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## **Growth Instability and Development Assistance among African Countries**

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**Abstract**

*There is much written on the growth performance of the sub-Saharan countries that focuses on explaining average rates of growth over shorter or longer periods. This paper demonstrates that a key characteristic of the countries of the sub-Saharan region is the instability of growth rates, across countries, and for individual countries over time. Research suggests that this instability has a negative effect on average growth rates. Building on this insight, we use a simple model to account for instability, and suggest policy measures to reduce it. While reducing instability is fundamentally a task of long-run development strategy, we find that short-term macro management supported by development assistance can have a substantial impact*

Key words: Growth, Growth instability, sub-Saharan Africa, Development Assistance, Aid

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## I. Introduction

There is relatively little research on a central characteristic of their growth over the last forty years: the tremendous year-to-year variability of growth rates.<sup>1</sup> In part this is a result of the statistical techniques and analytical models used by various authors and international institutions. It also may arise from a tendency to view growth as an equilibrium process, and deviations from the equilibrium path to be the result of random 'shocks' or policy mistakes. This paper first inspects the degree to which instability afflicts the sub-Saharan countries, then considers the causes as revealed by empirical evidence.

Analysing the variability of growth is important for both analytical and policy purposes, because average rates conceal important clues about a country's economic performance. For example, over forty years (1961-1999) Burkina Faso and Rwanda had almost the same average growth rate (3.4 and 3.3 percent per annum, respectively), and one might conclude that their growth performances were quite similar. This judgement would be reassessed by the discovery that the standard deviation of the growth rate for the former was 3.4 and for the latter 12.1. This difference in variability has important implications for macroeconomic management. Growth variability in sub-Saharan countries is so great, even excluding conflict-affected countries, that it cannot credibly be explained or dismissed as the result of 'poor policy'. It is difficult to avoid the conclusion that the growth variability arises from structural characteristics of the countries, which have a historical and social basis. A central policy issue is whether short-term macroeconomic policy might be used to reduce growth variability.

## II. The Instability of Growth in the Sub-Sahara

### Growth and Growth Instability

Before inspecting indicators of the instability of growth among the sub-Saharan countries, we consider whether instability is associated with poor growth performances. Since in a subsequent section we model instability in terms of key variables determining the growth rate, the modelling would be internally inconsistent if growth were specified as a function of that instability; that is, we should not both specify growth as a function of instability, and specify instability as a function of the determinants of growth.

We treat the relationship between the average rate of growth over time and its instability to be a hypothesis, rather than behavioural. Figure 1 shows a scatter diagram of the average growth rate of thirty-nine sub-Saharan countries, and the standard deviation of that rate, using four-year moving periods, 1961-1999.<sup>2</sup> Visual inspection of the diagram suggests a negative relationship over much of the thirty-nine years. For the period 1969-1981, the adjusted correlation coefficient is 0.32,

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<sup>1</sup> A notable exception is the article by Lensink and Morrissey (2000), to which we refer below. The discussion in this paper is careful not to use the term 'vulnerability' or, more specifically, 'structural vulnerability', a concept developed by the Committee for Development Policy to mean 'the risk of being negatively affected by unforeseen events beyond the control of country' (Committee for Development Policy 2000, p. 12). While the measures used below may be relevant to vulnerability, they derive from growth rates themselves, rather than measures or proxies for factors determining vulnerability.

<sup>2</sup> The diagram shows the four-year standard deviation of the cross country average, not the standard deviation among countries.

with an elasticity between the variables of -0.72; and for 1982-1999, the statistics are 0.48 and -0.88, respectively. These statistics suggest that for most of the thirty-nine years, the hypothesis that instability impacts negatively on the regional growth rate cannot be rejected. This hypothesis has been tested econometrically and confirmed by Lensink and Morrissey (2000). The conclusion of that study is indirectly supported by the results in a paper by Fosu (2001) linking growth to instability in imports, exports and investment.

There are several arguments to support the instability-reduces growth hypothesis. First, growth instability can discourage private investment. Collier and Gunning (1999) have argued that the sub-Saharan countries are characterised by high degrees of risk, which impacts negatively on investment by domestic producers and foreign companies. Growth instability is an aggregate signal of this risk and uncertainty. Second, with regard to governments, excessive fluctuations in the growth rate have a negative impact on the ability to manage monetary and fiscal policy. Even if monetary instruments were effective, an issue discussed below, their use to reduce fluctuations could undermine the private sector's ability to anticipate policy changes. On the fiscal side, instability results in fluctuations in revenue, which make it more difficult for governments to manage and programme expenditures, especially if the government is operating under deficit conditionalities by external donors and lenders whose behaviour may be unpredictable (see Lensink & Morrissey 2000, 32-33).

Third, instability can affect household welfare. Mendoza comments, 'growth effects that could result from uncertainty and risk aversion in the presence of terms-of-trade effects, as well as uncertainty with the regard to other growth determinants, are generally ignored [in growth models]' (Mendoza 1997, p. 326), and proceeds to construct a model of household behaviour based the savings-under-uncertainty framework of Phelps (1962) and Levhari and Srinivasan (1969). His empirical results provide robust support for hypothesis that instability in the terms of trade lower the growth rate, and he concludes that 'the proposition that indicators of risk are relevant for growth can be extended to the other variables typically emphasized in empirical growth analysis...' (Mendoza 1997, p. 355). The negative impact of the variability of the terms of trade has also been found in other empirical studies (Barro & Sala-i-Martin 1995; Easterly, Prichett & Summers 1993; and Fischer 1993).<sup>3</sup>

On the basis of previous work, we accept the hypothesis that instability of growth has a negative impact on the average rate of growth, and investigate the causes of variability, in order to consider policies to reduce it. This extends previous research, which focused on the impact of instability on growth itself.

