some form of debt relief as the value of real debt is reduced. On the other side of the debate are the monetarists, who believe that inflation is harmful to growth. For instance, inflation reduces the real value of money and may lead to shortages of goods. As well, uncertainties in future inflation may discourage savings and investment, thereby leading to negative economic growth. Although the theories in support of the inclusion of the above-mentioned explanatory variables in our model pertain to their effects on economic growth, rather than the different dimensions of poverty, these same theories are nonetheless suitable foundations for exploring how these factors may help provide a better understanding of poverty, one of the primary challenges for economic growth.

Using cross-country data from 32 to 61 aid recipient countries, we estimate a general unrestricted model (GUM) based on the general functional form:

$$(AE_{i,1}, AE_{i,2}, AE_{i,3}, AE_{i,4}, AE_{i,5}, \text{ or } AE_{i,6}) = \beta_1 + \beta_2(\ln Yorig_i) + \beta_3(\ln Human_i) + \beta_4(\ln Econfree_i) + \beta_5(\ln Aid_i) + \beta_6(\ln AidSQ_i) + \beta_7(\ln Aid_i \ln Human_i) + \beta_8(\ln Aid_i \ln Econfree_i) + \beta_9(\ln Govexp_i) + \beta_{10}(\ln Open_i) + \beta_{11}(\ln Inflat_i) + \beta_{12}DumAfrica + \beta_{13}DumAsia + \varepsilon_i \quad (1)$$

where, i indexes countries. The variables are defined as follows:

$AE_{i,1}$	average growth rate of real GDP per capita from 1990 to 2003
$AE_{i,2}$	the natural log of the average proportion of the population living below \$1 (PPP) per day over the period 1990 to 2004
$AE_{i,3}$	the natural log of the average poverty gap ratio over the period 1990 to 2004
$AE_{i,4}$	the natural log of the average share of the poorest quintile in national consumption or income over the period 1990 to 2004

$AE_{i,5}$	the natural log of the average prevalence of underweight children under five years of age as a proportion of the population over the period 1990 to 2004
$AE_{i,6}$	the natural log of the average proportion of the population that is undernourished, over the period 1990 to 2004
$\ln Y_{orig_i}$	the natural log of initial real GDP per capita (1975)
$\ln Human_i$	the natural log of the average years of schooling in the total population, aged 15 and above over the 1970s
$\ln Econfree_i$	the natural log of the average summary index that covers aspects of how policies and institutions operate in support of economic freedom over the 1970s; the higher the index is, the more economic freedom the country enjoys
$\ln Aid_i$	the natural log of total official development assistance (ODA) and official aid as a percentage of GNI averaged over the 1970s
$\ln AidSQ_i$	square of $\ln Aid_i$
$\ln Aid_i \ln Human_i$	interaction terms between the natural log of aid and natural log of human capital
$\ln Aid_i \ln Econfree_i$	interaction terms between the natural log of aid and the natural log of the economic freedom index
$\ln Govexp_i$	the natural log of the average real total government consumption as a percentage of real GDP over the period 1970 to 2004
$\ln Open_i$	the natural log of the sum of real exports and imports as a percentage of real GDP over the period 1970 to 2004
$\ln flat_i$	the change in consumer price indices (2000 = 100), averaged over the period 1970 to 2004
$DumAfrica$	dummy variable equal to 1, if the recipient country is in Sub-Saharan Africa, and 0, otherwise
$DumAsia$	dummy variable equal to 1, if the recipient country is in East Asia, and 0, otherwise

Table 1 presents summary statistics for the main variables used in the analysis. From Table 1 we see that those countries in the highest quartile of the distribution for total aid received in the 1970s ($\ln Aid$), i.e., those that have received the most aid, are, as expected, those that score poorly in terms of the initial level of real GDP per capita and years of schooling. Moreover, these countries that received the most aid in 1970s have, after nearly two decades, scored better in terms of the MDG indicators. There appears no obvious discernible pattern across quartiles in terms of the economic freedom index and other macroeconomic policy variables.

EMPIRICAL RESULTS AND DISCUSSION

Using the “general-to-specific” (Gets) algorithm implemented in PcGets (Hendry and Krolzig, 2001),⁷ we estimated general unrestricted models (GUMs) for each of the dependent variable (see equation 1). Tables 2 and 3 present the results for each of the estimated GUMs and the corresponding specific models selected by the Gets testimation process.

