Investigate how and the extent to which foreign aid damages the recipient country

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ABSTRACT

This paper provides an examination of the channels through which foreign aid damages the recipient country. More specifically, it focuses on whether foreign aid decreases capital accumulation, hinders growth in GDP per capita, and depresses exports in sub-Saharan Africa. The dataset has observations for 40 years from 1962 to 2001 and includes 47 sub-Saharan African countries. The regressions results imply that foreign aid does not have any significant impact on growth, savings, investment, and exports. This paper argues that this apparent lack of impact stems from aid's inability to influence the incentives in place. In addition, this paper concludes that aid can potentially have adverse effects on sub-Saharan African countries when other side effects of aid are taken into account.

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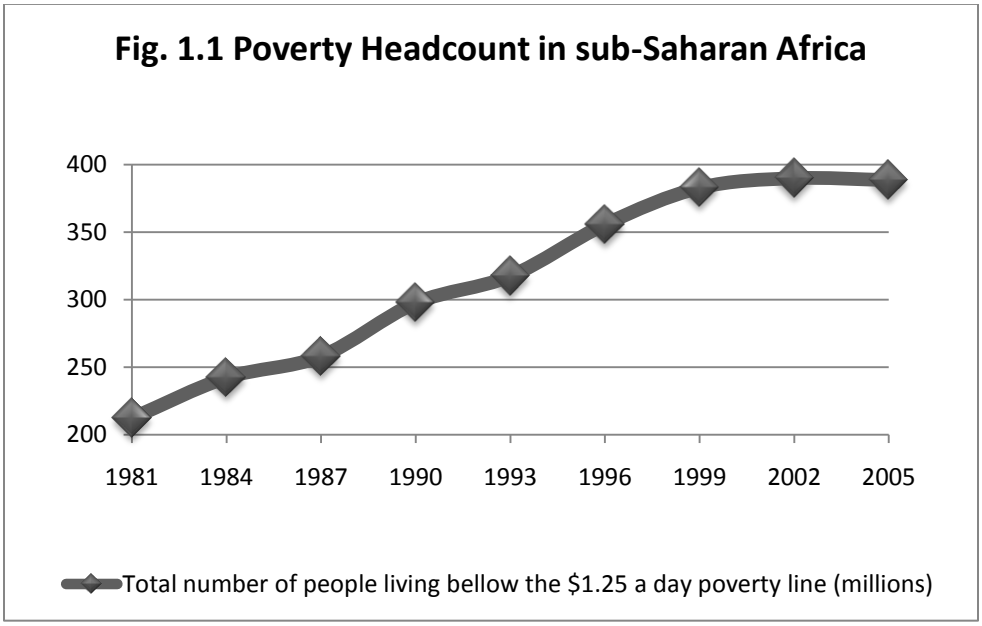
1. INTRODUCTION

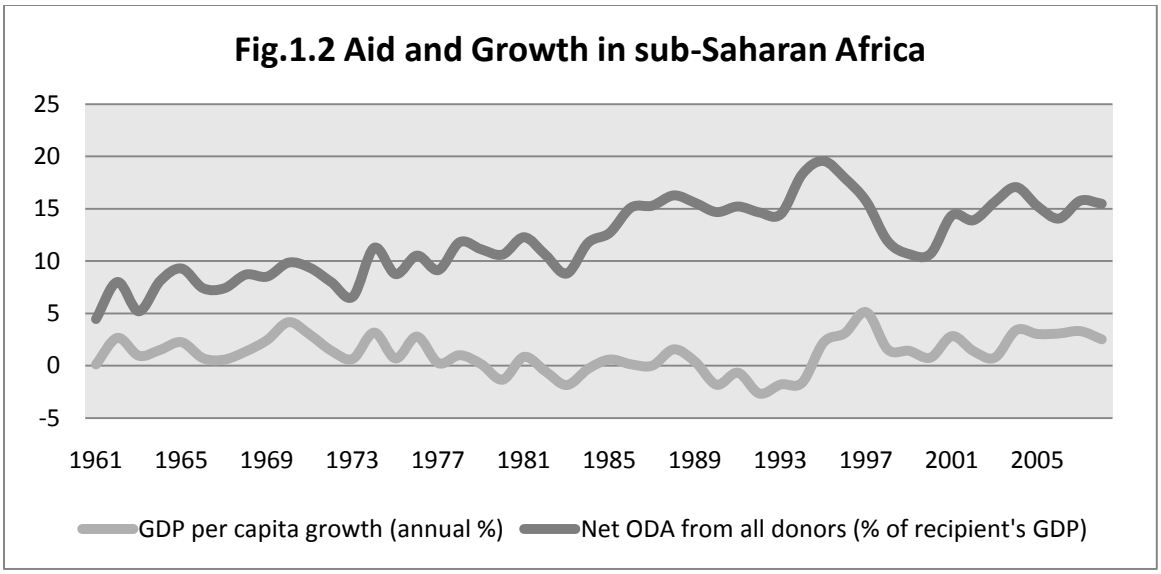
The state of Africa is a scar on the conscience of the world
Tony Blair[1]

The abject poverty and the poor institutional environment that ensued from European colonialism, slavery, and natural resources exploitation and expropriation, have made foreign aid programs, whose aim is to alleviate poverty and promote economic growth, a moral imperative for rich countries and development institutions. After all, it is inhumane to allow so many countries to remain poor if a small transfer of resources could set them on the path to growth.

In the past fifty years, donors have transferred over US$ 1 trillion in development-related aid to sub-Saharan African countries[2], and yet between 1981 and 2005 the number of people living under US$1.25 a day in the region has nearly doubled (see Fig. 1.1)[3]. Fig. 1.2 shows that while aid has increased over time, sub-Saharan Africa's growth rate has decreased, with the most aid-dependent countries exhibiting average growth rates of minus 0.2 per cent per annum.



[1] Tony Blair speaking at the Labour Party Conference in Brighton 2001
[2] D. Moyo (2009) pp.xviii
[3] PovcalNet: the on-line tool for poverty measurement developed by the Development Research Group of the World Bank; http://iresearch.worldbank.org/PovcalNet/povDuplic.html



If all of the US$2 billion of aid received by Zambia since the 1960s had gone into productive investment, it would have a per capita income of about US$20,000 by the early 1990s. Instead, it is one of the poorest countries in the world and its per capita income in the early 1990s was lower than it had been in 1960, under US$500[4].

Foreign aid is highly fungible, which allows for resources to be easily misallocated and/or misappropriated. Nevertheless, economic retrogression, as observed in Zambia, poses the questions of whether aid helps poor countries grow in a sustained way and whether it can damage the recipient country.

There are several possible channels through which aid damages a recipient country. Large flows of money into an economy, however robust, may have negative effects[5]. For economies that are poorly managed, weak and susceptible to outside influence - most of sub-Saharan Africa economies fall into this later category - aid poses four main macroeconomics challenges: reduction of savings rates and investment; inflation; diminishing exports; and adoption of a "soft budget constraint". Foreign aid increases government consumption[6]. Increased government consumption reduces savings causing banks to have less money to lend for domestic investment. Corollary to a higher aid-induced consumption is the increased demand for locally produced as well as imported goods and services. Increased demand in an environment where goods are scarce invariably leads to price rises, i.e. inflation. In order to

[4] Easterly (2003) pp.33
[5] D. Moyo (2009) pp.60
[6] Boone (1996) pp.293

counteract inflation domestic policymakers raise interest rates, further reducing investment. An additional side effect of inflation is the appreciation of the real exchange rate which discourages exports and encourages imports. Aid dampens financial pressures for reform by providing governments with a soft budget constraints and allowing for unmanageable gaps in the balance of payments to be sustained over longer periods[7].

As a voluntary transfer of resources, in the form of grants or loans, from a government or international institution to another government, foreign aid helps sustain corrupt governments by supporting the rent-seeking behaviour - the use of governmental authority to take and make money without the production of wealth[8]- of government officials at the receiving end of this windfall of resources because it provides a rent that is easily diverted and stolen. It can also have a negative impact on democracy since politicians engaged in rent-seeking activities try to exclude other groups from the political process in order to appropriate these rents [9]. High levels of aid over an extended period of time can cause dependency[10]. Aid-dependent governments put less effort into pursuing tax revenues making them less accountable to their citizens.

Corruption, inflation, the reduction of domestic investment and the weakening of political institutions reduce economic growth, which leads to fewer job opportunities and increasing poverty levels.

This paper provides an analytical examination of the channels through which aid damages sub-Saharan African countries. More specifically, it focuses on whether foreign aid decreases capital accumulation, hinders growth in GDP per capita, and depresses exports. My empirical results suggest that none of the channels examined in this paper seem to be present in sub-Saharan Africa. These results are robust to the use of alternative definitions of aid and sources of capital accumulation.

This paper is structured as follows. Section 2 reviews the aid effectiveness literature, focusing on papers published in the last two decades. Section 3 provides a summary of the neoclassical growth model, which constitutes the theoretical basis of this study. Section 4 provides an outline of the empirical model, a description of the main variables and data sources. Section 5 presents the empirical results. The last section draws some conclusions and provides

[7] C. Lancaster (1999) pp.61
[8] D. Moyo (2009) pp.52
[9] Djankov et al. (2008) pp.2
[10] C. Lancaster (1999) pp.66

some insights into why aid has been ineffective in having an impact on the variables here studied.

2. LITERATURE REVIEW

By the end of 2004, the aid effectiveness literature consisted of 97 econometric studies[11]. Different methodological approaches have been used to address the question of whether aid works. The impact of aid has been evaluated at both the micro- and macroeconomic level; cross-country as well as single-country case studies have been relied upon.