#### Measures of Growth Instability

Having established a *prima facie* case for the impact of growth instability on the average growth rate, we inspect various indicators of instability within and among sub-Saharan countries that will provide the basis for the subsequent modelling of instability. Figure 2 displays the average growth rate and standard deviation of growth rates across countries. In only six of the thirty-nine years was the standard deviation lower than the cross-country growth rate, and these occur with apparent randomness.<sup>4</sup>

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<sup>3</sup> See also Pallage and Robe (2003), who compare the welfare costs of instability in developed and developing countries, and find it to be considerably higher in the latter. Elbadawi and Schmidt-Hebbel (1998) also compared developed and developing countries and reached the conclusion that high variability was associated with low growth.

<sup>4</sup> While there are thirty-nine countries with time series, only thirty-one have data for all thirty-nine years. However, the cross-country averages for 1961-1999 are almost the same for both sets of countries. Figure 2 uses the average for thirty-nine.

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Table 1 provides several complementary indicators of growth instability. The first column of gives the number of years for which there are GDP growth statistics for each country, and, whatever the start date, each series is continuous through 1999. The second column gives the percent of years for which the growth rate of the country was above the average for the region, which is followed by the growth rate itself, the standard deviation, and the coefficient of variation. To these basic growth statistics are added the relative growth rate, which is the country average divided by the regional average (with the latter calculated for the years for which there are data for the country). Columns eight and nine report the number of times each country was among the ten fastest and ten slowest growers in the region, by decade (1960s, 1970s, etc.). The final three columns report extreme shifts in growth rates, arbitrarily defined as a year-to-year change in the absolute value of the growth rate equal to or greater than ten percentage points; the percentage of years when this occurred follows, and, finally, the number of these shifts that were consecutive.

Column three of the table reports for each country the number of years that growth was above the regional average, as a percentage of all years. The percentage of years above the average compared to relative growth suggests that country growth rates were skewed. For the region as a whole, the skew is negative, as Figures 4 and 5 show, the former for growth rates themselves, and the latter for the absolute first difference. The mean growth rate across countries for all years was 3.5, compared to the median value of 3.1. About sixty percent of the growth rates lay below the average. For first differences, by definition there is a mean of zero, but a median of 0.1, again with a negative skew.

It should be noted that countries migrate in and out of the top and bottom ten. However, there are a few cases of persistent high growers and low growers. Five countries appear in the top ten at least three times, Botswana (the only one with the maximum of four), Mauritius, Malawi, Lesotho and Kenya. Three of these five are small countries and contiguous to South Africa (members of the South African Customs Union, SACU), and a fourth, Mauritius, is an island with few structural similarities to the continental countries. The third member of SACU, Swaziland, appears in the top ten only once, but had the third highest growth rate for the region, just behind Lesotho. At the other extreme, there were two consistently low growth countries, the Central African Republic and Madagascar, both in the bottom ten for all decades.

More striking than the persistently fast and slow growers are the nine countries that could be found in the top ten in one decade *and* the bottom ten in another. Perhaps the most extraordinary case is Cameroon, in an elite group very decade: twice among the ten fastest, twice among the ten slowest. Such reversals might be attributed to being conflict affected or a petroleum exporter, but neither characteristic applies to Cote d'Ivoire and Benin, which also switch between the top and bottom. While in every decade the Sub-Saharan region had countries with outstanding growth rates, even ones in the range of the so-called High Performing Asian Economies,<sup>5</sup> few of the forty-three could sustain such rates over the long run.

Perhaps the starkest indicator of instability is extreme growth reversals. Of over 1300 country-years summarised in the table, in fifteen percent of the cases the growth rate changed by more than ten percentage points. Sixty-eight percent of these large shifts came as consecutive growth reversals; i.e., a change of ten percent or more was followed by a greater than ten percent change of the opposite sign. Relatively well-performing Malawi, with a four-decade growth rate of 4.4, experienced during 1992-1995 consecutive growth reversals of -16, 17, -20, and 26 percentage points. The high frequency of consecutive growth reversals implies that large shifts

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<sup>5</sup> That is, Indonesia, Korea, Malaysia, Taiwan and Thailand. This term for these countries (along with the city states of Singapore and Hong Kong) was coined by the World Bank.

were not random, but concentrated in seizures of instability. Inspection of the clustering of reversals shows no obvious general cause, such as changes in the terms of trade, drought, conflict, changes in government, or major policy shifts, though all these appear as influences during one period or another.

Table 2 shows that the growth variability for the Sub-Saharan countries was considerably greater than for other regions. Only twenty-one percent of the Sub-Saharan countries had either no episode of a ten percent year-to-year shift in growth or only one. For Latin America and the Caribbean and Asia the percentages were almost double that number. The North Africa and West Asian region had a higher percentage of years with such large growth shifts, but almost a third were for one country, Syria. Coefficients of variation of the growth rate show a similar difference between the Sub-Sahara and the other regions. Though the Sub-Saharan, Latin America and the Caribbean, and North Africa and West Asian regions had similar average rates of growth, the coefficient of variation for the first was substantially above those for the other two regions. The Asian group had the lowest coefficient of variation, and the lowest standard error.