TABLE 1. SAMPLE DESCRIPTIVE STATISTICS

	<i>Sample Mean</i>	<i>By Quartile of lnAid</i>			
		(1)	(2)	(3)	(4)
AE_1	1.55 (1.90)	2.19	1.92	1.07	0.92
AE_2	-2.22 (1.16)	-2.89	-2.55	-1.69	-1.67
AE_3	-3.44 (1.35)	-4.19	-3.73	-2.87	-2.86
AE_4	-3.07 (0.44)	-3.11	-3.20	-3.02	-2.92
AE_5	-2.05 (0.86)	-2.64	-2.07	-1.72	-1.70
AE_6	-1.99 (0.89)	-2.68	-1.91	-1.57	-1.72
$\ln Y_{orig}$	7.81 (0.76)	8.39	8.16	7.39	7.21
$\ln Human$	0.94 (0.73)	1.34	1.23	0.91	0.20
$\ln Econfree$	1.54 (0.18)	1.55	1.58	1.50	1.54
$\ln Govexp$	2.96 (0.32)	2.93	2.94	3.03	2.92
$\ln Open$	3.94 (0.57)	3.64	3.95	4.14	4.05
$\ln Inflat$	48.75 (108.21)	87.65	43.23	54.36	6.72

NOTES: Sample descriptive statistics are based on a balanced panel of data for the main variables of interest (excluding the interaction terms and dummy variables). Standard deviations are in parentheses. Quartiles of $\ln Aid$ (1) less than or equal to -4.95 ; (2) greater than -4.95 and less than or equal to -4.04 ; (3) greater than -4.04 and less than or equal to -3.08 ; (4) greater than -3.08 .

TABLE 2. ESTIMATES OF THE GENERAL UNRESTRICTED MODELS (GUMS) FOR REAL GDP GROWTH AND MDG OUTCOMES

	GUMS					
	AE_1	AE_2	AE_3	AE_4	AE_5	AE_6
<i>Constant</i>	3.0 (6.2)	12.1** (4.1)	10.8* (5.0)	-0.7 (2.1)	4.1* (2.1)	6.3† (3.4)
<i>lnYorig</i>	-1.0** (0.4)	-1.5** (0.3)	-1.5** (0.4)	-0.0 (0.1)	-0.7** (0.1)	-0.9** (0.2)
<i>lnHuman</i>	-1.2 (0.9)	0.2 (0.7)	0.3 (0.8)	-0.1 (0.2)	-0.3 (0.3)	0.2 (0.5)
<i>lnEconfree</i>	2.9 (3.1)	-2.2 (2.1)	-2.3 (2.5)	-1.8† (1.1)	-1.6 (1.0)	-1.7 (1.7)
<i>lnAid</i>	-2.0† (1.2)	0.4 (0.9)	0.3 (1.0)	0.3 (0.5)	-0.1 (0.4)	0.3 (0.7)
<i>lnAidSq</i>	-0.0 (0.1)	-0.0 (0.0)	-0.0 (0.0)	-0.0 (0.0)	-0.1** (0.0)	-0.0 (0.0)
<i>lnAidlnHuman</i>	-0.5* (0.2)	0.1 (0.2)	0.2 (0.2)	-0.0 (0.1)	0.0 (0.1)	0.1 (0.1)
<i>lnAidlnEconfree</i>	1.3* (0.6)	-0.5 (0.4)	-0.6 (0.5)	-0.3 (0.3)	-0.4† (0.2)	-0.5 (0.4)
<i>lnGovexp</i>	-0.7 (0.7)	0.2 (0.5)	0.5 (0.5)	0.0 (0.2)	0.2 (0.2)	0.1 (0.3)
<i>lnOpen</i>	1.0* (0.4)	-0.2 (0.3)	-0.2 (0.4)	-0.0 (0.1)	-0.1 (0.1)	0.2 (0.2)
<i>Inflat</i>	-0.0* (0.0)	0.0* (0.0)	0.0 (0.0)	-0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
<i>DumAFR</i>	-1.6* (0.7)	-0.4 (0.5)	-0.6 (0.6)	0.4* (0.2)	0.1 (0.2)	-0.4 (0.4)
<i>DumEA</i>	1.0† (0.5)	-1.2** (0.4)	-1.8** (0.5)	0.7** (0.1)	0.5* (0.2)	-0.8** (0.3)
R-squared	0.60	0.60	0.57	0.54	0.73	0.54
Adj R-squared	0.51	0.46	0.42	0.39	0.65	0.41
Chow(n_1)	1.12	0.70	0.71	1.02	0.71	1.55
Chow(n_2)	0.68	1.36	1.60	0.78	0.54	1.63
Normality	0.39	1.48	1.34	2.54	0.99	0.98
Hetero	0.65	0.35	0.37	0.44	0.30	0.52