This paper concerns the impact of aid on growth and on factors that affect growth. It focuses on studies published in the last two decades for they include larger data sets, measures of economic policy and the institutional environment, in addition to improved growth models and econometric methods[12].

Neoclassical models, which have been widely used by development economist analysing the relationship between development aid and subsequent economic growth since the mid 1990s, were preceded by the Harrod-Domar model and the two-gap model by Chenery and Strout (1966). Boone (1996) was one of the first studies to assess the macroeconomic impact of aid using a neoclassical framework[13]. Boone, using a panel data set of 96 countries and covering a period of twenty years, found that aid did not significantly increase investment but increased unproductive government consumption. Boone's findings imply not only that aid is ineffective in promoting public investment-led growth but it could lead to high rates of inflation, as discussed in section one, lowering private investment.

Doucouliagos et al. (2009) meta-analysis of 66 studies examining the effect of aid on savings and investment confirms Boone's results. Yet, Hansen and Tarp (2000) regards Boone's results to be at odds with the broad range of investments studies by them surveyed. Boone (1996) when including in his sample small countries where the aid/GDP ratio is extremely large found that aid led to higher investment. He argued that in small countries where aid financed large public infrastructure projects aid is unlikely to be fungible leading to a higher marginal propensity to invest out of aid. Criticism of Boone (1996) includes its linear treatment of the aid-

[11] Doucouliagos and Paldam (2009) pp.433
[12] Hansen and Tarp (2000) pp.387
[13] Dalgaard and Hansen (2001) pp.19

growth relationship, which ignores the possibility of diminishing returns to aid. Absorptive capacity constraints and Dutch disease problems have been put forward to motivate the non-linear modelling of the aid-growth relationship. Hadjimichael et al. (1995) and Durbarry et al. (1998) when including an aid squared regressor found a positive impact of aid on growth which becomes negative beyond a certain aid to GDP ratio threshold. Hadjimichael et al. (1995) estimates a threshold of 25 percent of GDP, while Durbarry et al. (1998) estimates it to be 42 percent of GDP. Hansen and Tarp (2001) also report decreasing returns to aid, in addition to findings that aid impacts on growth via investment.

In a seminal paper, Burnside and Dollar (2000) capture the non-linearity in the aid-growth relationship by introducing an aid-policy interaction term. They argue that aid can have a positive impact on growth but only in the presence of a stable macroeconomic policy environment. Their chosen indicators of macroeconomic policy were the budget surplus relative to GDP, inflation and trade openness as measured by the Sachs and Warner index[14]. A policy index was created using a weighted average of the three variables. Using a panel data set of 56 countries and six four-year periods covering the years 1970-1993 they concluded that "aid has a positive impact on growth in developing countries with good fiscal, monetary and trade policy, but has little effect in the presence of poor polices"[15]. These findings influenced foreign aid commitments causing multilateral development banks and donor governments to be more "selective" with their aid and allocate a larger share to countries with stronger polices and institutions. The statement "aid works in a good policy environment", despite being intuitively plausible, does not explicitly define what is meant by good policy. The notion that closed economies, as defined by the Sachs and Warner criteria, have bad policies can be misleading. High tariff or nontariff barriers on imports might be an appropriate policy for a country to pursue if it suffers from chronic balance of payments and debt problems. Bhagwati et al. (2002) noted that "there are several cases of macroeconomic stability and absence of a policy of outward orientation, such as the Communist countries and India, but none of successful outward orientation and absence of macroeconomic stability"[16]. Easterly (2003), following the same

[14] The Sachs and Warner measure of openness is a dummy variable, which takes the value of zero if the economy was closed according to any of the following criteria: 1. it had average tariff rates higher than 40%; 2. its nontariff barriers covered on average more than 40% of imports; 3. it had a socialist economic system; 4. it had a state monopoly of major exports; 5. its black-market premium exceeded 20%. Rodrigues and Rodrik (2000) pp.281
[15] Burnside and Dollar (2000) pp.847
[16] Bhagwati and Srinivasan (2002) pp.180

approach in Burnside and Dollar (2000), used alternative measures of openness and other indicators of macroeconomic stability to construct several policy indexes. He reran the Burnside and Dollar regressions with these alternative policy indexes and aid interacted and found that none of these interactive terms are statistically significant. Aid does not boost growth in just any good policy environment.

The Burnside and Dollar (2000) results failed independent replication by other academics and data. Easterly et al. (2004) found the aid-policy interaction term to be insignificant after running the same Burnside–Dollar's regressions but using a data set expanded to 1970-1997 and updated to include data that was missing for the original period. Dalgaard and Hansen (2001), using the same data set as Burnside and Dollar (2000), concluded that a more positive impact of aid on growth in good policy environments is not a robust result and it depends crucially on deletion of a few influential observations. The aid-policy interaction term is insignificant in the full sample of 56 developing countries and only becomes significant once 5 "big outliers" are excluded from the regressions.

This paper focuses on sub-Saharan Africa, hereafter known as SSA, which covers all African countries that are fully or partially located south of the Sahara[17]. Hadjimichael et al. (1995) examines the contribution of foreign aid to savings, investment, and growth in 31 SSA countries during 1986-92. Contrary to previous studies that found the effectiveness of foreign aid in SSA to be very low in comparison with other regions[18] - Hansen, Tarp, and Dalgaard say that aid raises growth outside the tropics but not in them[19] - Hadjimichael et al. (1995) results indicate that foreign aid stimulates growth, albeit with diminishing returns. In contrast to the positive impact of aid on growth, they found that domestic savings and private investment are both adversely affected by flows of foreign aid, while the impact on government investment is positive. Based on Hadjimichael et al. (1995) findings the positive aid-growth relationship during 1986-92 in SSA is mainly explained by aid financed government capital expenditure.

Clemens et al. (2004) assess the effectiveness of aid allocated to support the budget and balance of payments commitments, investments in infrastructure, agriculture, and industry, in promoting growth. They argue that aid allocated to these sectors is likely to have a discernible effect on growth in the short run. They state that aid to support democracy, the environment,

[17] UN political definition of "major regions"; http://esa.un.org/unpp/definition.html
[18] See Hadjimichael et al. (1995) pp.51
[19] Dalgaard, Hansen and Tarp (2004)

health and education only affects growth over the long run, if at all. They find a positive, casual relationship between "short-impact" aid and economic growth (with diminishing returns) over a four-year period. In SSA short-impact aid raised average annual per capita income growth by three quarters of a percentage point or more between 1973 and 2001.

Hadjimichael et al. (1995) findings of a positive impact of aid on growth in SSA driven by aid financed government investment over a six year period are consistent with Clemens et al. (2004) empirical results. Both studies use data on aid disbursements as reported by donors to the OECD rather than recipient governments actual expenditure of the aid received. If aid is fungible, it could not be financing the high priority investments it was earmarked for, which would have been carried out anyway, but more marginal investments and consumption[20]. Thus, based on the IS-LM model the positive impact of aid on growth in the short run could be due to the increased government consumption this inflow of resources allows for which shifts the IS curve to the right causing national income to rise temporarily. Studies reporting a positive impact of aid on growth in the short-run might be capturing the temporary fluctuations aid causes on national income rather than long-run trends. In my empirical work the impact of aid on growth is analysed over a forty year period 1962-2001, so that any impact reflects long run effects rather than temporary increases in national income.

The basic Solow growth model, which is used by most studies here reviewed, forms the theoretical basis of this paper. It assumes growth is a function of capital accumulation, which in turn is determined by domestic savings. Foreign aid helps capital starved countries by providing the finance needed for investment. Aid is fungible, implying that how well aid gets translated into growth depends on how well the recipient country translates all expenditures into growth. Policies and institutional quality may help determine a recipient's willingness to use aid for productive outcomes[21]. In this paper the model examining the growth impact of aid includes both policy variables and sources of finance - foreign aid, domestic savings and foreign direct investment.

The theory which analyses the effect of a transfer of an external rent, also termed *the transfer problem, the resource curse* or *Dutch disease*, is an alternative theory for analyzing the macroeconomic effect of aid. The term "Dutch disease" originated from the observed adverse

[20] Cassen et al. (1994) pp.17
[21] Rajan and Subramanian (2008) pp.655

impact on Dutch manufacturing of the increase in income associated with the discovery of natural gas in the Netherlands in the 1960s, through an appreciation of the Dutch guilder[22]. Foreign aid, much like natural resources revenue, is an external rent that enters into the domestic economy. Suppose there are two sectors the tradable and non-tradable, and that these transfers are largely spent on non-tradable services such as construction, health care, and education. If employment and capacity utilization is high, wages in this sector will increase, labour will be drawn into the non-tradable sector leading to an overall increase in wages. Given that the price of traded goods are set internationally and, therefore, fixed, the higher wage in terms of traded goods will reduce traded sector profitability, competitiveness and lead to a decline in exports. This is termed the resource movement effect. In addition, the higher wages will be spent, raising the price of non-traded goods relative to traded goods causing an appreciation of the real exchange rate, further damaging traded sector competitiveness. This is termed the spending effect.

Rajan and Subramanian (2011) find evidence of the Dutch disease effect of aid. They examine the impact of aid on the growth rate of exportable manufacturing industries in developing countries. Labour intensity is higher in manufacturing than in natural resources extraction. In poor developing countries, exportable industries are less likely to be protected than import-competing ones. Thus, if aid reduces the competitiveness of the tradable sector by pushing recipient countries' real exchange rate up, this reduction will cause exportable manufacturing industries to grow more slowly. Indeed, after analysing 28 industries in 32 countries for the 1980s and 15 countries for the 1990s, they concluded that real exchange rate appreciations induced by aid inflows have adverse effects on the relative growth rate of exportable manufacturing industries.