### III. Accounting for Growth Variability

#### Instability and Sustainability

Recently analysis by the Economic Commission for Africa has stressed the problem of growth sustainability in the region, and constructed indices to measure it (ECA 1999, 2001, 2003).<sup>6</sup> Using these indices ECA concluded that there is a clear difference between performance and sustainability (ECA 1999, 2001). In the 1999 study, only three sub-Saharan countries, Equatorial Guinea, South Africa and Botswana, were found to manifest the characteristics that generate sustainable growth.<sup>7</sup> On the basis of the study, the ECA report concluded:

...[W]hile [macro] policies are very important, they are by no means sufficient to sustain development. The unfortunate neglect of sustainable variables - macroeconomic (saving-investment and exports), human capital, institutions, structural diversification, transaction costs and competitiveness, as well as environmental and ecological balance - must have been the major causes of Africa's fragile performance overtime...[A]chieving [macroeconomic] stabilization...has entailed sacrificing expenditure on building the requisite institutions, infrastructure, and in investing in human capital development and retention....Systematically designing policies with the twin goals of macroeconomic stability and sustainability...is lacking.(ECA, 1999: 38).

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<sup>6</sup> ECA employs three indicators to show performance and sustainability. The Annual Economic Improvement Index is constructed from measures of the current account balance, domestic inflation and per capita income. A second, the Economic Sustainability Index, is computed relative to the three best performers on the continent over a specified time period. It is generated using more than twenty-one indicators of human capital, structural diversification, external dependency, transactions costs, and macroeconomic indicators. Third, an Economic Policy Stance Index attempts to evaluate the appropriateness of various aspects of monetary and fiscal policies using indicators such as budget deficit, taxation, monetary growth and interest rate. The last is also constructed relatively to the three best performing countries.

<sup>7</sup> The three countries account for about six percent of the continent's population. Mauritius ranked fourth (scoring 5 out of 10, compared to 6 for the other three). In 2001 only five countries (Egypt, Mauritius, Seychelles, South Africa and Tunisia) scored above five.

While we concur with the ECA view that growth *sustainability* is a problem requiring a long term development strategy that includes more than economic policies, this is not inconsistent with use of policy instruments available to African governments to reduce the short and medium term problem of growth *instability*. Though useful for designing the long-term strategy, the ECA indices are of limited help in dealing with short and medium term instability. It is to this issue, identifying policies for short-term macro management, the rest of this section is devoted.

### Modelling Growth Instability

We address the issue of growth instability by use of a Harrod-Domar model, modified for application to the short run<sup>8</sup>. The modelling begins with the following familiar definition, where the first term on the right hand side of the equation is the incremental output-capital ratio, and the second is the net investment rate in national income:

$$\frac{\Delta Y}{Y} = \left[ \frac{\Delta Y}{\Delta K} \right] \left[ \frac{I}{Y} \right] \text{ since } \Delta K = I \text{ by definition.}$$

Y = national income

K = capital stock

I = net investment

If these ratios are treated as parameters, one has the warranted or equilibrium growth path of the Harrod-Domar model,  $y^* = \frac{I^*}{K^*}$ , where  $\frac{I^*}{K^*}$  is the full capacity output-capital ratio, and  $\frac{I^*}{K^*}$  the planned investment rate. By specifying a partial adjustment over time, the actual rate of growth can be distinguished from the warranted rate of growth.

$$(1a) \quad y_t = y_{t-1} + \chi(y_t^* - y_{t-1}), \quad \text{and } 0 < \chi < 1$$

$$(1b) \quad y_t = y_{t-1} + \chi(\alpha_t \beta_t^* - y_{t-1})$$

The variability of the growth rate results from those factors that cause fluctuations in the warranted or desired rate of growth ( $\frac{I_t^*}{K_t^*}$  and  $\frac{I_t}{K_t^*}$ ), and those that cause the actual rate to deviate from the warranted rate. We assume that private investment is constrained by market access, shortage of foreign exchange, problems of (macro) economic policies, and that public investment is funded largely by official development assistance (perhaps with national matching funds for domestic currency costs). Both assumptions are typical of sub-Saharan countries. The terms of trade are used as a proxy for variations in the market availability of foreign exchange. Therefore,

<sup>8</sup> Though the ICOR and gap based approaches are the building blocks of the international financial institutions macro framework for African countries, this approach has serious limitations. Easterly (1997) discussed the theoretical and empirical failures of the approach. According to Easterly, first, as the inventor of the model, Domar, admitted, the proportionality assumption of production capacity and capital stock is unrealistic. Second, the purpose of Domar's work was to comment upon the debate on business cycle as opposed to derive empirically meaningful growth rates. Third, by assuming that output is only proportional to the stock of capital the approach imposes that human capital does not contribute for growth. On the empirical ground, Easterly (1997) showed that the basic link that aid promotes investment has a very weak empirical support. It is only on 19% of his sample countries that aid has a positive and significant effect on investment while it has a negative and significant coefficient on 41% of the same sample.



$$(2) \quad \beta_i^* = \beta \left( \frac{ODA_t}{GDP_t}, TT \right) \text{ where } ODA/GDP \text{ is official development assistance as share of GDP, and } TT \text{ the terms of trade.}$$

