MONASH University
Business and Economics

DEPARTMENT OF ECONOMICS

ISSN 1441-5429

DISCUSSION PAPER 35/07

FOREIGN AID AND DOMESTIC SAVINGS: THE CROWDING OUT EFFECT

Michael P. Shields[1]

Abstract

The paper examines the relationship between foreign aid and savings using annual data
for 119 countries. Regressions for each country are run separately in order to find which
countries have a positive aid-saving experience. The explanatory variables chosen are
thought to be exogenous to current economic policy. Countries are placed into five
categories according to the strength of the aid-saving relationship. Few countries show
evidence of substantial crowding out. Consequently, aid is found to be clearly beneficial
to saving and, hence, investment for the preponderance of these countries.

[1] Visiting Professor of Economics, Monash University
Email: Michael.Shields@monash.edu.au (On leave from Central Michigan University
Email: Michael.p.shields@cmich.edu)

FOREIGN AID AND DOMESTIC SAVINGS: THE CROWDING OUT EFFECT

While there are many reasons for giving foreign aid, a major argument for such aid is that this assistance will increase the rate of economic growth in countries which are recipients of aid. The growth expectations of aid proponents, however, have often been disappointed. While much of this disappointment may be due to initial expectations that were unrealistically high, numerous reasons have been given as to why aid might be largely ineffective in generating growth. The explanation with the longest history is that aid largely goes to consumption, crowding our domestic savings and investment. The extent of crowding out, if it exists, should be an important consideration in determining the net benefits from foreign aid in terms of whether it increases the rate of economic growth. In this paper, crowding out will be examined for every developing country for which suitable data are available.

The Crowding Out Hypothesis

Saving has long been thought to be a crucial source of economic growth. The basic idea is that aid will augment domestic savings and, hence, increase the rate of investment, which will lead to a higher growth rate. The most famous models of aid induced growth are based on a simple version of the Harrod-Domar growth model.[2] Growth is held to be determined by the saving rate, where the growth rate of per capita income, g, is given by

(1) $g = s/v - n$,

where s is the marginal saving rate, v is the incremental capital output ratio and n is the

_____

[2] See Harrod (1939) and Domar (1946).

population growth rate. In this model, investment equals savings. Anything that increases s, decreases v, or decreases n will increase g. Aid has been introduced into this model as either augmenting savings or improving technology.

Rosenstein-Rodan (1961) and Chenery and Strout (1966) suggest a gap model, where foreign assistance would close the gap between the savings required to achieve a targeted rate of growth and the rate of growth that would occur without the aid. Emphasis was placed on aid augmenting domestic savings. In other words, the growth rate becomes

(2) $g = s'/v - n = (s + fa)/v - n$,

where fa is foreign aid as a proportion of income. s' gives the total funds (domestic savings plus foreign aid) available for investment. Note that each dollar of foreign aid is assumed to increase these funds, and hence investment, by an equal amount.[3]

Griffin (1970) presented an early criticism of this approach. Griffin assumes that foreign aid should be treated as augmenting income. An increase in income of fa would increase consumption by $(1 - s)fa$ and increase the funds available for investment by sfa. Consequently, s' would increase from $s' = s$, in equation (1) to

(3) $s' = s + sfa$.

However, fa of this increase is the amount of foreign aid. Consequently, domestic savings would be crowded out by the foreign aid and this decline in savings would equal $(s - 1)fa$. Hence, Griffin argues that foreign aid would partially crowd out domestic savings and investment because part of this aid would go to consumption. Furthermore, from the permanent income hypothesis, if this foreign aid was viewed by consumers as

---

[3] For surveys of the impact of aid on development see White (1992a), Hansen and Tarp (2000), and Hermes and Lensink (2001).

being a temporary increase in income, the decline in domestic savings would almost exactly match foreign aid.

Grinois and Bhagwati (1976) argue that even if substantial crowding out does occur, foreign aid would still increase growth in the short run. A higher growth rate would itself increase domestic savings, which in the long run could cause domestic savings to rise above the level it would reach without foreign aid.