Notes:

†, * and ** denote statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are in parentheses.

Chow(n) is a parameter constancy test and is F distributed under the null of parameter constancy.

Normality is the Doornik-Hansen test for normality and is asymptotically chi-squared distributed under the null of normality.

Hetero is an F -approximation of White's (1980) test for unconditional heteroskedasticity.

**TABLE 3. ESTIMATES OF THE SPECIFIC MODELS
FOR REAL GDP GROWTH AND MDG OUTCOMES**

	Specific Models					
	AE_1	AE_2	AE_3	AE_4	AE_5	AE_6
<i>Constant</i>	7.4** (2.6)	7.6** (1.4)	5.4** (1.9)		2.5** (1.0)	3.6** (0.9)
<i>lnYorig</i>	-1.4** (0.3)	-1.2** (0.2)	-1.2** (0.3)		-0.6** (0.1)	-0.7** (0.1)
<i>lnHuman</i>						
<i>lnEconfree</i>				-2.2** (0.1)		
<i>lnAid</i>	-1.1** (0.4)		-0.3† (0.2)	0.6** (0.1)	-0.6** (0.2)	
<i>lnAidSq</i>					-0.1** (0.0)	
<i>lnAidlnHuman</i>	-0.2** (0.1)		0.1† (0.1)		0.1* (0.0)	
<i>lnAidlnEconfree</i>	0.6** (0.2)			-0.4** (0.1)	-0.2* (0.1)	
<i>lnGovexp</i>						
<i>lnOpen</i>	1.2** (0.4)					
<i>Inflat</i>	-0.0** (0.0)	0.0** (0.0)	0.0** (0.0)			0.0** (0.0)
<i>DumAFR</i>	-2.0** (0.6)			0.4** (0.1)		
<i>DumEA</i>		-0.8** (0.3)	-1.3** (0.4)	0.7** (0.1)	0.4** (0.2)	-0.6** (0.2)
R-squared	0.56	0.52	0.52	0.52	0.70	0.44
Adj R-squared	0.50	0.49	0.46	0.48	0.66	0.41
Chow(n_1)	0.97	0.74	0.55	0.50	1.18	1.19
Chow(n_2)	0.81	1.62	1.21	0.61	0.52	1.47
Normality	0.04	0.28	1.18	3.58	1.15	2.80
Hetero	0.48	1.59	0.69	0.61	0.56	0.57

Notes:

†, * and ** denote statistical significance at the 10%, 5% and 1% levels respectively. Standard errors are in parentheses.

Chow(n) is a parameter constancy test and is F distributed under the null of parameter constancy.

Normality is the Doornik-Hansen test for normality and is asymptotically chi-squared distributed under the null of normality.

Hetero is an F -approximation of White's (1980) test for unconditional heteroskedasticity.

The results of the GUM regressions indicate that *lnYorig* is a robust indicator for five out of the six MDG indicators; the exception is AE_4 (the average share of the poorest quintile in national income or consumption). The negative sign on the coefficient suggests that countries with low levels of real GDP per capita experience improvements in terms of real GDP per capita growth (AE_1) which could indicate support for the