In the Dutch disease model production factors are assumed to be fully and efficiently employed, and transferable between sectors. For most of SSA these assumptions do not hold. In SSA there is considerable underutilised capacity, implying that the impact of an increase in aid-financed local expenditures will be absorbed without pushing up wages, or causing production factors to move into the booming sector. Rajan and Subramanian (2011) sample only includes 15 SSA countries. SSA is the least industrialised region in the world. Hence, the adverse impact of

[22] Nkusu (2004) pp.6

aid on the exportable manufacturing sector may not be so applicable to SSA. In my empirical analyses I will include a regression that examines the impact of aid on the level of exports.

In the literature foreign aid and natural resources revenue share another similarity. They are both found to have a negative effect on political institutions. External rents may reduce a government's need for taxation lowering the level of checks and balances in place. Political institutions may become less democratic and less representative when politicians in power in order to appropriate external rents exclude other groups from the political process. Djankov et al. (2008) using panel data for 108 recipient countries, among which 43 SSA countries, during the period 1960-1999, found that foreign aid has a negative impact on institutions in terms of reduced checks and balances and lower level of democracy. Despite giving examples of transmission channels through which aid may adversely affect political institutions the authors do not validate their argument with empirical evidence. Reliable and extensive data on institutions and governance for SSA is scarce. Therefore, this study will focus on how determinants of growth are affected by inflows of foreign.

Aid may flow to countries whose institutions are getting worse or whose per capita income has been stagnant or whose real exchange rate is overvalued. In this case aid is endogenous, i.e. jointly determined with the dependent variable. If aid is endogenous the OLS parameters are biased and inconsistent. Thus, there might be a negative correlation between aid and the dependent variable but this does not reflect causation. The simultaneity bias due to the endogeneity of aid is a problem well recognized in the literature as is a possible solution, instrumenting for aid and using Two Stage Least Square (2SLS) to estimate the ceteris paribus effect of aid on the dependent variable. The challenge with using 2SLS is what instruments to include since these have to be uncorrelated with the error term of the structural equation and partially correlated with aid. There is not a consensus in the literature on how to best instrument for aid. Poor instruments cause the 2SLS estimators to be worse than the OLS ones. Burnside and Dollar (2000) use both OLS and 2SLS when estimating the impact of aid and good policies on growth. The OLS estimators do not deviate significantly from the 2SLS estimators. This study assumes aid is an exogenous variable. Section 4 explains this assumption in more details.

3. THEORETICAL SUMMARY

3.1 The Solow Growth Model

The neo-classical model or Solow growth model shows how the long-run evolutions of income and consumption per worker are affected by a country's rate of savings, investment and the growth rate of its population.[23]

The basic Solow model is built around two equations, a production function and a capital accumulation equation. The production function is assumed to have the Cobb-Douglas form and is given by

$$Y = B(K_t)^{\alpha}(L_t)^{1-\alpha} \qquad B > 0 \; and \; 0 < \alpha < 1 \qquad (3.1)$$

where Y denotes output, K and L are the perfectly substitutable inputs capital and labour, respectively, B and α are given parameters. B captures the influence of all factors that influence production other than those explicitly present in the production function, among these technology.[24] This production function displays constant returns to scale: if all of the inputs are doubled, the output will exactly double. GDP per capita, not GDP itself, determines the prosperity of a nation[25], following this statement the Solow equation is defined in terms of output per worker, y ≡ Y/L, and capital per worker, k ≡ K/L.

$$y_t = B(k_t)^{\alpha} \qquad (3.2)$$

Assuming that B stays constant, an increase in output per worker can only come from an increase in capital per worker. However, there are diminishing returns to capital: each additional unit of capital provided to a single worker increases the output of that worker by less and less. Capital accumulation occurs through savings. Assuming workers/consumers save a constant fraction, s, of their income, and the economy is closed, so that savings, sY_t, equal investment, I_t, and the only use of investment in this economy is to accumulate capital, the change in capital stock per

[23] Sørensen et al. (2010) pp.57
[24] Sørensen et al. (2010) pp.61
[25] Sørensen et al. (2010) pp.68

period, $K_{t+1} - K_t$, is equal to the amount of gross investment, sY_t, less the amount of depreciation that occurs during the production process, δK_t.

$$K_{t+1} - K_t = sY_t - \delta K_t \qquad where\ 0 < s < 1 \tag{3.3}$$

The Solow model assumes that the labour force growth rate is equal to the population growth rate which is given by the parameter n.

$$L_{t+1} = (1 + n)L_t \qquad where\ n > -1 \tag{3.4}$$

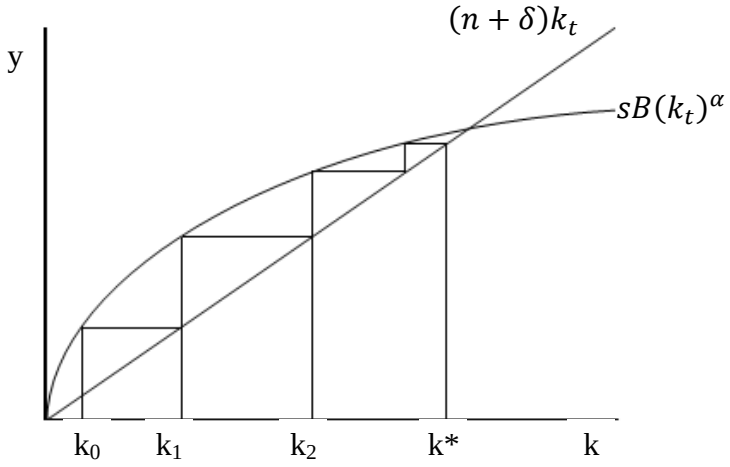
The transition equation shows how output per worker evolves over time and is derived using all three assumptions.

$$(1 + n)k_{t+1} = (1 - \delta)k_t + sB(k_t)^{\alpha} \tag{3.5}$$

Capital per worker in the next period, $k_{t+1,}$ depends on capital per worker in the last period minus any decrease caused by depreciation, $(1-\delta)k_{t,}$ plus any addition made through savings per worker $sB(k_t)^{\alpha}$. Population growth, n, exerts a downward pressure on per capita capital stocks, since the larger the rate of population growth, the lower is per capita capital stock in the next period.

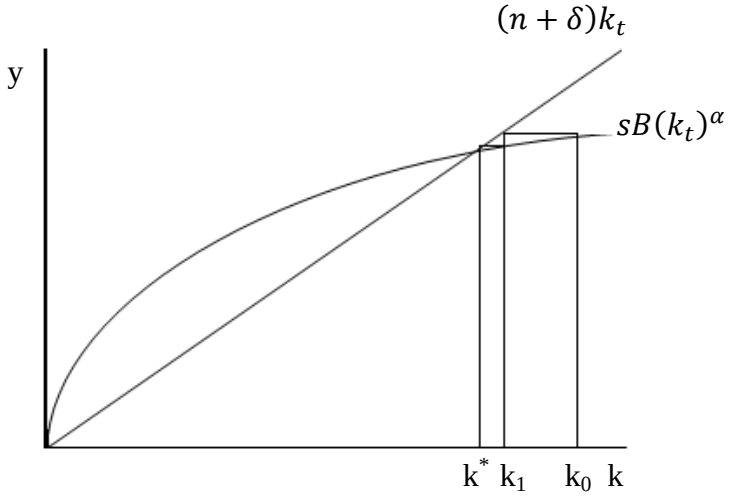
Fig. 3.1 and 3.2 show the evolution of income in the Solow model. At k_0, the amount of investment per worker, $sB(k_t)^{\alpha}$, exceeds the amount needed to keep capital per worker constant, $(n+\delta)\ k_t$, so that capital deepening occurs - k increases over time. This capital deepening will continue until $k = k^*$, at which point $sB(k_t)^{\alpha} = (n+\delta)\ k_t$, so that k = 0. At this point the capital per worker remains constant and such point is called the steady state.

Fig.3.1 Dynamics of the Solow Model



Source: Ray, D. (1998) "Development Economics"

Fig.3.2 Dynamics of the Solow Model

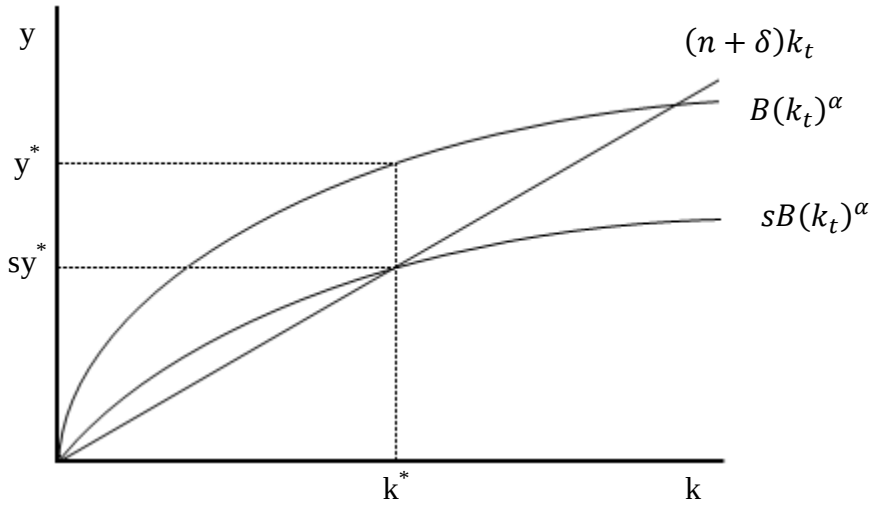


Source: Ray, D. (1998) "Development Economics"

For an economy starting with a capital stock per worker larger than k^*, the amount of investment per worker is less than the amount needed to keep the capital-labour ratio constant, so that capital thinning occurs - k decreases over time. This decline occurs until the amount of capital per worker falls to k^*.