A more general version of equation (3) is that aid may reduce domestic savings, leave it unchanged or increase domestic savings. Equation (3) can be rewritten as

(4) $s' = s + \beta fa$.

If $\beta = 1$, then all aid goes to investment leaving domestic savings unchanged. This was the situation in equation (2). Next there is the possibility that $0 > \beta < 1$. Here said is beneficial to growth but part of this positive impact is crowded our by reduced domestic savings. This was the case in equation (3). There are two more extreme possibilities. One is that foreign aid will reduce investment and, hence, growth. This would be the case if $\beta < 0$. The other is that foreign aid will increase domestic savings. This would be the case if $\beta > 1$. White (1992b) discusses this latter possibility.

In the next section, we will test these hypotheses. Before proceeding to this section, we will first discuss the relationship between savings and growth. The relationship between savings and growth is complicated for several reasons. First, the savings and investment relationship might be more complicated than assumed in the literature just discussed. For example, Stern (1989) points out that, while the saving growth relationship differs by groups of countries, the investment growth relationship seems to hold for all groups of countries. However, Attanasio, Picci, and Scorcu (2000)

3

in a causality study using panel data contradict Stern's claim. For many of their models, savings cause growth with a positive sign, while investment causes growth with a negative sign. In any event, the causality might be between growth and savings, be between savings and growth or be mutual.[4] Second, there is a growing literature, partly based on endogenous growth models, which suggest that in the long run the saving (and investment) rate is unimportant for growth. Institutional factors that influence resource efficiency and the ability of an economy to innovate and respond to opportunities may be much more important than the saving rate, both in the long run and the short run. Numerous growth models have been formulated to estimate the impact of policies and institutions on growth.[5]

The gap models of saving and investing, since these models are based on the Harrod-Domar model, rule out the possibility of diminishing returns and place little or no emphasis on the role of institutions and technological progress. Diminishing returns are a defining component of Solow growth models.[6] Saving in the Solow model is only important in the short run, when a country is catching up to the capital-output ratio of wealthy countries. In the long run the (steady state) growth rate in national income only depends on the rate of population growth and the rate of technological progress. That is

$$g = \lambda + n,$$

where λ is the rate of technological progress and n is the labor force growth rate. Hence, the saving rate has no impact on the steady state growth rate. Saving can only influence steady state growth through its influence on λ. However, since the rate of technological

---

[4] See Dhakal, Grabowski and Shields (1991), and Attanasio, Picci and Scorcu (2000).
[5] These models have typically been called Barro regressions after Barro (1991).
[6] See Solow (1956).

progress is assumed to be exogenous, the saving rate can have no long run impact on growth.

There have been several studies linking institutions and government policies with foreign aid. Using cross-sectional OLS, Singh (1985) examined the impact of interventionist state policy on economic growth. He found that both the saving rate and the rate of foreign aid (as a percentage of GDP) were positive and significant. However, when an index of state intervention was introduced into the model, foreign aid became insignificant. With savings as the response variable, foreign aid was negative and significant when the index of state intervention was introduced into the model.

Recent interest in the impact of policy and the effectiveness of foreign aid was spurred by Burnside and Dollar (2000), who conclude that foreign aid was only beneficial for economic growth when it was given to a country following good macroeconomic policy. Burnside and Dollar has sparked numerous criticisms based on the implications of their suggested aid criterion and on the robustness of their results. Much of this criticism has been focused on their implied condition for giving foreign aid. That is, aid should only be given to countries with good governance. One feature of bad governance is rent-seeking behavior. Aid may directly impact the quality of governance in any framework for giving aid. Knack (2001) argues that aid may increase the rewards to rent-seeking behavior and, hence, undermine the quality of governance. In order to reduce this linkage between aid and rent seeking, it is important for good governance to be clearly defined and measured. Otherwise, any proposed measure is likely to be arbitrary and to lead to behavior that merely gives the impression of good governance in order to receive the aid. In other words, it will lead to rent-seeking behavior. Doornbus

5

(2001), McGillivray and Morrissey (2001) and Van Der Hoeven (2001) argue that good governance is difficult to define and to measure.

