The Effect of Foreign Aid on Economic Growth in Developing Countries

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ABSTRACT

This paper analyzes the effects of foreign aid on the economic growth of developing countries. The study uses annual data on a group of 85 developing countries covering Asia, Africa, and Latin America and the Caribbean for the period 1980-2007. We explore the hypothesis that foreign aid can promote growth in developing countries. We test this hypothesis using panel data series for foreign aid, while accounting for regional differences in Asian, African, Latin American, and the Caribbean countries as well as the differences in income levels. While the findings of previous studies are generally mixed, our results also indicate that foreign aid has mixed effects on economic growth in developing countries.

JEL Classifications: F21, F43, O40

INTRODUCTION

The role of foreign aid in the growth process of developing countries has been a topic of intense debate. Foreign aid is an important topic given its implications for poverty reduction in developing countries. Previous empirical studies on foreign aid and economic growth generate mixed results. For example, Papanek (1973), Dowling and Hiemenz (1982), Gupta and Islam (1983), Hansen and Tarp (2000), Burnside and Dollar (2000), Gomanee, *et al.* (2003), Dalgaard *et al.* (2004), and Karras (2006), find evidence for positive impact of foreign aid on growth; Burnside and Dollar (2000) and Brautigam and Knack (2004) find evidence for negative impact of foreign aid and growth, while Mosley (1980), Mosley, *et al.* (1987), Boone (1996), and Jensen and Paldam (2003) find evidence to suggest that aid has no impact on growth. It should be noted that, although Burnside and Dollar (2000) concluded that foreign aid has positive effects, this conclusion applies only to economies in which it is combined with good fiscal, monetary, and trade policies. A recent study by Doucouliagos and Paldam (2009), using the meta-analysis covering 68 papers containing a total of 543 direct estimates, it is found that the effect of aid on growth estimates scatter considerably and add up to a small positive, but insignificant, effect on growth. The zero correlation result has yet to be overcome.

The main role of foreign aid in stimulating economic growth is to supplement domestic sources of finance such as savings, thus increasing the amount of investment and capital stock. As Morrissey (2001) points out, there are a number of mechanisms through which aid can contribute to economic growth, including (a) aid increases investment, in physical and human capital; (b) aid increases the capacity to import capital goods or technology; (c) aid does not have indirect effects that reduce investment or savings rates; and aid is associated with technology transfer that increases the productivity of capital and promotes endogenous technical change. According to McGillivray, *et al.* (2006), four main alternative views on the effectiveness of aid have been suggested, namely, (a) aid has decreasing returns, (b) aid effectiveness is influenced by external and climatic conditions, (c) aid effectiveness is influenced by political conditions, and (d) aid effectiveness depends on institutional quality.

It is interesting to note that in recent years there has been a significant increase in aid flows to developing countries although other types of flows such as foreign direct investment and other private flows are declining. For example, according to the Organization for Economic Corporation and Development (OECD, 2009b), foreign direct investment and other private flows are on the decline, and remittances are expected to drop significantly in 2009. Budgets of many developing countries were hit hard by the rises in food and oil prices in the last two years. Many countries are not in a strong fiscal position to address the

current financial crisis. According to the OECD (2009b), in 2008, total net official development assistance (ODA) from members of the OECD's Development Assistance Committee (DAC) rose by 10.2% in real terms to US$119.8 billion and are expected to rise to US$130 billion by 2010. Africa is the largest recipient of foreign aid. For example, net bilateral ODA from DAC donors to Africa in 2008 totaled US$26 billion, of which US$22.5 billion went to sub-Saharan Africa. Excluding volatile debt relief grants, bilateral aid to Africa and sub-Saharan Africa rose by 10.6% and 10% respectively in real terms.