In the short run, the actual rate of growth deviates from the warranted rate of growth due to insufficient demand, manifest in a sub-optimal output-capital ratio (under-utilisation of capacity). We assume that the primary short-term influence on aggregate demand in a small economy is export growth. For the region as a whole, we assume export growth is determined by the growth of output in the developed countries, to which the overwhelming majority of African exports go. Our proxy for this is the rate of growth of the OECD countries. In addition the macroeconomic environment and natural shocks (such as drought) do also contribute for growth instability. The partial adjustment model implies that the variation in the growth rate takes the following form, where  $i$  denotes country and  $t$  the time period:

$$(3) \quad \begin{aligned} stdev(SSA_{grw})_{i,t} = & a_0 + a_1 [stdev(SSA_{grw})_{i,t-1}] - a_2 [stdev(TrmTd)_{i,t-1}] + a_3 \left[ stdev\left(\frac{ODA}{GDP}\right)_{i,t-1} \right] \\ & + a_4 [stdev(OECD_{grw})_{i,t-1}] + a_4 [stdev(Mcro)_{i,t-1}] + a_4 [stdev(Z)_{i,t-1}] + \varepsilon \end{aligned}$$

The variation in the terms of trade ( $TrmTd$ ), official development assistance ( $ODA/GDP$ ), and growth of the OECD countries ( $OECD_{grw}$ ) are measured by the standard deviation. The terms of trade are defined as the ratio of the US dollar export price index to the dollar import price index. Official development assistance is calculated as its share in GDP. In the case of the OECD growth rate, it is assumed that this impacts on each country proportional to the share of trade in the country's GDP. That is, the relevant variable is the OECD growth rate times the average of the sum of the shares in GDP of exports and imports of goods and services. For the growth of the African countries ( $gdp_{grw}$ ), the standard deviation is used. The standard deviation of the nominal exchange rate and inflation rate are used as a proxy for (macro) policy, while agriculture growth is used as a proxy for rainfall variability. Noting the importance of investment variability for growth variability in Africa, we have used the standard deviation of the share of investment in GDP as another regressor.<sup>9</sup> The variables are described in more detail in the annex.

In addition to the behavioural variables, the observations are divided into four time periods: 1961-1972, before the first oil price increases; 1970-1989, covering the implementation of the first generation of Structural Adjustment Programs (SAPs) in the regions as well as the second episode of sharp increases in oil prices, and the drop in commodity prices; and 1990-1999, 'second generation' structural adjustment.<sup>10</sup> Because two of the behavioural variables incorporate the most important influences of international markets (terms of trade and developed country growth), the time period logit variables were expected to reflect the effects of factors internal to the region or internal to specific countries, including drought and conflicts which are not captured by measurable and available proxies that we have employed. The empirical specification is estimated over thirty-nine sub-Saharan countries for the period 1967-1999 using pooled fixed-effect model with over 1500 observations.

Since there are no quarterly data on growth rates except for a few countries, it is necessary to use the standard deviation of annual rates. The minimum number of observations need for a standard deviation is three, and we have chosen to use four. While there is no *a priori* reason to

<sup>9</sup> We are grateful for to one of the referees of the journal for these points.

<sup>10</sup> Some would identify the 1990s as a period of qualitatively increased integration of the international economy, so-called globalisation.



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choose four, it has the advantage of reducing the number of extreme values. For consistency, all the variables are calculated over the same time period. Thus, each observation is the annual four-year moving standard deviation, beginning with 1967. The potential number of observations, 1404, is reduced to 856 because of missing observations, most frequently of the terms of trade variable.

Two versions of the model are estimated: first, partial adjustment as specified above; and, second, an 'equilibrium' version which implicitly assumes that full adjustment to the level of instability implied by the behavioural variables occurs each time period. We consider the former to be the better approximation of reality, and include the latter for those troubled by partial adjustment models. Both versions confirm the relevance of the behavioural variables, all of which are statistically significant. Before considering these, one can note two points. First, the constant terms for each country (not reported) are found to be significant in both versions of the model. This could be interpreted as signalling omitted variables, or, in our view, as indicating the strong structural element in the growth variability. Second, we found both dummy variables are statistically significant (1990-1999, with a similar negative coefficient (not reported) and the 1970-89 with a positive coefficient (see Table 3). The downward shift in variability during 1990-1999 might be explained by fewer drought years in that decade, and the reduction or resolution of several major conflicts; e.g., in Mozambique and Ethiopia.<sup>11</sup>

In the partial adjustment version of the model, the most statistically (and also in value) significant behavioural variable is the standard deviation of the terms of trade, which is consistent with other research findings. The absolute values of the coefficients for the behavioural variables are not small either. For two of them (terms of trade and ODA), a ten unit reduction in the standard deviation reduces the standard deviation of growth by more than three units. Moreover, this understates the impact of these variables, since a reduction in their variation, via the previous period, reduces the lagged value of the dependent variable. This point is demonstrated in the 'equilibrium' version of the model, where the coefficient on the terms of trade increases by more than forty percent, and more than doubles for agricultural growth, investment and the OECD growth effect.

One might conclude that the correlation coefficient for the partial equilibrium model is too low<sup>12</sup> for the results to be taken seriously. This inference would be incorrect for two reasons. First, regression models are not judged by how much they explain, but by whether the variables used in the model are significant; and, whether the unexplained variation is stochastic or the systematic result of omitted variables. The statistic tests support the hypothesis that the errors are randomly distributed. Second, it is not unusual for econometric models of economic growth in Africa to have correlation coefficients in the .2 to .4 range using cross-section data, and achieving this range only through use of analytically dubious interactive terms and .<sup>13</sup>

One possible channel through<sup>14</sup> which growth variability may be effected is through investment instability. This could be true given the strong association between investment and growth in Africa. To supplement our two models we have specified the variation in investment on

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<sup>11</sup> Three countries affected by conflict in the 1990s have no data for one or more variables for all or part of the decade (the Democratic Republic of the Congo, Sierra Leone and the Sudan).