There has also been discussion of the meaning and robustness of the results in Burnside and Dollar. They use a cross term (aidXpolicy) to capture the interaction of aid with policy. This term turns out to be positive and significant while the aid variable, taken alone, becomes insignificant. The results are sensitive to the years and countries included in the model (see Easterly, 2003). They also depend on other aspects of model specification such as whether aid is linear or quadratic (see Lensik and White, 2001, and Hansen and Tarp, 2000). In addition, both aid and policy may be endogenous, responding to exogenous factors such as climate. Guillaumont and Chavet (2001) and Dalgaard, Hansen and Tarp (2004) consider this possibility. Once exogenous factors are introduced into the model, the aidXpolicy variable becomes insignificant.

One reason for concentrating on saving instead of growth is the difficulty of finding a suitable growth model with exogenous variables. The saving rate is thought to be an important source of growth in the short run in Solow models and in both the short and long run in Harrod-Domar models and in many versions of endogenous growth theory.[7] In the empirical model we will estimate, all the explanatory variables can be thought of as being reasonably exogenous. Furthermore, countries which have a record of using foreign aid to augment saving can be identified and discussed.

---

[7] See Jones (2002) and Romer (2001).

Empirical Model

Previous studies with few exceptions aggregated the experience of selected countries for either a single year or pooled data for a short time period.[8] In this paper, a reduced form OLS model is estimated separately for 119 countries. The model estimated is

$$s_{it} = \alpha_{0i} + \alpha_{1i}AID_{it} + \alpha_{2i}LABOR_{it} + \alpha_{3i}AG_{it} + \varepsilon_{it}, i = 1,...,119.$$

The variables are Gross National Savings as a percentage of Gross National Income, s, official development assistance (ODA) and official aid as a percentage of Gross National Income, AID, the percentage of the total population that is in the age group 15 to 64, $Labor$, and value added in agriculture as a percentage of Gross National Product, AG. The data are taken from the *World Development Indicators: 2005*.

The variables are limited to a few key exogenous variables that might affect the saving rate partly because of the limited sample size for a few countries. Another reason is because we wanted to limit the analysis to a few key determinants of the saving rate. The first explanatory variable, *AID*, is the variable of interest. The second variable, *LABOR*, is a demographic variable. It represents the proportion of the population that could be in the labor force and consequently earn the income from which to save. The third variable, *AG*, represents the dominance of agriculture. A reason for including this variable is in deference to W. Arthur Lewis and his emphasis on non-agricultural production as a source of savings and an engine of growth.[9]

There are two distinct null hypotheses concerning the impact of aid on the saving rate. They are $H_1: \alpha_1 = 0$ and $H_2: \alpha_1 = -1$. The first null hypothesis is that no crowding

---

[8] An exception is, of course Attanasio, Picci, and Scorcu (2000), who look at causality.
[9] See Lewis (1954).

out occurs. The second null hypothesis is that aid has no impact on net savings (domestic savings plus foreign aid.) Depending upon the outcome of tests concerning these null hypotheses, countries are either listed in one of five categories or the aid coefficient is insignificant for both null hypotheses and is not included in the lists. Category I consists of countries for which α_1 is positive and significant. In this case, far from crowding out savings, foreign aid increases the domestic saving rate. In other cases, crowding out may occur but may not be sufficient to reduce investment and growth. Of primary interest is whether α_1 is significantly greater than -1. In this case, foreign aid increases net savings even though there may be some crowding out. Category II consists of countries for which crowding out is insignificant but for which foreign aid has a positive ($\alpha_1 > -1$) and significant impact on net savings. Category III consists of countries where crowding out is significant but its impact on net savings is insignificant. In both cases there is only partial crowding out. Category IV consists of countries with significant partial crowding out but with an insignificant impact on net savings. Finally, Category V consists of countries where foreign aid has a negative and significant impact on net savings.

In summary, aid increases net savings for countries in Category I, II and III, reduces domestic savings with no significant impact on net savings for countries and Category IV, and reduces net savings for countries in Category V. Almost all the countries (72%) are in the first three categories with almost half (45%) of the countries in Category II. Only 11% of the countries are in Category V, where aid can be seen to have a significant and negative impact on net savings and, perhaps, on economic growth.