Figure 3.3 illustrate how the Solow diagram determines the steady-state level of capital per worker. The production function determines the steady-state value of output per worker, y^*, as a function of k^*. The steady-state consumption per worker is then given by the difference between steady-state output per worker, y^*, and steady-state investment per worker, $sB(k^*)^{\alpha}$.

Fig 3.3 The Solow diagram and the Production Function



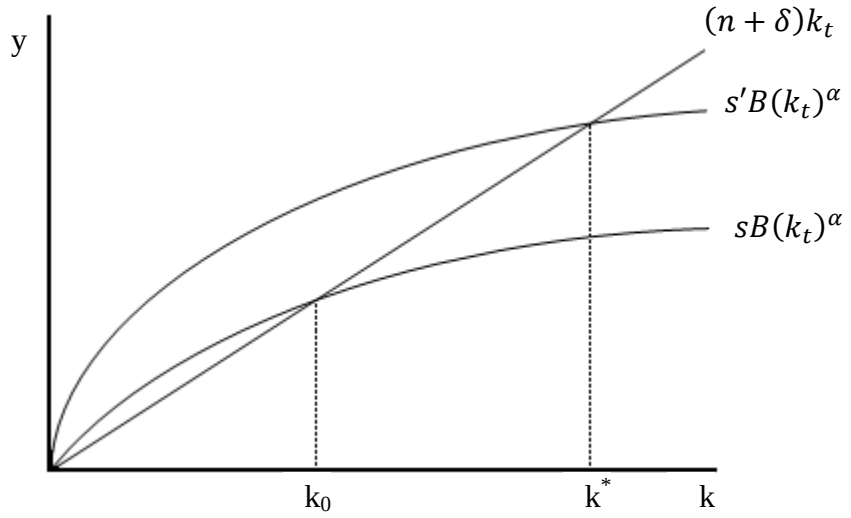
Source: Weil, D. (2009) "Economic Growth"

3.2 The Role of Foreign Aid in the Solow Growth Model

In countries where the majority of the citizens live at the margin of subsistence savings rates are bound to be low. If capital is not mobile, as it is often assumed to be, profitable investments projects are not undertaken due to a shortage of domestic savings.[26] Hence, growth efforts must rely on other sources of capital accumulation, such as foreign aid. In the neoclassical model foreign aid stimulates growth through investment by providing countries with the finance needed to match investment opportunities, in addition to providing foreign exchange to finance needed imports of capital and intermediate goods, and allowing governments to invest in physical and social infrastructure by easing fiscal constraints.

[26] Boone (1996) pp. 290

Fig. 3.4 An increase in the savings rate in the Solow diagram



Source: Sørensen et al. (2010) "Introducing Advanced Macroeconomics"

Figure 3.4 illustrates how greater savings caused by an inflow of foreign aid affects the long run level of income. The increase in investment rate shifts the $sB(k_t)^{\alpha}$ upwards to $s'B(k_t)^{\alpha}$. At the current level of capital stock, k^*, investment per worker exceeds the amount required to keep capital per worker constant, and therefore the economy begins capital deepening again, which continues until $s'B(k_t)^{\alpha} = (n + \delta)k$ causing a gradual movement to a new steady-state, k^{**}. This higher level of capital per worker is associated with higher per capita output, y^{**}.

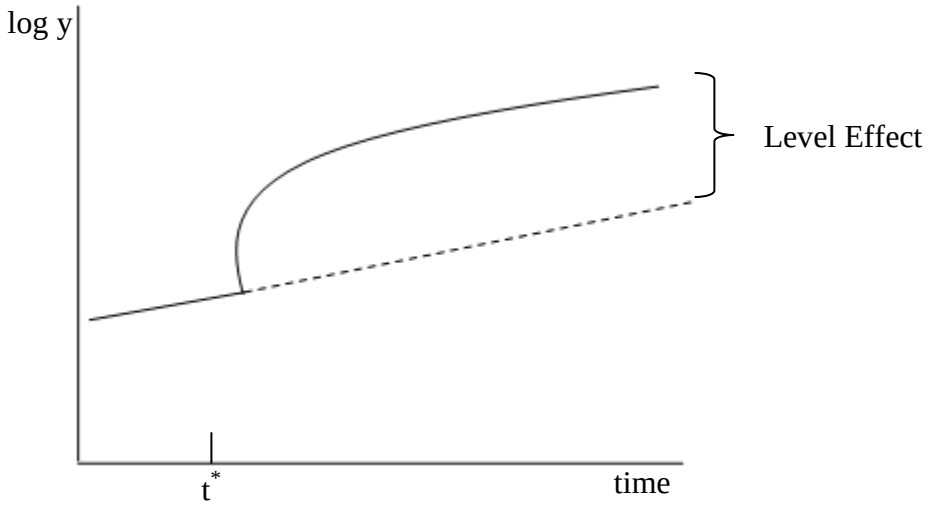
3.3 Limitations of the Solow Growth Model

The basic Solow model predicts that once a country reaches its steady state, there is no longer growth in GDP per worker. This is at odds with the observed long-run growth in GDP per capita in most developed countries. According to the model growth ceases in the long run due to diminishing marginal returns to capital, which implies that growth falls as capital becomes abundant. Hence, there is transitory growth in GDP per worker on the way to steady state, but no growth in the steady state. Nonetheless, transitory growth takes place over decades for realistic

parameters value.[27] The relative slowness in adjustment outside steady state justifies the use of the basic Solow model to study the impact of aid on growth over long periods of time.

Figure 3.5 and 3.6 illustrates how a change in the investment rate or the population growth rate affect the long run level of output per worker but not the long run growth rate of output per worker, since the later converges to a path parallel to the original growth rate.

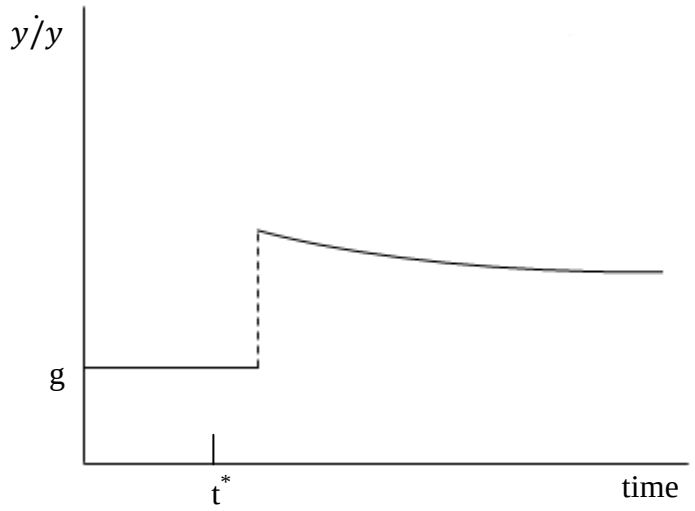
Fig. 3.5 The Effect of an increase in Investment on y



Source: Weil, D. (2009) "Economic Growth"

[27] Sørensen et al. (2010) pp.81

Fig. 3.5 The Effect of an increase in Investment on y



Source: Weil, D. (2009) "Economic Growth"

In order to better explain long-run growth rates in GDP per capita, the Solow model can be augmented with technological progress, which offsets diminishing returns to capital accumulation allowing for a long-term balanced growth path with positive growth in GDP per capita. Technology is assumed to be exogenous, "a manna from heaven"[28], which is highly implausible. A recent addition to the Solow model is human capital, which like technological progress, is not subject to diminishing marginal returns.

Other limitations to the Solow model include its failure to explain why growth rates and per capita incomes differ greatly worldwide with little sign of convergence, and why developing countries, where capital is scarce and labour abundant implying a high rate of return on capital, fail to attract large flows of capital from wealthy countries therefore equalizing the marginal productivity of capital worldwide.[29]

[28] Sørensen et al. (2010) pp.219
[29] Clunies-Ross (2009) et al pp. 102

4. EMPIRICAL MODEL SPECIFICATION AND DATA SOURCES

4.1 Empirical Model Specification

To examine whether foreign aid has an adverse impact on the capital accumulation determinants of growth, on per capita GDP growth and on exports a panel data set for 47 sub-Saharan African countries during the period 1962 - 2001 is used. Due to limited time-series data for some of the variables has been averaged in ten four-year periods from 1962 - 1965 through 1998 - 2001. Hence, an observation is a country's performance averaged over a four-year period. The two capital accumulation models are:

$$S_{it} = \beta_0 + \boldsymbol{x}_{it}\beta_{\boldsymbol{x}} + aid_{it}\beta_{aid} + aid^2{}_{it}\beta_{aid^2} + S_i + \varepsilon_{it} \quad (4.1)$$

$$I_{it} = \beta_0 + \boldsymbol{x}_{it}\beta_{\boldsymbol{x}} + aid_{it}\beta_{aid} + aid^2{}_{it}\beta_{aid^2} + I_i + \varepsilon_{it} \quad (4.2)$$

where *i* indexes countries, *t* indexes period, S is the ratio of gross domestic savings to GDP, and I_{it} is the ratio of gross domestic investment to GDP, $\mathbf{x}_{it}$ is a *P* x 1 vector of variables that affect savings and investments. Hadjimichael et al. (1995) provides a thorough analysis of the empirical determinants of savings and investments in SSA, including inflation, budget balance, growth rate of GDP per capita, foreign direct investment, and financial depth. aid_{it} indicates the level of aid to GDP received, aid^2_{it} captures potential diminishing returns to aid, S_i and I_i capture country fixed effects, which represents the net effect of omitted time-invariant variables such as political instability, military governments, climatic conditions[30], and ε_{it} is the error term, which captures the net effect of omitted variables that vary over both time and country. The model that examines the effects of aid on growth can be written as:

$$g_{it} = \beta_0 + Y_{it}\beta_y + aid_{it}\beta_{aid} + aid^2{}_{it}\beta_{aid^2} + \boldsymbol{x}_{it}\beta_{\boldsymbol{x}} + \boldsymbol{p}_{it}\beta_{\boldsymbol{p}} + g_{\boldsymbol{i}} + \varepsilon_{\boldsymbol{it}} \quad (4.3)$$

g_{it} is real per capita GDP growth, Y_{it} is the logarithm of real GDP per capita for the first year of the period, $\mathbf{x}_{it}$ is a *P* x 1 vector of capital sources (domestic and foreign), $\mathbf{p}_{it}$ is a *P* x 1 vector of variables that affect growth, these include trade, financial depth, and macroeconomic indicators,