Given the importance of foreign aid to the economies of developing countries, it is important to understand its contribution to economic growth of developing countries. This paper analyzes the effects of foreign aid on the economic growth of developing countries. We analyze these effects using panel data series for foreign aid, while accounting for regional differences in Asian, African, Latin American, and the Caribbean countries as well as the differences in income levels. One of the contributions of this paper is its contribution to the existing empirical literature on the effects of foreign aid on economic growth of developing countries through its thorough analysis covering a large number of developing countries as well as a longer time period. The study focuses on the time period 1980-2007. In order to better understand the effect of aid on growth as well as any change of its effect over time, we also estimated three separate models for shorter time periods, namely, 1980-1989, 1990-1999, and 2000-2007.

The paper is structured as follows: The next section presents a survey of literature, whereas Section 3 presents the specification of the econometric model and data sources. The empirical results are presented and discussed in Section 4 and finally, Section 5 summarizes the main results and concludes with some policy implications.

METHODOLOGY AND DATA

Specification of Model

This section discusses the model specifications to examine the relationships between foreign aid and per capita GDP growth. The models specified are estimated using panel least squares estimation method.

The model is derived, in conventional manner, from a production function in which foreign aid is introduced as an input in addition to labor and domestic capital. In the usual notation the production function can be written as follows:

$$Y = f(L, K, A) \tag{1}$$

where Y is gross domestic product (GDP) in real terms, L is labor input, K is domestic capital stock, and A is stock of foreign aid.

Assuming (1) to be linear in logs, taking logs and differencing, we obtain the following expression describing the determinants of the growth rate of real GDP:

$$y = \alpha + \beta l + \delta k + \phi a \tag{2}$$

where lower case letters denote the rate of growth of individual variables. Following the precedent set in numerous previous studies, we approximate the rate of growth of the capital stock by the share of investment in GDP. This is necessary due to the formidable problems associated with attempts to measure the capital stock, especially in the context of developing countries. In addition, we also replace the rate of change in labor input by the growth rate of population. Following Karras (2006) and others, we also

include several other variables that often believed to have a favorable effect on growth. As pointed out by Feeny and McGillivray (2008), a reasonably robust finding of recent studies is that there is an inverted U-shaped relationship between aid and growth. This finding indicates that there are diminishing returns to aid due to recipient countries having absorptive capacity constraints. Absorptive capacity relates to an aid recipient's ability to utilize foreign aid inflows effectively. In order to take into account this relationship, a square term is added to the following model. These changes yield the following growth equation:

$$GGDP_{it} = \beta_0 + \beta_1 GPOP_{it} + \beta_2\left(\frac{INV}{GDP}\right)_{it} + \beta_3\left(\frac{AID}{GDP}\right)_{it} + \beta_4\left(\frac{AID}{GDP}\right)^2_{it} + \beta_5 \ln(GDP_{i0}) + \beta_6 INF_{it} + e_{it} \quad (3)$$

where $GGDP_{it}$ is the growth rate of real GDP per capita of country i in year t, $GPOP_{it}$ is the growth rate of population of country i in year t, INV is the investment of country i in year t, AID is the foreign aid of country i in year t, GDP_{i0} is the initial level of GDP of country i, and INF_{it} is the inflation rate of country i in year t. The growth rate of population is a proxy for the growth rate of labor force, and the investment/GDP ratio represents the growth rate of capital stock. Regional dummies, income level dummies, a dummy variable representing ethnic wars, and a variable representing the economic freedom are also introduced. We are interested in testing whether the marginal impact of foreign aid on growth, β_3, is positive or negative and statistically significant. The expected signs of the coefficients β_1 and β_2 are positive and that of β_3 either positive or negative, β_4 is negative, and that of β_5 and β_5 are negative.

Variable Description and Data Sources

In order to test the implications of our models, we collected a panel of aggregate data on foreign aid on a large number of developing countries. The entire data set includes 85 countries for which foreign aid and all other relevant variables are reported over the 1980–2007 period. The sample of countries consists of 25 low-income countries, 29 low-middle-income countries, 22 high-middle-income countries, and 7 high-income countries. The list of countries used in the empirical analysis is given in Appendix Table 1.