The twelve countries in Category I can clearly be called aid success stories. The regressions for these countries are shown in Table V in order to discuss the saving rate

for these countries. There are mixed results concerning the impact of the labor and agriculture variables on savings. In the majority of these countries a larger labor force as a proportion of the population increases savings. This positive result is consistent with the life-cycle hypothesis. The negative signs for a few countries might indicate that child labor is used in market and household production to increase savings. Six of the countries have a positive relationship between agriculture (as a percent of GNI) with the saving rate. This result indicates that for the majority of the successful countries, agricultural intensity of production tending to enhance savings and, hence, increase growth in contrast to the standard Lewis type model.

Conclusions

A clear pattern emerges when we perform separate regressions for each developing economy using annual data. The results confirm a positive relationship between foreign aid and savings inclusive of the aid. Hence, substantial crowding out does not appear to be a common phenomenon. Only nine countries have crowding out to such an extent that aid reduces net savings and, hence, the economic growth rate. Furthermore, the results are similar for countries of every region. The results support an optimistic of the general effectiveness of foreign aid in terns of increasing economic growth across the globe. Finally, there is no obvious connection between the aid-saving relationship that would suggest some form of policy conditionality other than the past terms of aid.

References

Attanasio, Orazio P., Lucio Picci, and Antonello E. Scorcu, 2000, "Saving, Growth, and Investment: A Macroeconomic Analysis Using a Panel of Countries," *The Review of Economics and Statistics*, 82 (May):183-211.

Barro Robert E., 1991, "Economic Growth in a Cross-Section of Countries," *Quarterly Journal of Economics*, 104: 407-433.

Burnside, Craig and David Dollar, 2000, "Aid, Policies, and Growth," *American Economic Review*, 90 (September):847-68.

Cassen, Robert and Associates, 1986, *Does Aid Work?* Oxford: Oxford University Press.

Chenery, Hollis and W. Strout, 1966, "Foreign Assistance and Economic Development," *American Economic Review*, 66 (September):679-733.

Dalgaard, Carl-Johan, Henrik Hansen and Finn Tarp, 2004, "On the Empirics of Foreign Aid and Growth," *Economic Journal*, 114 (June):191-216.

Dhakal, Dharmendra, Richard Grabowski and Michael P. Shields, 1991, "The Role of Savings in Economic Development," *Japan and the World* Economy, 3:331-340.

Domar, Evsey, 1946, "Capital Expansion, Rate of Growth and Employment" *Econometrica* 14 (April):137-47.

Easterly, William, 1999, "The Ghost of Financing Gap: Testing the Growth Model of the International Financial Institutions," *Journal of Development Economics*, 60 (December):423-38.

Easterly, William, 2003, "Can Foreign Aid Buy Growth?" *journal of Economic Perspective* 17 (Summer):23-48.

Griffin, Keith and John Enos, 1970, "Foreign Assistance: Objectives and Consequences," *Economic Development and Cultural Change*, 18:313-27.

Grinois, Earl and Jagdish Bhagwati, 1976, "Foreign Capital, Savings and Dependence," *Review of Economics and Statistics*, 58:416-24.

Harrod, Roy F., 1939, "An Essay in Dynamic Theory," *The Economic Journal* (March): 14-33

Hermes, Niels, and Robert Lensink, 2001, "Changing the Conditions for Development Aid: A New Paradigm," *Journal of Development Studies*, 37:1-16.

11

Jones, C.I, 2002, *Introduction to Economic Growth* Second Edition (New York; Norton).

Knack, Stephen, 2001, "Aid Dependence and the Quality of Governance: Cross-Country Empirical Tests," *Southern Economic Journal*, 68 (October):310-29.

Lewis, W. Arthur, 1954, "Economic Development with Unlimited Supplies of Labor," *Manchester School*, 2 (May):139-91

Mosley, Paul, 1987, *Overseas Aid: Its Defense and Reform*, Brighton: Wheatsheaf Press.

Romer, D., 2001, *Advanced Macroeconomics* Second Edition (New York; McGraw-Hill).