convergence theory. As well, in terms of the other MDG indicators, the negative sign on the coefficients suggest that countries with low levels of real GDP per capita also end up with better MDG outcomes as measured by AE_2 , AE_3 , AE_5 and AE_6 .⁸ Contrary to initial expectations, overall, human capital ($\ln Human$) and policies and institutions that support economic freedom ($\ln Econfree$) do not appear to be significant determinants of MDG outcomes. The exception is AE_4 , for which $\ln Econfree$ is a marginal significant determinant. The results however suggest that policies and institutions are negatively associated with the average share of the poorest quintile in national consumption or income. In general, neither $\ln Aid$ nor $\ln AidSq$ appear to be significant determinants of the MDG indicators. $\ln Aid$ is a significant determinant only for AE_1 , and results suggest that countries that receive less aid end up growing at a faster rate. Although $\ln Human$ was not a statistically significant influence on AE_1 , on its own, the interaction term between aid and human capital ($\ln Aid \ln Human$) appears to be a statistically significant influence on AE_1 . The inclusion of this interaction action term changes the interpretation of the coefficients of $\ln Aid$ (the unique effect of aid on real GDP growth if human capital is zero) and $\ln Human$. The interaction indicates that the effect of aid on real GDP growth is different for different levels of human capital. The results suggest a negative marginal effect of human capital on growth as aid increases. Although it is often difficult to interpret the effects of interaction terms, in particular when the results are counter-intuitive, one plausible explanation can be that this result may in fact be only marginally significant, given that human capital is insignificant in the first place.

The interaction term between aid and economic policies also appears to be a significant determinant of AE_1 and AE_5 . The results could suggest that countries that receive more aid and at the same time have better economic policies, tend to grow at a faster rate and also experience improvements in the prevalence of underweight children. On the other hand, a significant coefficient on $\ln AidSq$ (the unique effect of the square of aid if economic policy is zero) for AE_5 indicates that improvements in the prevalence of underweight children are achieved only when the proportion of aid in GNI is relatively large. In general, the variables capturing general macroeconomic policies ($\ln Govexp$, $\ln Open$ and $\ln Inflat$) do not significantly influence aid effectiveness; the exception is for $\ln Open$, which appears to be a significant determinant of real GDP growth (AE_1); and $\ln Inflat$, which appears to have a rather very small (less than 0.01%) yet significant effect on AE_1 and AE_2 (the proportion of population living in poverty). The dummy variable for Africa ($DumAfr$) appears to have a significant negative effect on AE_1 and a significant positive effect on AE_4 . These results suggest that countries in Africa are associated with lower real GDP growth rates and the poorest quintile in these countries enjoy a larger (average) share of national consumption or income. In terms of the dummy variable for East Asia ($DumEA$), the results suggest that countries in East Asia are associated with higher real GDP growth rates, have a lower proportion of their population living below \$1 per day and underweight, a lower poverty gap ratio and a larger share of national consumption or income for their poorest. However, the prevalence of underweight children in East Asia appears higher than in other countries.

The results for the specific models selected by the Gets testimation process indicate a relatively consistent select set of explanatory variables across the different MDG indicators. Again, $\ln Yorig$ appears to be a robust indicator for the different MDG indicators and lower initial levels of real GDP per capita are generally associated with

improvements in these measures. Similar to the results of the GUM regressions, *lnHuman* was not selected in any of the specific models, leading us to conclude that based on this analysis, human capital on its own, does not affect the effectiveness of aid on the MDG indicators. Also, there is no strong support for the idea that government policies, measured in terms of *lnEconfree*, *lnGovexp*, *lnOpen* and *lnInflat* influence the MDG outcomes. *lnEconfree* was found to be a significant influence only on *AE₄*; *lnOpen* was a significant influence only on *AE₁*; and although *lnInflat* was a significant influence on *AE₁*, *AE₂* and *AE₆*, we find that on the average, a 1 percentage point decrease in inflation will lead to less than 0.1% improvement in aid effectiveness.

In contrast to the results of the GUM estimation, the specific models show that *lnAid* is an important determinant of the MDG indicators and those countries that receive less aid in the 1970s tend to have better MDG outcomes in the 1990s. Bearing in mind the caveat on interpreting interaction terms mentioned earlier, we find that *lnAidlnHuman* is a significant negative determinant of *AE₁*, *AE₃* and *AE₅*. The results suggest that human capital significantly alters the influence of aid on the country's real GDP growth rate, poverty gap ratio and the prevalence of underweight children. As we have seen earlier, countries that receive more aid tend to be the countries that have lower levels of human capital (fewer years of schooling). The results could be taken to mean that aid given to countries with low levels of human capital will not be very effective in improving the quality of life of the recipients as measured by some of the MDG indicators. In terms of the interaction term between aid and economic policies (*lnAidlnEconfree*) we find that this is a significant determinant of *AE₁*, *AE₄* and *AE₅*. This suggests that when aid is given to countries with good economic policies, they tend to grow at a faster rate and also experience improvements in the prevalence of underweight children. However, the negative coefficient on *lnAidlnEconfree* in the regression with *AE₄* as the dependent variable indicates that despite good economic policies, aid may result in the poorest receiving a smaller share in national consumption or income. This could lend support to the idea that aid may contribute to inequality in countries, an issue that is worth investigating much further. Results related to the dummy variables for Africa and East Asia are the same as in the GUM regressions.