<sup>12</sup> Apparently, the beta coefficient in Table 3 are very low. This shouldn't be a surprise as those coefficients show the variation, in standard deviation unit, of the dependent variables due to variation in (again in standard deviation unit) the explanatory variables which themselves are in standard deviation.

<sup>13</sup> See Collier & Gunning 1999 for a summary of several econometric estimations using cross-country data. Though they would considerably raise the correlation coefficient, we have not used interactive terms because our model does not generate them. *Ad hoc* multiplicative variables and 'black box' logit variables, such as whether a country has a direct outlet to the sea, offer little explanatory or policy information. We consider it preferable to transparently concede that the explanatory power of the model is low, but the specified coefficients significant.

<sup>14</sup> We are grateful for one of the unanimous referees of the journal for pointing out this. As pointed out by the referee, the link with growth variability could be thought through a fixed coefficient.

all factors that we used as regressors in the growth model. The results show that (see Table 3c) all regressors, except the time dummy, are found to be statistically significant. In terms of the magnitude of coefficients both the terms of trade and, in particular, the OECD growth effect are found to be stronger in explaining investment instability. Though the coefficients are low, macro variables, contrary to their effect on the growth model, are found to be statistically significant in the investment equation. These results, except the ODA coefficient which is low in magnitude and negative, are intuitive given the nature of GDP and Investment in Africa.

African governments can do nothing to affect the level or variance of the growth of the OECD countries, and in general they suffer from the ineffectiveness of policy instruments that might be used to counter external shocks. In more developed countries, fluctuations in foreign exchange flows can be partially absorbed through open market operations by the central bank. Few African countries have bond markets sufficiently developed to use this instrument effectively. The absence of bond and equity markets also means that so-called market based capital controls (e.g., taxes on private in-flows and out-flows) are unlikely to be effective. None-the-less, there exist policies that even low-income countries with underdeveloped financial markets can implement to reduce the impact of fluctuations in the terms of trade, and the variability of flows of development assistance.

At least three policy options are available. The first derives in part from changes emerging in the management of development assistance (the so-called new aid agenda). As a condition for concessional lending from the World Bank and the International Monetary Fund, almost all sub-Saharan countries must prepare Poverty Reduction Strategy Papers.<sup>15</sup> One aspect of the process associated with these documents is that donors and lenders should simplify and coordinate their loans and grants, in part through moving from funding projects to budget support. Within this process, African governments could negotiate for longer-term commitments from donors and lenders, with a more predictable flow of funds. In some countries, with specific donors and lenders, this has occurred.<sup>16</sup> If assistance flows were predictable, they could be dispersed by governments in a manner to counter the domestic impact of changes in the terms of trade, as an alternative to the inability to use open market operations. Perhaps the most important function of ODA funds would be to manage the nominal exchange rate to reduce its fluctuations, a source of instability identified in numerous studies.<sup>17</sup>

Second, even in low-income countries fiscal policy can be used as a counter-cyclical instrument. In stabilisation and structural adjustment programmes throughout the sub-Sahara, emphasis has been placed on deficit reduction, based on the argument that this is necessary to reduce inflation and close trade gaps. As a result, fiscal policy has typically had a pro-cyclical impact, despite evidence that moderate deficits are not closely correlated with inflation, and, in any case, the impact of inflation on growth is ambiguous.<sup>18</sup> In addition to policy conditionalities, a practical constraint to counter-cyclical fiscal policy has been balance of payments pressure. By maintaining control over the currency conversion of development assistance, and using currency

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<sup>15</sup> See the World Bank website (<http://www.worldbank.org/poverty/strategies/index.htm>), where the PRSP process is described.

<sup>16</sup> For example, an agreement was signed between the UK Department of International Development and the government of Rwanda establishing a medium term commitment by DFID and scheduling of assistance flows (see DFID 1999).

<sup>17</sup> In the approach of the international financial agencies, nominal exchange rate fluctuations are viewed as a buffer to external shocks. A recent study concludes, 'the big selling points of floating exchange rates – monetary independence and accommodation of terms of trade shocks – have not lived up to their promise' (Frankel 2003).

<sup>18</sup> From a cross-country econometric study, Bruno and Easterly conclude, 'Our findings do not support the view that reduction of high inflation carries heavy short-to-medium run output costs' (Bruno & Easterly 1995).

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reserves to support the balance of payments in contractionary periods, governments could return fiscal policy to the counter-cyclical purpose recommended by generations of Keynesians.<sup>19</sup>

The analysis in this paper shows the importance of the terms of trade shock. However, the long-term downward trend of the terms of trade is more difficult to handle. It would not matter so much if volume were increasing fast enough to raise the income terms of trade (as happens with labour-intensive manufactures), but this is not, in fact, the case. The market for tropical commodities is oligopolistic and riddled with restrictive practices, e.g., sugar and cotton in the US, bananas and coffee in Europe. Therefore, producer cartels may be the only viable solution. However, in spite of the recent increase in oil and other mineral prices, Africa is unlikely to be able to organize such cartels in view of the worldwide supply of most of its commodities. Africa needs to change the mix (or, at least, upgrade the quality) of its primary exports. This requires investments which have not been sufficiently forthcoming for various reasons. Rather than savings, risk seems to be the main deterrent since there is substantial capital held overseas by Africans, and also substantial liquidity in the banking system. The design and implementation of appropriate policies include measures to take advantage of this capital and liquidity (see Alemayehu 2002).