Rosenstein-Rodan, P. N., 1961, "International Aid for Underdeveloped Countries," *Review of Economics and Statistics*, 43 (May):107-48.

Singh, Ram D., 1985, "State Intervention, Foreign Economic Aid, Savings and Growth in LDCs: Some Recent Evidence," *Kyklos*, 38:216-32.

Solow, Robert M., 1956, "A Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics* 70, 1(February):65-94.

Stern, Nicholas, 1989, "The Economics of Development: A Survey," The *Economic Journal*, 99 (September):597-685.

White, Howard, 1992a, "The Macroeconomic Impact of Development Aid: A Critical Survey," *Journal of Development* Studies, 47 (February):163-240.

White, Howard, 1992b, "What do we know about Aid's Macroeconomic Impact? An Overview of the Aid Effectiveness Debate," *Journal of International Development*, 4:121-37.

Table I. Latin America and Caribbean

Category I	Category II	Category III	Category IV	Category V
Costa Rica Honduras	Belize Guyana Honduras Jamaica St. Lucia Suriname	Bolivia El Salvador Nicaragua	Columbia Guatemala	Dominican Rep. Mexico

Table II. Sub-Saharan Africa

Category I	Category II	Category III	Category IV	Category V
Benin Burkina Faso Cape Verde Guinea- Bissau Togo Zimbabwe	Burundi Cape Verde Cent. African Rep Comoros Congo, Dem. Rep. Congo, Rep. Cote d'Ivoire Ethiopia Gambia Kenya Madagascar Malawi Mauritius Mozambique Niger Rwanda Senegal Sierra Leone Somalia Swaziland Tanzania Uganda Zambia	Malawi Niger Rwanda Sierra Leone Somalia Uganda	Cameroon Chad Ghana Sudan Zambia	Angola Lesotho Mali Mauritania

Table III. Asia

Category I	Category II	Category III	Category IV	Category V
Indonesia Bhutan	Cambodia Vanuatu Vietnam Nepal Sri Lanka	Lao	Malaysia Mongolia Papua New Guinea India Pakistan	Malaysia

Table IV. Middle East & North Africa

Category I	Category II	Category III	Category IV	Category V
Egypt Tunisia	Bahrain Malta Morocco Syria	Jordan	Algeria Libya	Kuwait Lebanon

Table V. Saving Rate of Category I Countries.

Country	Intercept	AID % GNI	Labor	Agriculture % GNI	Adj R-square Deg Freedom
Costa Rica	-.59.528	0.468 (1.94)*	1.113 (6.71)*	0.630 (4.52)*	0.72 43
Honduras	-27.255	0.674 (2.48)*	0.635 (1.29)	0.142 (1.95)	0.21 43
Benin	-87.896	0.449 (2.44)*	1.414 (2.12)*	0.394 (2.89)	0.17 43
Burkino Faso	-20.359	0.606 (2.77)*	-0.153 (-0.16)	0.749 (2.32)*	0.34 43
Cape Verde	-78.370	0.520 (2.39)*	0.845 (0.61)	0.311 (1.09)	0.44 17
Guinea-Bissau	-60.724	0.209 (2.99)*	0.797 (0.88)	0.097 (0.38)	0.20 32
Togo	-460.329	0.792 (1.83)*	9.409 (4.98)*	-0.67 (-3.55)*	0.41 43
Zimbabwe	53.199	0.711 (1.78)*	-0.961 (-2.18)*	0.612 (2.71)*	0.16 36
Indonesia	181.852	2.262 (3.94)*	-2.07 (-12.88)*	-1.463 (-12.50)*	0.92 36
Bhutan	82.746	0.651 (3.27)*	-0.682 (-0.09)	-0.811 (-1.00)	0.71 22
Egypt	62.224	0.246 (3.20)*	-0.695 (-2.60)*	-0.511 (-4.38)*	0.39 38
Tunisia	15.673	0.733 (1.65)*	0.053 (0.22)	0.315 (0.67)	0.22 38

Figures in parentheses are t-statistics.
*Significant at 5% level.