The economic growth rate is measured in this study as the growth of real GDP per capita in constant (2000) U.S. dollars. The data on real GDP are from the World Bank, *World Development Indicators* database. The growth rate of population is used as a proxy for the growth rate of the labor force. The data on population are from the World Bank, *World Development Indicators* database. The investment/GDP ratio is used as a proxy for the growth rate of the capital stock. Since the investment/GDP ratio is not reported for the majority of the developing countries, gross fixed capital formation as a share of GDP is used to represent investment/GDP ratio. The data on foreign aid are from the Organization for Economic Corporation and Development (OECD), *OECD.Stat* online database and from the United Nations Conference on Trade and Development (UNCTAD), *Handbook of Statistics 2008* database. Inflation rate is defined as the annual percentage change in Consumer Price Index (CPI). The data on inflation rate are from the International Monetary Fund, *World Economic Outlook* database, October 2008. The data on ethnic war variable are from the World Bank. The data on economic freedom are from the Freedom House, *The Freedom in the World 2008* database.

EMPIRICAL RESULTS

The results of our empirical analysis are presented in Tables 1, 2 and 3. First, we estimated model (3) for four different time periods: 1980-1989, 1990-1999, 2000-2007 as well as for the entire period of 1980-2007. The results of this analysis are presented in Table 1. Then we estimated the model for different

regions, namely, Asia, Africa, and Latin America and the Caribbean. The results of this analysis are presented in Table 2. Finally we estimated the model for different income levels, namely, low income, low middle income, upper middle income and all income levels. The results of this analysis are presented in Table 3.

Table 1. Effects of Foreign Aid on Growth in Developing Countries
Dependent variable: Real GDP per capita growth

Variable	1980-1989	1990-1999	2000-2007	1980-2007
Constant	-0.5478 (-0.404)	0.4523 (0.371)	-1.3279 (-1.452)	0.0545 (0.071)
Capital Growth	0.1264*** (5.151)	0.1209*** (6.447)	0.1477*** (9.574)	0.1268*** (9.174)
Labor Growth	0.0043 (0.237)	0.1062 (0.642)	0.9326*** (6.611)	0.0075 (0.707)
AID/GDP	-0.0766 (-1.291)	-0.0205 (-1.606)	0.0284 (1.142)	-0.0057 (-1.241)
$(AID/GDP)^2$	-0.0016 (1.157)	-0.0003 (-0.448)	-0.0001 (-0.199)	-0.0001 (1.214)
Initial GDP	-0.0249 (-0.187)	-0.1337 (-1.525)	-0.5262*** (-8.524)	-0.2606*** (-4.325)
Inflation	-0.0005*** (-2.599)	-0.0006*** (-2.416)	-0.0012*** (-2.270)	-0.0006*** (-4.899)
Economic Freedom	-0.4223* (-1.891)	-0.0106 (-1.066)	-0.1406 (-1.078)	-0.2352* (-1.918)
Ethnic Wars dummy	-0.4406 (-1.224)	-1.2079*** (-3.990)	-1.6847*** (-4.287)	-0.7747*** (-3.672)
Asia dummy	3.4375*** (5.514)	0.5084 (0.817)	1.1357*** (3.253)	1.1671*** (2.967)
Latin America dummy	0.3825 (0.593)	-0.6367 (-1.042)	0.0273 (0.823)	-0.6332* (-1.666)
Sub-Saharan Africa dummy	1.9021** (3.211)	-1.1370** (-1.968)	0.6995*** (2.253)	0.0282 (0.772)
Low Income countries dummy	0.1955 (0.202)	0.9688 (1.263)	-1.7293*** (-3.015)	0.5309 (1.063)
Low Middle Income countries dummy	0.8231 (0.993)	0.8838 (1.430)	-1.4763*** (-3.209)	0.6129 (1.529)
Upper Middle Income countries dummy	1.0617 (1.392)	0.6541 (1.084)	-1.5764*** (-3.317)	0.2874 (0.742)
Number of countries	83	83	83	83
Number of observations	830	830	664	2324
Adjusted R^2	0.348	0.649	0.627	0.379

Note: Figures in parentheses are t-values. ***, ** and * indicate the statistical significance at the 1%, 5% and 10% level, respectively.