CONCLUSIONS

This paper has essentially been an exercise in finding out whether or not aid is effective not only in terms of improving real GDP per capita growth, but also in terms of achieving the Millennium Development Goals. It is important that we take into consideration how aid affects the MDG as these more clearly portray different dimensions of poverty that real GDP per capita growth cannot adequately capture. Our results suggest that aid is an important indicator of real GDP per capita growth. Its influence however is negative, suggesting that perhaps aid on its own does not necessarily lead to higher economic growth. However, in terms of improving the quality of life in aid-receiving countries, as measured by the MDG indicators, in particular, in terms of the poverty gap ratio, the average share of the poorest quintile in national consumption or income and the prevalence of underweight children, aid appears to be a significant positive determinant.

In general, human capital and good economic policies do not appear to have unique and significant effects on the MDG outcomes. Nonetheless, when human capital

and economic policies are allowed to interact with aid, these become more robust indicators of the effectiveness of aid in helping achieve the MDG. Results show that when aid is interacted with human capital, the MDG outcomes tend to be worse, but when aid is interacted with economic policies, the MDG outcomes (e.g., in terms of the real GDP growth rate and prevalence of underweight children) are improved, but not in terms of the share of the poorest in national income or consumption. These results could indicate that aid without adequate human capital will not be effective, whereas aid interacted with good economic policies appears to be an important positive influence on real GDP per capita growth and the proportion of the population that is undernourished. There is also some possibility, however, that depending on the economic policies in place in a country, aid could lead to more inequality.

ENDNOTES

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¹ See, for instance, Doucouliagos and Paldam (2005a and 2005b) for meta studies of aid effectiveness.

² In particular, Goal 1 of the MDG, is to eradicate extreme poverty and hunger.

³ There are many studies that address the issue of whether inequality measures based on consumption or income should be preferred (e.g., Deaton and Zaidi, 2002 and Atkinson & Bourguignon, 2000). However, as pointed out in the UNU-Wider World Income Inequality Database (2005), regardless of what these different studies conclude, the collection (and therefore availability) of inequality measures is specific to different countries' data collection practices, with most industrialised and Latin American countries using income-based measures of inequality and poverty (Deaton and Zaidi, 2002), and Asian and African countries using consumption-based measures. For the purposes of this study, we simply make use of whatever measure is available in the different countries.

⁴ Thirty-eight components and sub-components are used to construct the summary index of economic freedom that measures the degree of economic freedom in five areas: (1) size of government; (2) legal structure and protection of property rights; (3) access to sound money; (4) international exchange; and (5) regulation (Gwartney et al., 2006). Gwartney et al.'s (2006) summary index for economic freedom is used rather than another index for government policy as this index encompasses more than just the different aspects of government policy; it measures the degree to which policies and institutions of countries are supportive of economic freedom, the bases of which are personal choice, voluntary exchange, freedom to compete and security of privately owned property.

⁵ See for example, Seguino (2000) and the references cited therein.

⁶ See Mallick and Chowdhury (2001) for a good summary of the important empirical literature on inflation and economic growth.

⁷ A detailed review of the "general-to-specific" (Gets) algorithm implemented in PcGets is provided in Owen (2003).

⁸ Recall that for these MDG indicators, a decrease in the measure indicates an improved state.