Third, ODA funds could be used to support programmes to reduce the impact of changes in international prices on importers and exporters. For a small country price stabilisation schemes for exports would also reduce the volatility of production levels. Attempts to compensate producers, as discussed above, for the full effect of international price changes, for example via a fixed producer price, often prove to be too expensive to maintain in the long run. However, more modest price stabilisation rules, supported by development assistance, could have a substantial impact on terms of trade fluctuations.

Use of ODA in the manner suggested above would require donors and lenders to allow recipient governments to have control over the conversion of grants and loans into national currency, which is not the case in many African countries.<sup>20</sup> In effect, donors and lenders would have to accept exchange controls as a legitimate instrument of economic policy, as advocated by Lim (1999) for East Asian countries.

We can use the modelling results to give an indication of the benefits from interventionist use of development assistance to protect African economies against external shocks. Figure 5 presents the actual cross-country growth rate, and the standard deviation generated by using actual values in the partial adjustment model (labelled 'av'). Also calculated is the standard deviation on the assumption that the governments negotiate a smoothing of ODA flows such that the fluctuations are reduced to the minimum annual value for the time period (1962-1965). In the counter-factual, governments intervene using ODA foreign exchange for counter-cyclical policies, which is assumed to reduce the impact of the terms of trade and OECD growth to their minimum annual values (1980-1983 and 1966-1969, respectively). The result of these assumptions, arbitrary but credible, is to lower the standard deviation of growth by almost twenty-five percent over the four decades.

#### IV. Conclusion

Countries cannot completely insulate themselves from external shocks. However, if by negotiation with donors and lenders governments reduced ODA fluctuations and used the development funds for counter-cyclical interventions to cushion the impact of terms of trade

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<sup>19</sup> See Weeks (2001) and Geda (2002) for further discussion of counter-cyclical policies in the African context.

<sup>20</sup> For example, in Mozambique the World Bank deposits its loans directly into government accounts in private banks, and the latter are free to convert the foreign exchange when they wish.

changes, the effect on growth instability could be substantial. Since the techniques of counter-cyclical fiscal policy are well-known, it only remains for donors and lenders to facilitate such policies through their assistance programmes.

The current orthodoxy of 'sound' macro policy strongly discourages counter-cyclical management of developing economies. As a result, countries are left not merely to weather the caprices of international markets, but pressured to magnify them with pro-cyclical fiscal and monetary policy. In this paper we have identified specific reasons why counter-cyclical demand management, exchange rate interventions, and export and import price stabilisation would represent 'good practice'.

The governments of developed countries have it within their power to issue African governments an instrument to reduce the destabilising effect of international market forces: a more predictable flow of development assistance, combined with flexible conditionality that permits counter-cyclical use of that assistance.<sup>21</sup> It may well be that African economies would grow faster if they were more open (Sachs & Warner 1997, Collier & Gunning 1999); our results indicate that a favourable outcome would result from openness with an active fiscal policy. In addition to funding capital accumulation and providing general balance of payments and budget support, the delivery of development assistance can be reformed to foster growth by reducing its instability.

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<sup>21</sup> 'With the right rules, aid could play an important growth-enhancing and poverty-reducing role if allocated at least partly on the basis of vulnerability (Combes & Guillaumont 2002).

Table 1: Indicators of Growth Instability for the Sub-Saharan, 1961-1999

Country	League Table					Growth Reversals				
	data years	% > aver	Grw rate	Stdev	Relative	by decade		Years > 10	% of years	No. +/- Consec- utive
					growth rate	highest 10	lowest 10			
Botswana	39	92	9.7	5.7	2.76	4		1	3	0
Uganda	17	82	5.3	3.7	1.50	1		0	0	0
Guinea	13	77	4.1	1.0	1.17	1		0	0	0
Gabon	39	67	5.2	11.1	1.47	2		8	22	8
Eq Guin	15	67	5.9	5.5	1.68	1	1	1	8	0
Mauritius	39	62	5.1	6.4	1.45	3		10	27	6
Swazild	29	62	5.3	4.5	1.50	1		1	4	0
Malawi	39	62	4.4	5.6	1.24	3		7	19	6
Cote d'Iv	39	59	4.6	5.7	1.31	2	1	12	32	7
Moz'que	19	58	3.2	7.9	0.90	1	1	4	24	2
Lesotho	39	56	5.8	7.8	1.65	3		12	32	7
Ethiopia	18	56	2.8	7.8	0.80			5	14	3
Gambia	33	55	4.0	3.4	1.15			1	3	0
Kenya	39	54	4.8	5.3	1.36	3		6	16	4
Seychelles	39	54	4.6	6.4	1.30	1		4	11	3
Rwanda	39	54	3.3	12.1	0.94		1	10	27	7
Togo	39	51	4.0	6.7	1.14	1		7	19	6
Congo, Rp	39	51	4.3	6.4	1.21	1	1	2	5	0
Benin	39	51	3.3	3.4	0.92	1	1	1	3	0
Mauritania	39	51	3.6	6.5	1.04	1	2	11	30	9
Guinea-B	29	48	2.4	8.5	0.68		1	9	33	6
Angola	19	47	1.8	7.7	0.51		1	2	12	2
Zimbabwe	39	46	4.1	5.8	1.18	2		6	16	4
Nigeria	39	46	3.5	7.9	0.99	1	1	13	35	8