[30] Durbarry et al. (1998) pp.8

aid_{it} is aid receipts relative to GDP, aid^2_{it} captures potential diminishing returns to aid, g_i is country-fixed effects, and ε_{it} is the error term.

The fouth model used in the empirical analyses estimates the impact of aid on exports and can be written as:

$$E_{it} = \beta_0 + \boldsymbol{x}_{it}\beta_{\boldsymbol{x}} + aid_{it}\beta_a + aid^2{}_{it}\beta_{aid^2} + E_{it} + \varepsilon_{it} \quad (4.4)$$

E_{it} is the ratio of exports to GDP, $\mathbf{x}_{it}$ is a P x 1 vector of variables that affect exports, these include real exchange rate, inflation, openness to trade, investment, and, foreign direct investment, aid_{it} is aid receipts relative to GDP, aid^2_{it} captures potential diminishing returns to aid, E_i is country-fixed effects, and ε_{it} is the error term.

The inclusion of a quadratic aid term, represented by aid_{it}^2, is based on previous studies by Durbarry *et al.* (1998) and Hansen and Tarp (2001), which view the aid-growth relationship as being non-linear. The first order derivative of the growth model with respect to aid

$$\frac{\delta g_{it}}{\delta aid_{it}} = \beta_{aid} + 2\beta_{aid^2} \quad (4.5)$$

shows that if $\beta_{aid} + 2\beta_{aid}^2 < 0$, there diminishing returns to aid, and consequently potential side effects to receiving too much aid relative to GDP.

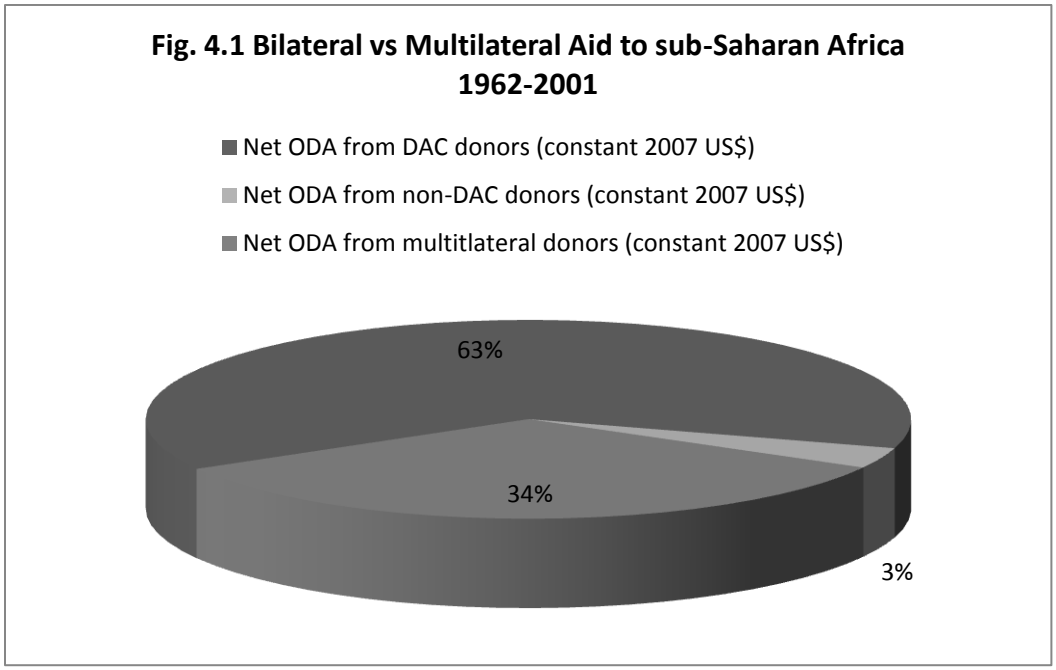
In this study the parameters in equations 4.1, 4.2, 4.3 and 4.4 are estimated using OLS. Despite being plausible, the use of two-stage least-squares (2SLS) to estimate aid-growth equations does not yield coefficients that vary greatly from those estimated using OLS. Burnside and Dollar (2000) use a Durbin-Wu-Hausman (DWH) test to test the hypothesis that the two estimation methods yield similar coefficients[31]. The reported *p* values range from 0.29 to1. Hence, they reject the alternative hypothesis that the difference in coefficients is systematic. Hansen and Tarp (2001) also report very similar results when comparing OLS and 2SLS estimates.

Bilateral aid – aid provided by one government to another - allocation is most influenced by donors' strategic interests than by recipients' income level, population, and policy[32]. Since

[31] Hansen and Tarp (2001) pp. 555
[32] Burnside and Dollar (2000) pp. 848

63% of all aid disbursed to Sub Saharan African countries, during the period covered by this study, was provided by DAC countries[33], see Figure 4.1, I assume that most of the aid received by SSA countries was not allocated with the scope of promoting economic development in the recipient country and hence is exogenous to the models.

Fig. 4.1 Bilateral vs Multilateral Aid to sub-Saharan Africa 1962-2001



The variables used in this study are averaged over four-year periods. Assuming that aid is predetermined, i.e. allocation of aid may be influenced by random events in the past but not contemporaneous events[34], and that decisions over aid allocation are made with a planning horizon of 4 to 5 years, aid may be correlated with past growth, savings and investment rates but not with current rates. Under these assumptions aid is exogenous to growth. It is uncorrelated with the error term in the growth equation and hence, OLS provide a more efficient estimate of the true aid-growth relationship.

[33] African Development Indicators, World Bank Database
[34] Hansen and Tarp (2001) pp. 554

4.2 Data Sources[35]

The data set used in this study is based on that of Roodman (2007)[36]. It consists of 470 observations for a sample of 47 countries. The first adjustment made to the Roodman (2007) data set was to restrict the country sample to 47, so as to include only SSA countries. The period of coverage was reduced from 1958 - 2001 to 1962 - 2001, this allows for the inclusion of new variables whose data is only available from 1960.

The literature that examines the effect of aid on growth traditionally uses the Official Development Assistance (ODA) measure. ODA includes grants and concessional loans, whose grant element is at least 25%. Net ODA captures the flow of funds to the recipient country in a particular year minus repayments. The Roodman (2007) data set includes three aid variables: the ratio of Net ODA to real GDP in constant 1985 US$, the ratio of Net ODA to nominal GDP and the ratio of Effective Development Assistance (EDA) to real GDP in constant 1985 US$. EDA differs from ODA in that it only includes pure transfers of resources from donors to recipients; it is the sum of grants and the grant element of loans. Net ODA/ nominal GDP was dropped from the base data set and replaced by the ratio of Net ODA per capita to real GDP per capita. Data on Net ODA per capita and GDP per capita were in current US$ and were transformed in constant 1985 US$ using an annual consumer price index (CPI)[37].

In the analysis of the effect of aid on growth, this paper uses the traditional set of macroeconomic policy controls present in most studies in addition to three major sources of capital accumulation. Three factors have been shown to affect developing countries' growth: inflation, budget surplus, and trade openness[38]. Inflation, included as the log (1 + inflation) in the dataset, indicates the overall ability of the government to manage the economy[39]. Budget surplus, measured in relation to GDP, captures the government's ability to mobilise domestic resources and hence, is a proxy for the stabilising role of government. It is defined as the sum of current and capital revenue including grants, less the sum of current and capital expenditures and government lending minus repayments[40]. Trade openness raises growth by promoting access: to advanced technology from abroad, to a variety of inputs for production, and to broader markets

[35] All data were collected from the World Bank data catalogue, except for USA consumer price index.
[36] http://www.cgdev.org/content/publications/detail/2745
[37] http://www.data360.org/dataset.aspx?Data_Set_Id=1106 ; original CPI base year has been changed from 2000 to 1985
[38] World Bank (1998) pp.12
[39] Durbarry et al. (1998) pp. 5
[40] Durbarry et al. (1998) pp. 9

that raise the efficiency of domestic producers through specialization[41]. The Sachs and Warner measure of trade openness used in this study, is a dummy variable that takes the value of zero if a country is closed or one otherwise. As in Burnside and Dollar (2000) instead of including these three macroeconomic policy variables separately they are used to construct a policy index, given by:

$$\text{Policy} = 1.28 + 6.85(\text{Budget Surplus}) - 1.4(\text{Inflation}) + 2.16(\text{Trade Openness})$$

Since Burnside and Dollar (2000) published the policy index it has been used by several other studies as a control variable. In order to make results more easily comparable I measure the impact of good policies on growth in the same manner.