Let us first discuss the estimated results that are presented in Table 1. The conventional variables behave very much the same way as the model predicts, and the estimated coefficients are statistically significant.

The adjusted R^2 values range from a low of 0.348 to a high of 0.649. These values, though relatively low, are acceptable for a cross-sectional study and are comparable to those obtained in other studies.

The coefficients of the first two variables in model (3) are expected to be positive and our results are consistent. Although the capital growth variable is statistically significant, labor growth variable is statistically significant only during the period 2000-2007. Foreign aid variable has a negative sign in three out of four cases, indicating that foreign aid appears to have an adverse effect on economic growth in developing countries. This coefficient is not statistically significant in any of the four cases. The square term is also found be statistically insignificant. The coefficient of the initial GDP variable has the expected negative sign and is statistically significant during the periods of 2000-2007 and 1980-2007.

Inflation rate variable has the expected negative sign and it is statistically significant at the 1% level of significance in all four cases. These findings are also consistent with the findings of previous studies. The variable representing the economic freedom has a negative sign in all four cases but it is statistically significant in periods 1980-1989 and 1980-2007. This variable is defined as follows: 1 if free; 2 if partly free; and 3 in not free. Therefore, the negative sign can be interpreted as countries which are relatively free tend to have a higher economic growth. The ethnic war dummy variable has a negative sign in all cases and highly statistically significant in three of the four cases, implying that ethnic wars have an adverse effect of economic growth.

Of the three regional dummy variables used in the model, Asia dummy variable consistently has a positive sign and statistically significant in three of the four cases. Dummy variables for the other two regions have missed results. The dummy variables representing the different income levels indicate that the estimated coefficients are mostly positive for all income levels but negative during 2000-2007 period.

Let us now discuss the estimated results of our second set of models. The conventional variables behave very much the same way as the model predicts, and several estimated coefficients are statistically significant. The adjusted R^2 values range from a low of 0.147 to a high of 0.619. These values, though relatively low, are acceptable for a cross-sectional study and are comparable to those obtained in other studies.

The coefficients of the first two variables in model (3) are expected to be positive and our results are consistent. Although the capital growth variable is statistically significant in all four regions, labor growth variable is statistically significant only for Latin American region. Foreign aid variable has a negative sign in three out of four cases, indicating that foreign aid appears to have an adverse effect on economic growth in developing countries. However, this variable is positive for African region indicating that foreign aid have a positive effect on economic growth in African countries. This coefficient is not statistically significant in any of the four cases. The square term is also found be negative and statistically insignificant. The coefficient of the initial GDP variable has the expected negative sign and is statistically significant for Asia and for all countries.

Inflation rate variable has the expected negative sign and it is statistically significant at the 1% level of significance in three of the four cases. It is not statistically significant for Asian region. These findings are also consistent with the findings of previous studies. The variable representing the economic freedom has a negative sign in all four cases but it is statistically insignificant for Asian countries. This variable is defined as follows: 1 if free; 2 if partly free; and 3 in not free. Therefore, the negative sign can be interpreted as countries which are relatively free tend to have a higher economic growth. The ethnic war dummy variable has a negative sign in all cases and highly statistically significant in African countries, implying that ethnic wars have an adverse effect of economic growth. This finding is not surprising given the fact that Africa countries suffer the most from ethnic wars than any other region.

Finally, let us now discuss the estimated results of our third set of models. In this case also the conventional variables behave very much the same way as the model predicts, and several estimated coefficients are statistically significant. The adjusted R^2 values range from a low of 0.213 to a high of 0.429. These values, though relatively low, are acceptable for a cross-sectional study and are comparable to those obtained in other studies.

The coefficients of the first two variables in model (3) are expected to be positive and our results are consistent. Although the capital growth variable is statistically significant in all income levels, labor growth variable is statistically significant only in low income and upper-middle income countries. Foreign aid variable has a positive sign in three out of four cases, indicating that foreign aid appears to have a positive effect on economic growth in developing countries. However, this variable is negative for low-middle income countries indicating that foreign aid have a negative effect on economic growth in these countries. This coefficient is not statistically significant in any of the four cases. The square term is also found be negative and statistically insignificant. The coefficient of the initial GDP variable has the expected negative sign and is statistically significant for all income levels except for upper-middle income countries.