Ghana	39	46	2.5	4.5	0.71	1	2	3	8	0
Burk Faso	39	46	3.5	3.4	0.99			2	5	0
Senegal	39	46	2.5	4.5	0.72		1	8	22	6
Sudan	39	44	3.4	6.3	0.96	1	1	6	16	4
Cameroon	39	44	3.5	6.6	0.99	2	2	6	16	4
Eritrea	7	43	4.1	4.3	1.16			1	20	0
So Africa	39	41	3.2	3.9	0.91	1	1	3	8	2
Burundi	39	41	2.6	6.6	0.74	1	2	9	24	4
Mali*	32	41	3.0	5.1	0.84		2	5	17	4
Niger	39	38	1.7	6.4	0.47		2	6	16	6
Tanzania	11	36	3.4	4.9	0.97			3	33	3
Chad	39	33	1.9	7.8	0.55	1	2	11	30	10
Congo DR	39	32	.2	6.3	0.06		2	2	5	2
CAR	39	31	1.5	4.1	0.43		4	3	8	2
Namibia	18	26	2.2	3.3	0.61		1	1	6	2
Zambia	39	26	1.9	4.8	0.54		2	6	16	4
Mad'car	39	26	1.5	3.5	0.44		3	2	5	0
Srr Leone	<u>39</u>	<u>21</u>	<u>.7</u>	<u>5.6</u>	<u>0.20</u>	-	<u>2</u>	<u>4</u>	<u>11</u>	<u>4</u>
	1391	na	3.5	6.5	1.00	40	40	214	15.4	145

Percent of years >|10| = 68.0

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Notes:

'data years' refers to those years with GDP growth statistics.

'%>aver' is the number of years the country's growth rate was greater than the average for the years covered by its data (to one percentage point).

'Grw rate' is the average for the years covered.

'Stdev' is the standard deviation of the growth rate for the years covered.

'Relative growth rate' is the country average divided by the cross-country mean for the years covered for that country.

'League Table' gives the number of times a country was among ten highest or lowest growers by decade.

'Growth reversals, years >|10|' gives the number of years for which the country's growth rate increased or decreased by ten or more percentage points compared to the previous year, followed by the percentage of years in which this occurred ('% of years'), and the number of years for which they were consecutive with opposite signs.

Table 2: Summary of Instability Measures by Region, 1961-1999

<u>Region</u>	Number of <u>countries</u>	<u>Growth rate</u>	Growth Reversals > 10 ,			gdp grw: <u>stdev</u>
			Countries <u>with 0 or 1</u>	% of <u>all years</u>	percent <u>consecutive</u>	
Sub-Saharan	42	3.5	21.4	15.3	68.0	7.2
LA & Carib	28	3.8	39.3	7.7	66.3	6.3
Asia	20	5.7	40.0	6.3	22.2	4.8
NA&WE	<u>16</u>	<u>3.6</u>	<u>31.3</u>	<u>19.6</u>	<u>68.2</u>	<u>5.5</u>
Totals	106	napp	31.1	12.2	60.1	6.2

Notes:

Except for the sub-Saharan growth reversals of 10 percent or more were concentrated in a few countries: Latin America and the Caribbean (21% in the Bahamas and Trinidad & Tobago); Asia (31 percent in Bangladesh and Myanmar); and North Africa & Western Asia (31 percent in Syria). The last column gives the standard deviation of the growth rate.

Table 3: Modelling Growth Instability



Dependent variable: four year moving standard deviation of the growth rate by African country (1970-99)

A. Partial Adjustment Model

<u>Variable</u>	<b>Unstandardised Coef</b>		<u>Standardised Coefficients</u>		
	<u>B</u>	<u>Std. Error</u>	<u>Beta</u>	<u>T-value</u>	<u>Sig. of T</u>
Stdev[ExchRate](t-1)	0.000	0.000	0.000	-1.325	0.185
Stdev[Inflation](t-1)	0.000	0.000	0.000	0.078	0.938
Stdev[Invest/GDP](t-1)	0.022	0.015	0.000	1.451	0.147
Stdev[SSA grw](t-1)	0.703	0.018	0.003	38.241	0.000
stdev[TrmTrd](t-1)	0.452	0.205	0.024	2.201	0.028
Stdev[ODA/GDP](t-1)	0.327	0.026	0.002	12.651	0.000
Stdev[OECD grw](t-1)	0.044	0.024	0.000	1.835	0.067
Stdev[AgrGrow](t-1)	0.060	0.008	0.000	7.797	0.000
Dummy(1970-89)	0.392	0.109	0.011	3.608	0.000
Adjusted R-sq =	0.77				
F-statistic =	657.12				
Durban-Watson =	1.66				
Panel Observation =	1590				

B. Equilibrium Model

<u>Variable</u>	<u>Unstandardised Coef</u>		<u>Standardised Coefficients</u>		
	<u>B</u>	<u>Std. Error</u>	<u>Beta</u>	<u>T-value</u>	<u>Sig. of T</u>
Stdev[ExchRate](t-1)	-0.001	0.000	0.000	-2.520	0.012
Stdev[Inflation](t-1)	0.000	0.000	0.000	0.867	0.386