Financial repression is believed to be detrimental to growth[42]. The level of broad money (M2) over GDP proxies for the development of the financial system, and it is lagged one period in the dataset due to concerns over the endogeneity of the same[43]. The logarithm of the initial level of per capita GDP is included to capture conditional convergence effects.

In the neoclassical growth model capital accumulation is the main source of output growth while population growth slows down the growth rate. Three main sources of capital accumulation, investment, savings, and foreign direct investment, not present in the original Roodman (2007) dataset were included. Savings is measured as the ratio of gross domestic savings to GDP and investment is measured as the ratio of gross domestic investment to GDP, and FDI is measured as a ratio to GDP. Population enters the regressions in logarithmic form.

Level of exports, not present in Roodman (2007), is measured as the ratio of exports to GDP. Real effective exchange rate, which is an index that measures the price competitiveness of the country's exports relative to its trading partners, enters the regressions in logarithmic form.

[41] Durbarry et al. (1998) pp. 9
[42] Durbarry et al. (1998) pp. 5
[43] Burnside and Dollar (2000) pp. 850

5. EMPIRICAL RESULTS

5.1 The impact of foreign aid on investment

Table.1 estimates the effect of foreign aid on gross domestic investment using three alternative measures of aid. In general the model performs well. The explanatory variables explain 0.72% of the variation in investment, slightly higher than what similar studies report[44]. Not all coefficients are statistically significant, but they all have the expected sign.

Growth in GDP per capita has a positive and statistically significant impact on domestic investment. Growth in GDP per capita signals an increase in aggregate demand causing firms to increase inventories in order to cope with unexpected or temporary fluctuations in production or sales and to invest in fixed assets, since they expect future profits from installed capital to be higher. Foreign direct investment has a sizeable effect on domestic investment. FDI can ease domestic financial constraints and cause crowding-in effects by creating linkages and externalities.

The objective of the regressions in Table 1 is to test the hypothesis that aid has no impact on gross domestic investment:

$$H_0: \beta_{aid} = 0$$

The alternative hypothesis is that aid has a discernible effect, either positive or negative, on domestic investment:

$$H_1: \beta_{aid} \neq 0$$

All three aid coefficients have *t*-statistics which fall below the critical values at the 10%, 5% and 1% significance level. Hence, the alternative hypothesis is rejected in favour of the null. Even if the aid coefficients showed a significant effect on investment the direction of the effect would be ambiguous. EDA has a positive effect on investments with diminishing returns while ODA has a negative impact with no signs of diminishing returns. This reinforces the importance of using alternative measures of aid to attest the robustness of the results obtained. Contrary to Hansen and Tarp (2001), the regressions in Table.1 show that aid has no statistically significant impact on gross domestic investment in SSA. Hansen and Tarp (2001) studies 56 countries, out of which

[44] Hadjimichael et al. (1995) regressions explain 71% of the variation in investment

21 were in SSA. Their study includes Tunisia, Morocco and Sri Lanka. Easterly (2003) found that in these countries an additional 1 per cent of GDP in aid increased investments by 1 per cent of GDP. Hansen and Tarp (2001) results could have been driven by these outliers.

Compared to other developing regions SSA attracts the lowest amount of FDI signalling a lower internal rate of return. Economic agents invest in the future when they get a high return to their investments. If these agents expect returns to be low or uncertain, they will not invest. Hence, no amount of aid will significantly increase investment in SSA if the incentives agents need to carry out these investments are not present. Instead aid will be consumed. This could explain why this study found foreign aid to have no significant impact on gross domestic investment in SSA.

5.2 The impact of aid on savings

Table.2 estimates the effect of foreign aid on savings. The model explains 71% of the variation in domestic savings in SSA. Despite the fact that none of the explanatory variables are statistically significant, the F-values show that the coefficients in the three models are jointly significant at the 5% level. Insignificant coefficients, but a rejection of the joint hypothesis that those coefficients are all zero signals the presence of multicollinearity. In the presence of multicollinearity, the estimated impact of the explanatory variables on gross domestic savings is less precise than if the explanatory variables were uncorrelated with one another. This helps explain why the sign, on some the coefficients, contradicts what theory predicts. Financial liberalisation, proxied by the level of broad money (M2) over GDP, is predicted to increase domestic savings by lessening controls on interest rates and on deposits. In Table 2 the coefficients on M2/GDP have a negative sign. Hadjimichael et al. (1995) pointed out that the growth in broad money in SSA fluctuated from year to year with no clear trend contributing to the variability in the annual inflation rate and this variability can have adverse effects on savings.

Foreign aid is assumed to facilitate and accelerate the process of development by generating additional domestic savings as a result of the higher growth rates that it is presumed to induce. Opponents of foreign aid programs, on the other hand, argue that domestic savings decline as a result of aid-induced increased consumption. The null hypothesis states that aid has no impact on gross domestic savings:

$$H_0: \beta_{aid} = 0$$

This hypothesis is tested against a two tailed alternative where foreign aid has an impact on domestic savings rate:

$$H_1: \beta_{aid} \neq 0$$

For all three measures of aid the *t*-statistics are smaller than the critical value at the 5% level, therefore the null hypothesis cannot be rejected. If statistically significant, the effect of foreign aid on savings in SSA would be negative with no diminishing returns, which is what Hadjimichael et al. (1995) and other similar studies find [45].

Multicollinearity issues impede this study from making any valid inferences on how aid impacts gross domestic savings. Instead, this study bases its argument that foreign aid may not have any robust impact on domestic savings in SSA on theoretical grounds.

Weil (2009) suggests two alternative explanations for the low rate of savings observed in most poor countries. People in poor countries live at the margin of subsistence, and hence cannot afford to reduce their present consumption in order to save for the future. An alternative to this argument focuses not on the constraints that poor people face but rather on their voluntary choices. The decision to save rather than to consume represents a choice between current and future satisfaction, so a person who does not care much about the future will not save. SSA is the most conflict ridden region in the world region, and where the number of armed conflicts is on the increase[46]. Life expectancy in the region is lower today than it was 30 years ago mainly because of the ravages of HIV/Aids[47]. If people value the present more because they are uncertain about the future, aid does not induce greater levels of savings because, at least in the short run, it cannot change the incentives people face when choosing consumption today over consumption tomorrow and people respond to incentives. In this context, foreign aid ends up being consumed by recipient governments rather than saved to be enjoyed in the future.

[45] See Hadjimichael et al. (1995) pp.50
[46] Moyo (2009) pp.59
[47] UN Development Programme's - Human Development Report (2006)

5.3 The impact of aid on growth

Table.3 estimates the effect of foreign aid on growth of per capita GDP. The three measures of aid and the two alternative sources of capital accumulation were used to yield six regressions. The maximum number of observations included in one single regression is 131, which is considerably more than the number of observations obtained by most studies in regressions which only include SSA countries[48]. In accordance with similar studies, the independent variables help explain around 36% of the variation in per capita income growth rates.

The policy index and the proxy for financial liberalisation are correctly signed but not statistically significant. Most studies that include M2/GDP lagged one period find the coefficients on this variable to be statistically insignificant. The policy index is not only statistically insignificant but the magnitude of its impact on growth is considerably smaller than what Burnside and Dollar (2000) reports.

As the neoclassical model predicts, the main determinant of per capita income growth is capital accumulation. The effect of investment and savings on growth is positive and statistically significant. A one standard deviation increase in the ratio of gross domestic investment to GDP leads to a 3.6% increase in the growth rate of GDP per capita. Similar to Durbarry et al. (1998) findings, FDI has a larger impact on growth than any other source of capital accumulation.

Foreign aid does not damage the recipient country by reducing its level of capital accumulation. Nonetheless, foreign aid can still damage a recipient country by reducing its growth rate of per capita income through channels not investigated in this study. Regressions 3.1 to 3.6 test two hypotheses: aid has an impact on growth and there diminishing returns to aid. These hypotheses were tested against a two tailed alternative:

$$H_0: \beta_{aid} = 0$$
$$H_1: \beta_{aid} \neq 0$$

$$H_0: \beta_{aid^2} = 0$$
$$H_1: \beta_{aid^2} \neq 0$$

[48] Durbarry et al. (1998) reports 90 observations in similar regressions where only SSA countries are included

For all three measures of aid and the two alternative measures of capital accumulation we fail to reject the null hypotheses. The only exception is the coefficient on ODA per capita /GDP per capita^2 in regression 3.6 which is statistically different from zero at the 10% level. Despite being statistically insignificant, in terms of magnitude ODA per capita/ GDP per capita have a large impact, but ambiguous impact on growth. In regressions 3.1 to 3.3 all aid and aid-squared coefficients have negative signs. In regressions 3.4 to 3.6 aid has a positive and insignificant impact on growth with diminishing returns.

These findings confirm the ambiguity of the aid-growth relationship, the sensitivity of the model to alternative aid and capital accumulation measures, and indicate that foreign aid does not have any systematic effect on growth. Yet, they do not contradict previous findings of a positive aid-growth relationship over a short period of time, usually four years, in SSA. This study, like others, show that in the long run this relationship is not robust. Rajan and Subramanian (2008) also found little robust evidence of a positive (or negative) relationship between aid inflows and economic growth after analysing a panel of 83 countries, among which 33 SSA countries, covering the period 1960-2000.