REFERENCES

- Asra, Abuzar, Estrada, Gemma, Kim, Yangseon and Quibria, M.G. (2005), Poverty and Foreign Aid. Evidence from Recent Cross-Country Data. ERD Working Paper No. 65, Economics and Research Department, Asian Development Bank, Manila.
- Atkinson, Anthony B. and Bourguignon, François. (2000), *Handbook of Income Distribution: Volume 1*, Elsevier.
- Barro, Robert J., and Lee Jong-Wha (2001), International Data on Educational Attainment: Updates and Implications, Oxford Economic Papers, Vol. 53, pp. 541-563.
- Benavot, Aaron (1989), Education, gender and economic development: A cross-national study, Sociology of Education, Vol. 62, pp. 14-32.
- Burnside, Craig and Dollar, David (2000), Aid, Policies and Growth, The American Economic Review, Vol. 90, No. 4, pp. 847-868.
- Burnside, Craig and Dollar, David (2004), Aid, Policies and Growth: Revisiting the Evidence, Policy Research Working Paper 3251, The World Bank.
- Chen, Shaohua and Ravallion, Martin (2008), The Developing World Is Poorer Than We Thought, But No Less Successful in the Fight against Poverty. Policy Research Working Paper 4703, The World Bank.
- Deaton, Angus and Zaidi, Salman (2002), Guidelines for Constructing Consumption Aggregates for Welfare Analysis. LSMS Working Paper No. 135. The World Bank.
- Dollar, David and Kraay, Aaron (2002), Growth is Good for the Poor, Journal of Economic Growth, Vol. 7, No. 3, pp. 195-225.
- Doucoulagos, Hristos and Paldam, Martin (2005a), Aid effectiveness on Growth. A meta study. Working Paper No. 2005-13. Department of Economics, University of Aarhus.
- Doucoulagos, Hristos and Paldam, Martin (2005b), Conditional aid effectiveness. A meta study, Working Paper No. 2005-14. Department of Economics, University of Aarhus.
- Easterly, William, Levine, Ross and Roodman, David (2004), New Data, New Doubts: A Comment on Burnside and Dollar's 'Aid, Policies, and Growth, American Economic Review, Vol. 94, No. 3, pp. 774-780.
- Emery, Robert (1967), The relation of exports and economic growth, Kyklos, Vol. 20, No.4, pp. 470-486.
- Ferreira, Luisa (1996), Poverty and inequality during structural adjustment in rural Tanzania. Policy Research Working Paper 1641, The World Bank, Washington, DC.
- Fielding, David, McGillivray, Mark and Torres, Sebastian (2006), A Wider Approach to Aid Effectiveness: Correlated Impacts on Health, Wealth, Fertility and Education. Research Paper No. 2006/23 UNU-Wider.
- Gwartney, James, Lawson, Robert, and Easterly, William (2006), *Economic Freedom of the World: 2006 Annual Report*, The Fraser Institute.
- Hansen, Henrik and Tarp, Finn (2001), Aid and Growth Regressions, Journal of Development Economics, Vol. 64, No. 2, pp. 547-570.

Hasan, Rana, Quibria, M.G. and Kim, Yangseon (2003), Poverty and Economic Freedom: Evidence from Cross-country Data, East-West Center Working Paper Series No. 60, September 2003.

Hendry, David F. and Krolzig, Hans-Martin (2001), *Automatic Econometric Model Selection Using PcGets*. Timberlake Consultants Ltd.

Islam, Nazrul (1995), Growth empirics: A panel data approach, Quarterly Journal of Economics, Vol.110, No. 10, pp. 1127-1170.

Lensink, Robert and White, Howard (2001), Are There Negative Returns to Aid? , Journal of Development Studies, Vol. 37, No. 6, pp. 42-65.

Mallik, Girijasankar and Chowdhury, Anis (2001), Inflation and Economic growth: Evidence from Four South Asian Countries, Asia-Pacific Development Journal, Vol. 8, No. 1, pp. 123-135.

Mankiw, N. Gregory, Romer, David and Weil, David N. (1992), A contribution to the empirics of economic growth, Quarterly Journal of Economics, Vol.107, pp. 407-437.

Nelson, Richard R. and Phelps, Edmund S. (1966), Investments in humans, technological diffusion, and economic growth, American Economic Review, Vol. 56, pp. 69-75.

Owen, P. Dorian (2003), General-to-Specific Modelling Using PcGets, Journal of Economic Surveys, Vol. 17, pp. 609-628.

UNU-Wider World Income Inequality Database (2005).

White, Halbert (1980) A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity, Econometrica, Vol. 48, pp. 817-838.