Inflation rate variable has the expected negative sign and it is statistically significant at the 1% level of significance in all four cases. These findings are also consistent with the findings of previous studies. The variable representing the economic freedom has a negative sign in all four cases but it is statistically significant only for upper-middle income countries. This variable is defined as follows: 1 if free; 2 if partly free; and 3 in not free. Therefore, the negative sign can be interpreted as countries which are relatively free tend to have a higher economic growth. The ethnic war dummy variable has a negative sign in all cases and highly statistically significant in all cases except for upper-middle income countries, implying that ethnic wars have an adverse effect of economic growth. This finding is not surprising given the fact that upper-middle income countries suffer the least from ethnic wars than low-income countries.

CONCLUDING REMARKS

This paper analyzes the effects of foreign aid on the economic growth of developing countries. We analyze these effects using panel data series for foreign aid, while accounting for regional differences in Asian, African, Latin American, and the Caribbean countries as well as the differences in income levels. One of the contributions of this paper is its contribution to the existing empirical literature on the effects of foreign aid on economic growth of developing countries through its thorough analysis covering a large number of developing countries as well as a longer time period. The study focuses on the time period 1980-2007 and 83 aid-receiving developing countries. In order to better understand the effect of aid on growth as well as any change of its effect over time, we also estimated three separate models for shorter time periods, namely, 1980-1989, 1990-1999, and 2000-2007. Then we estimated the model for different regions, namely, Asia, Africa, and Latin America and the Caribbean. Finally, we estimated the model for different income levels, namely, low income, low middle income, upper middle income and all income levels.

The major point emerging from this work is that foreign aid has a mixed impact on economic growth of developing countries. First, when the model was estimated for different time period, foreign aid variable has a negative sign in three out of four cases, indicating that foreign aid appears to have an adverse effect on economic growth in developing countries. In addition, this coefficient is not statistically significant in any of the four cases. Second, when the model was estimated for different regions, foreign aid variable has a negative sign in three out of four cases, indicating that foreign aid appears to have an adverse effect on economic growth in developing countries. However, this variable is positive for African region indicating that foreign aid have a positive effect on economic growth in African countries. This is not surprising given that Africa is the largest recipient of foreign aid than any other region. Finally, when the

model was estimated for different income levels, foreign aid variable has a positive sign in three out of four cases, indicating that foreign aid appears to have a positive effect on economic growth in developing countries. However, this variable is negative for low-middle income countries indicating that foreign aid have a negative effect on economic growth in these countries. Thus, the findings of this study are, for the most part, consistent with findings of previous studies on the effects of foreign aid on economic growth.

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Appendix Table 1. List of Developing Countries Included in the Study

Income Group	Countries
Low-Income Countries	Bangladesh, Burundi, Central African Republic, Congo, Dem. Rep., Gambia, Ghana, Guinea-Bissau, Haiti, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Pakistan, Papua New Guinea, Senegal, Sierra Leone, Solomon Islands, Tanzania, Togo, Uganda, Vietnam, Zambia, and Zimbabwe.
Low-Middle-Income Countries	Algeria, Bolivia, Cameroon, China, Colombia, Congo, Rep. of, Dominican Republic, Ecuador, Egypt, El Salvador, Guatemala, Guyana, Honduras, India, Indonesia, Iran, Jordan, Kenya, Lesotho, Nicaragua, Paraguay, Peru, Philippines, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Thailand, and Tunisia.
Upper-Middle-Income Countries	Argentina, Belize, Botswana, Brazil, Chile, Costa Rica, Dominica, Fiji, Jamaica, Libya, Malaysia, Mauritius, Mexico, Panama, Seychelles, South Africa, South Korea, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Turkey, Uruguay, and Venezuela.
High-Income Countries	Antigua and Barbuda, Bahrain, Barbados, Kuwait, Singapore, Trinidad and Tobago, and United Arab Emirates.