5.4 The impact of aid on exports

A macroeconomic side effect of large inflows of aid is the loss of competitiveness incurred by the exportable sector due to the appreciation of the domestic currency. Table 4 estimates the effect of foreign aid on exports. The explanatory variables explain an impressive 85% of the variation in exports to GDP ratio. Regressions 4.1, 4.2 and 4.3 provide some insights into the relationship between exports and macroeconomic variables in SSA. Real exchange rate exhibits a negative statistically insignificant coefficient, implying that even if aid caused an appreciation of the real exchange rate that would not depress exports in SSA significantly. Inflation, which in the Dutch disease model damages exportable sector competitiveness through the spending effect, has a significant and positive effect on exports in SSA. Imports of intermediate goods in SSA totalled US$25.4 billion in 2001[49]. If a country is a net importer of inputs to production, an appreciation of the real exchange rate caused by inflation need not damage the competitiveness of its traded sector to the extent that firms are able to offset a loss of competitiveness caused by

[49] African Development Indicators, The World Bank (2011)

an appreciation of the domestic currency by reducing production cost. Hence, the positive effect inflation has on exports in SSA might have be caused by its status as a net importer of inputs.
The objective of regressions 4.1, 4.2 and 4.3 is to test whether aid damages exports.

$$H_0: \beta_{aid} = 0$$

$$H_1: \beta_{aid} \neq 0$$

The null hypothesis that aid has no effect on exports was tested against a two-tailed alternative hypothesis. The alternative hypothesis is rejected in favour of the null. Foreign aid has no robust impact on exports in SSA. Inferences regarding how aid would impact exports had the estimators been statistically significant cannot be made since the signs on the aid coefficients are not uniform. The results here presented do not challenge the view that foreign aid causes Dutch disease. The divide between the underlying characteristics of many SSA economies and the premises of the Dutch disease model makes its prediction avoidable. In particular, the assumption that countries are producing on their PPF is not in line with many SSA economies where high unemployment and inefficient use of production factors exists. Furthermore, most of the aid provided to SSA finances imports rather than domestically produced goods, lessening its impact on domestic price levels and the exchange rate[50].

Regressions 4.4, 4.5 and 4.6 are estimates of the aid-growth relationship augmented to include exports. The inclusion of exports does not change the signs of any of the coefficients. Investment becomes marginally insignificant and the magnitude and significance of the FDI coefficients decrease. Exports have a positive but not statistically significant impact on growth. None of the coefficients on the aid variables are statistically significant. The addition of exports causes the coefficients on EDA/GDP and ODA/GDP to decrease and the coefficients on EDA/GDP^2 and ODA/GDP ^{2} to increase in comparison with similar regressions in Table 3. The opposite is true for ODA/GDP per capita and ODA/GDP per capita^2. This lack of uniformity does not allow for inferences regarding the direction of the effect of aid on growth when exports are controlled for to be made. Once again the results lead to the conclusion that foreign aid has no robust impact on growth.

[50] Lancaster (1999) pp.62

6. EVALUATION

Many measures were put in place in order to guarantee the robustness of the empirical results on which the inferences made on this paper are based.

Omission of an important variable that is correlated with any of the explanatory variables causes the OLS to be biased and inconsistent, since it violates the Gauss-Markov assumption: $E(u_t|\mathbf{X}) = 0$. Country unobserved characteristics that affect the dependent variable over time could be correlated with other explanatory variables, for instance cultural and socioeconomic characteristics could be correlated with macroeconomic policy indicators[51]. Hence, the models in this paper were estimated using fixed effects estimators, which controls for unobserved country heterogeneity when this is constant over time and correlated with the independent variables[52].

The data in this study, like in many others that rely on macro panels with long time series, was serially correlated and heteroskedastic, thus violating two Gauss-Markov assumptions[53]:

$$Var(u_t|\boldsymbol{X}) = Var(u_t) = \sigma^2 \qquad for\ t = 1, 2, \dots, n$$

$$Corr(u_t, u_s|\boldsymbol{X}) = 0 \qquad for\ at\ t \neq s$$

In this context, the OLS estimators are still unbiased but no longer BLUE (Best Linear Unbiased Estimator) and the standard errors, *t* statistics, and *F* statistics can no longer be used for statistical inference. To ensure the inferences made as a result of hypothesis testing were not affected by biased standard errors the effect of foreign aid on growth and on determinants of growth is estimated using OLS with heteroskedasticity and serial correlation consistent standard errors.

In terms of sample size, this study fares well. Nonetheless, the choice of only including SSA countries restricted the sample size and caused a considerable amount of observations to be

[51] Hansen and Tarp (2001) pp.555
[52] A Hausman test lead to the rejection of the null hypothesis that the preferred model is estimated using random effects
[53] A modified Wald test for groupwise heteroskedasticity in fixed effect model was used to detect the presence of heteroskedasticity. A Wooldridge test for autocorrelation in panel data was used to detect the presence of serial correlation.

dropped from the regressions. Asymptotic normality implies that as the sample size gets larger the distribution of the estimated parameter converges to the distribution of the actual parameter. Therefore, restricting the sample size may have had an unfavourable impact on the OLS estimators.

A common view opponents of foreign aid programs have is that aid damages the recipient country by increasing corruption[54]. This study could have benefited from the analyses of whether foreign aid causes corruption to increase, since higher levels of corruption are associated with lower growth[55]. Initially, I intended to include regressions estimating the effect of aid on corruption; however reliable and free data on corruption that extends over a long period of time and includes a significant number of SSA countries is not available. The earliest measure of corruption available is the International Country Risk Guide (ICRG). It has yearly data since 1984 and covers the largest number of countries, including 32 SSA countries, but it is not available for free. The Transparency International Corruption Index, which has data from 1995, is freely available but only includes a maximum of 15 SSA countries during the nineties. Data limitations and the adverse impact it could on the OLS estimators have lead this paper to focus on other detrimental effects of aid.

7. CONCLUSION

This paper investigated how and the extent to which foreign aid damages SSA using data on 47 countries and for 40 years. This study focused on how aid can have a deleterious impact on determinants of growth and growth itself. In my framework, aid can damage the recipient country through four different channels: aid crowds out investment, aid decreases domestic savings, aid hinders economic growth, and aid reduces the level of exports.

Contrary to other studies, I found that aid has no significant impact on gross domestic investment. Like Easterly (2001) I presume people only respond to the right incentives. Thus, foreign aid's failure to have any impact on domestic investment stems from its inability to influence the incentives people in SSA face when deciding whether or not to invest.

[54] See Moyo (2009) pp.48-53
[55] Mauro (1995) pp.705

The regressions indicated that aid has no effect on the rate of gross domestic savings in SSA. Multicollinearity compromised the reliability of the estimated coefficients. Therefore, rather than concluding, based on empirical evidence, that aid does not affect savings in SSA , this paper argues that aid might not have any significant effect on savings as, once again, it fails to affect the incentives people in SSA face when choosing between consumption today and consumption tomorrow.

Consistent with other authors, this paper showed that foreign aid has no significant impact on growth in SSA in the long run. Hence, the view that a micro-macro paradox exists, , where aid-funded projects report positive micro-level economic returns that are undetectable at the macro-level, is not challenged by this study. The regressions confirmed the neoclassical model assumption that capital accumulation is the main determinant of growth. Hence, foreign aid's insignificant impact on growth may arise from its apparent lack of effect on the determinants of capital accumulation.

Finally, this paper explored whether the argument that foreign aid causes Dutch disease is plausible in the case of SSA. The regressions estimating the impact of aid on exports showed that the transmissions channels through which aid causes Dutch disease do not adversely or significantly depress exports. Foreign aid itself has no robust impact on the ratio of exports to GDP. These results do not indicate that aid does not cause Dutch disease. On the contrary, the premises of the Dutch disease model do not apply to most SSA economies making its predictions avoidable.

This paper failed to detect the adverse effects attributed to aid in the literature. The use of two alternative definitions of aid, from which three different aid variables were yielded, confirmed how fragile results are to different aid definitions. In half of the regressions here studied the direction of the impact of aid on the dependent variable is sensitive to the definition of aid used. Due to this high sensitivity, an author's choice of variables could be influenced by what results are expected as a priori rather than methodological considerations. Thus, further study on aid effectiveness should not focus on whether aid affects growth but on how to improve the current framework under which the aid-growth relationship is studied.

This paper argued the foreign aid's failure originates in its inability to influence incentives people in SSA face. Due to data and limitations, this study could not exhaustively examine all channels through which aid damages the recipient country. Hence, the results

presented in this paper do not lead me to immediately conclude that aid could not damage the recipient country. When measuring the impact of aid on growth, out of all the determinants of growth I controlled for, FDI has the largest and most significant impact. FDI is very sensitive to the political regime and institutional quality in the recipient country. Several studies attested the link between foreign aid the worsening of political institutions, and an increase in the level of corruption[56]. Investors, like people, respond to the right incentives. Therefore, foreign aid could damage a recipient country by keeping in place unfavourable incentives, and as a consequence hamper development.

Nonetheless, in certain circumstances, such as when countries are subject to natural disasters or ravaging civil wars, foreign aid is required and imperative. Foreign aid should not be a main tool for policymakers trying to promote development in countries where the conditions or mentality required for development are not in place. In this context, aid acts as a substitute to development in the sense that it sustains bad practices by keeping countries afloat, when the threat of sinking could induce them to pursue policies that promote growth. If aid is ever to promote development, it has to be targeted to countries that are capable of swimming on their own. The answer to why countries that are capable of swimming on their own may need floating belts is beyond the scope of this paper and only aid agencies and donor governments may be able to provide.

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APPENDIX

Table 1. Estimates of the Effects of Foreign Aid on Domestic Investment
Countries: 32 SSA countries[57]
Time dimension: ten four-year periods, 1962-1965 to 1998-2001

Dependent Variable	Gross Domestic Investment as a ratio to GDP		
Explanatory Variables	(1.1)	(1.2)	(1.3)
Constant	0.162 (5.24)***	0.170 (4.59)***	0.166 (4.82)***
Growth GDP per capita	0.00485 (2.72)*	0.00506 (2.97)**	0.00506 (2.93)**
M2/GDP lagged	0.000480 (0.406)	0.000546 (0.53)	0.000579 (0.59)
Budget Balance	-0.204 (-1.30)	-0.228 (-.143)	-0.227 (-1.44)
Inflation	-0.0167 (-1.09)	-0.0152 (-1.05)	-0.0159 (-1.08)
FDI	0.621 (3.27)**	0.595 (3.17)**	0.606 (3.06)**
EDA/GDP	0.00568 (0.83)	—	—
$(EDA/GDP)^2$	-0.000678 (-1.34)	—	—
ODA/GDP	—	-0.00109 (-0.15)	—
$(ODA/GDP)^2$	—	0.0000140 (0.04)	—
ODA per capita /GDP per capita	—	—	-0.127 (-0.04)
(ODA per capita /GDP per capita)^2	—	—	0.0325 (0.06)
R^2	0.782	0.780	0.779
Adjusted R^2	0.724	0.721	0.720
F-value	6.48	6.91	8.01
Observations	181	181	181

Note: The symbols ***, **, and * denote statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

[57] Because of data limitations, only 32 countries were included in these regressions.

Table 2. Estimates of the Effects of Foreign Aid on Domestic Savings
Countries: 28 SSA countries[58]
Time dimension: ten four-year periods, 1962-1965 to 1998-2001

Dependent Variable	Gross Domestic Savings as a ratio to GDP		
Explanatory Variables	(2.1)	(2.2)	(2.3)
Constant	0.240 (2.92)**	0.272 (2.99)**	0.255 (2.78)**
Growth GDP per capita	0.000633 (0.62)	0.000229 (0.24)	0.00121 (1.31)
M2/GDP lagged	-0.00404 (-1.18)	-0.00377 (-1.16)	-0.00253 (-0.80)
Budget Balance	0.208 (1.07)	0.146 (0.78)	0.0999 (0.52)
Inflation	-0.0706 (-1.82)	-0.0632 (-2.28)*	-0.0695 (-2.18)*
EDA/GDP	-0.00440 (-0.34)	—	—
$(EDA/GDP)^2$	-0.00190 (-1.98)	—	—
ODA/GDP	—	-0.0149 (-0.89)	—
$(ODA/GDP)^2$	—	-0.000402 (-0.52)	—
ODA per capita /GDP per capita	—	—	-0.934 (-1.13)
(ODA per capita /GDP per capita)^2	—	—	0.449 (0.31)
R^2	0.778	0.781	0.777
Adjusted R^2	0.708	0.713	0.708
F-value	2.56	5.24	4.33
Observations	140	140	140

Note: The symbols ***, **, and * denote statistical significance at the 0.01, 0.05 and 0.10 levels, respectively

[58] Because of data limitations, only 28 countries were included in these regressions.

Table 3. Estimates of the Effects of Foreign Aid on Growth
Countries: 27 SSA countries[59]
Time dimension: ten four-year periods, 1962-1965 to 1998-2001

Dependent Variable	Growth of per capita GDP					
Explanatory Variables	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(3.6)
Constant	69.63 (1.83)	71.30 (1.84)	69.76 (1.92)	87.19 (2.18)*	87.74 (2.13)*	89.86 (2.32)*
Initial GDP per capita	-6.062 (-.2.28)*	-6.341 (-2.30)*	-6.515 (-2.27)*	-6.454 (-2.70)*	-6.717 (-2.70)*	-6.831 (-2.70)*
Population	-2.107 (-1.21)	-2.074 (-1.18)	-1.925 (-1.14)	-2.972 (-1.59)	-2.878 (-1.52)	-3.001 (-1.63)
M2/GDP lagged	0.0704 (1.15)	0.0718 (1.17)	0.0767 (1.21)	0.0695 (1.13)	0.0706 (1.14)	0.0783 (1.26)
Investment	18.37 (2.25)*	18.67 (2.24)*	19.20 (2.28)*	—	—	—
Savings	—	—	—	13.84 (2.77)*	14.14 (2.80)**	14.33 (2.81)**
FDI	29.35 (2.91)**	28.83 (2.80)**	28.01 (3.11)**	43.21 (4.34)***	43.29 (4.48)***	40.88 (3.99)***
Policy	0.309 (0.76)	0.286 (0.71)	0.343 (0.87)	0.165 (0.39)	0.130 (0.31)	0.210 (0.51)
EDA/GDP	-0.0552 (-0.17)	—	—	0.0713 (0.22)	—	—
$(EDA/GDP)^2$	-0.0251 (-1.12)	—	—	-0.0436 (-2.03)	—	—
ODA/GDP	—	-0.109 (-0.35)	—	—	0.302 (0.10)	—
$(ODA/GDP)^2$	—	-0.0128 (-0.79)	—	—	-0.0263 (-1.70)	—
ODA per capita /GDP per capita	—	—	-3.257 (-0.28)	—	—	3.509 (0.29)
(ODA per capita /GDP per capita)^2	—	—	-20.12 (-1.23)	—	—	-40.37 (-2.20)*
R^2	0.530	0.534	0.533	0.524	0.529	0.528
Adjusted R^2	0.362	0.367	0.366	0.356	0.362	0.360
F-value	6.74	6.22	6.00	5.55	4.83	4.99
Observations	130	130	130	131	131	131

Note: The symbols ***, **, and * denote statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

[59] Because of data limitations, only 27 countries were included in these regressions.

Table 4. Estimates of the Effects of Foreign Aid on Exports and Growth
Countries: 13 SSA countries for regressions 4.1-4.3, and 27 for regressions 4.4-4.6.
Time dimension: ten four-year periods, 1962-1965 to 1998-2001

Dependent Variable	Exports as a ratio to GDP			Growth of per capita GDP		
Explanatory Variables	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)
Constant	0.200 (1.28)	0.212 (1.31)	0.137 (0.65)	66.97 (1.82)	68.58 (1.83)	66.65 (1.89)
Real Exchange Rate	-0.0110 (-0.42)	-0.0119 (0.-12)	-0.0040 (-0.12)	—	—	—
Inflation	0.147 (4.49)***	0.143 (4.44)***	0.138 (3.61)**	—	—	—
Sachs and Warner	0.0798 (3.34)**	0.0777 (3.10)**	0.0744 (3.12)**	—	—	—
Initial GDP per capita	—	—	—	-6.537 (-2.58)*	-6.826 (-2.61)*	-7.059 (-2.56)*
Population	—	—	—	-1.813 (-1.03)	-1.774 (-1.01)	-1.576 (-0.92)
M2/GDP lagged	—	—	—	0.0703 (1.19)	0.0716 (1.21)	0.0766 (1.25)
Investment	0.671 (3.34)**	0.666 (3.22)**	0.672 (3.17)**	15.76 (1.98)	15.97 (1.97)	16.52 (2.03)
FDI	-0.451 (-0.77)	-0.430 (-0.71)	-0.275 (-0.46)	22.55 (2.28)*	21.85 (2.19)*	21.09 (2.37)*
Policy	—	—	—	0.136 (0.35)	0.108 (0.28)	0.162 (0.43)
Exports	—	—	—	7.935 (1.75)	8.146 (1.78)	8.270 (1.80)
EDA/GDP	-0.0135 (-1.35)	—	—	-0.0954 (-0.29)	—	—
$(EDA/GDP)^2$	0.000975 (1.28)	—	—	-0.0222 (-0.99)	—	—
ODA/GDP	—	-0.0108 (-1.29)	—	—	-0.126 (-0.41)	—
$(ODA/GDP)^2$	—	0.000547 (1.08)	—	—	-0.01221 (-0.74)	—
ODA per capita /GDP per capita	—	—	0.0247 (0.06)	—	—	-4.461 (-0.37)
(ODA per capita /GDP per capita)^2	—	—	0.0127 (0.02)	—	—	-18.49 (-.1.07)
R^2	0.890	0.891	0.887	0.542	0.547	0.547
Adjusted R^2	0.847	0.848	0.843	0.372	0.379	0.378
F-value	7.67	7.09	6.27	5.27	5.09	5.23
Observations	68	68	68	130	130	130

Note: The symbols ***, **, and * denote statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 5. Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Budget Balance	260	-0.043	0.058	-0.039	0.153
Exports	396	0.284	0.183	0.042	1.006
FDI	269	0.017	0.057	-0.082	0.787
Growth GDP per capita	394	0.881	4.515	-34.712	26.486
Inflation	325	0.157	0.298	-0.063	2.646
Initial GDP per capita	438	6.802	0.666	4.214	8.964
Investment	372	0.194	0.102	0.035	0.824
M2/GDP lagged	331	22.232	33.248	0.046	534.589
Population	465	15.039	1.531	10.692	18.609
Real Exchange Rate	104	191.019	223.039	57.816	1629.9
Sachs and Warner	345	0.182	0.373	0	1
Savings	294	0.0924	0.223	-1.059	1.1814
EDA/GDP	427	2.411	3.545	-12.606	33.095
$(EDA/GDP)^2$	427	18.348	69.051	0	1095.27
ODA/GDP	427	4.473	4.684	0	44.688
$(ODA/GDP)^2$	427	41.897	127.492	0	1997.06
ODA per capita /GDP per capita	396	0.112	0.111	0.0003	0.683
(ODA per capita /GDP per capita)^2	396	0.250	0.055	0	0.466