Stdev[Invest/GDP](t-1)	0.117	0.021	0.001	5.524	0.000
Stdev[SSA grw](t-1)	0.703	0.018	0.003	38.241	0.000
stdev[TrmTrd](t-1)	0.648	0.287	0.049	2.255	0.024
Stdev[ODA/GDP](t-1)	0.327	0.026	0.002	12.651	0.000
Stdev[OECD grw](t-1)	0.124	0.033	0.001	3.743	0.000
Stdev[AgrGrow](t-1)	0.135	0.010	0.000	13.119	0.000
Dummy(1970-89)	1.352	0.148	0.052	9.149	0.000
Adjusted R-sq =	0.60				
F-statistic =	277.17				
Durban-Watson =	0.62				
Panel Observation =	1590				

### C. Investment Variability

Dependent variable is the four year moving average of the standard deviation of the investment to GDP ratio for African countries (1970-1999)

Variable	Unstandardised Coef		Standardised Coefficients		
	B	Std. Error	Beta	T-value	Sig. of T
Stdev[ExchRate](t-1)	0.001	0.001	<b>0.000</b>	2.836	0.005
Stdev[Inflation](t-1)	0.000	0.000	<b>0.000</b>	2.677	0.008
stdev[TrmTrd](t-1)	0.631	0.354	<b>0.059</b>	1.781	0.075
Stdev[ODA/GDP](t-1)	-0.068	0.032	<b>-0.001</b>	-2.142	0.032
Stdev[OECD grw](t-1)	0.425	0.039	<b>0.004</b>	10.783	0.000
Dummy(1970-89)	-0.162	0.184	<b>-0.008</b>	-0.880	0.379
Adjusted R-sq =	0.28				
F-statistic =	134.2				
Durban-Watson =	0.64				
Panel Observation =	1590				

Note: The observations are those for all countries listed in the World Bank's World Development Indicators, except the following nine: the Central African Republic, Cape Verde, Comoros, Liberia, Mayotte, Sao Tome & Principe, Somalia, Sudan and Swaziland.

Figure 1: Scatter Diagram of the GDP Growth Rate and its Standard Deviation, 39 sub-Saharan Countries 1961-1999 (four year moving averages)

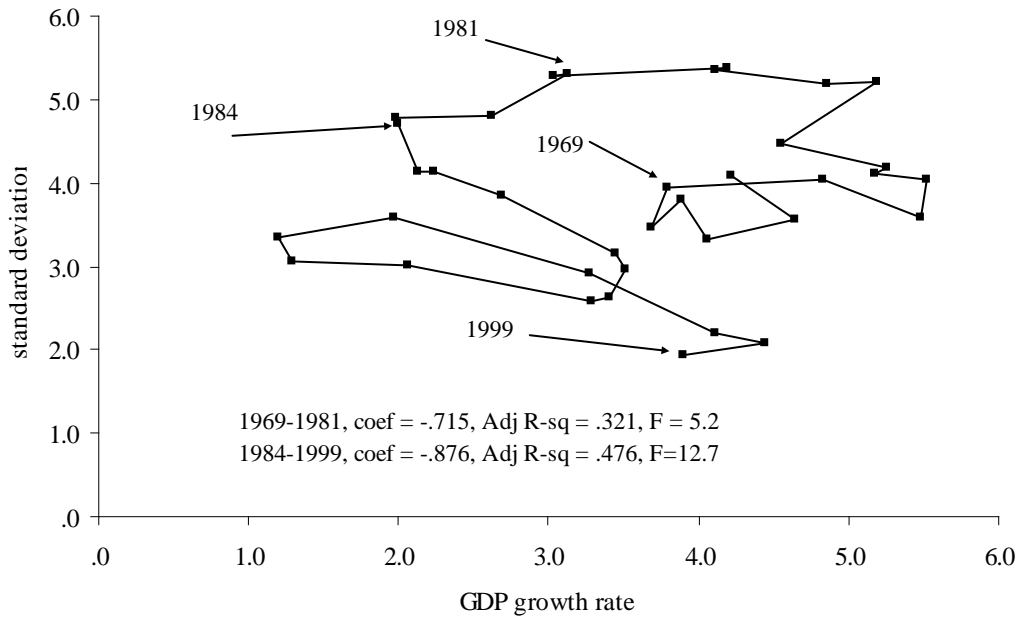


Figure 2: Cross-Country Growth Rates & Standard Deviation, sub-Saharan Countries, 1961-1999

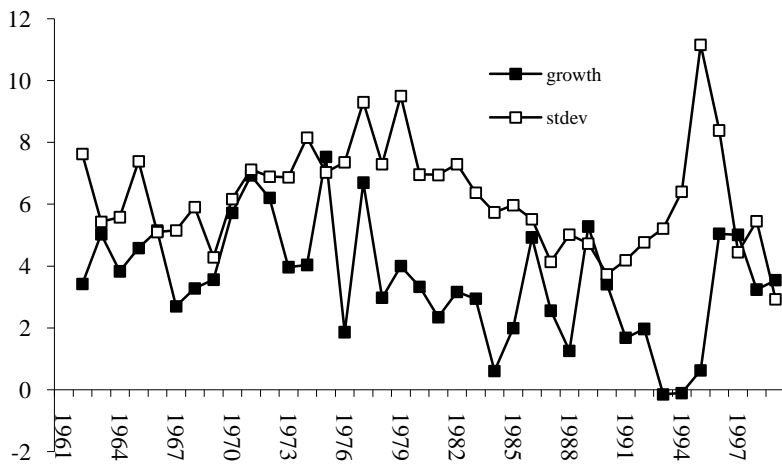




Figure 3: Distribution of Growth Rates in the Sub-Saharan, 1961-1998 (1316 of 1349 shown)

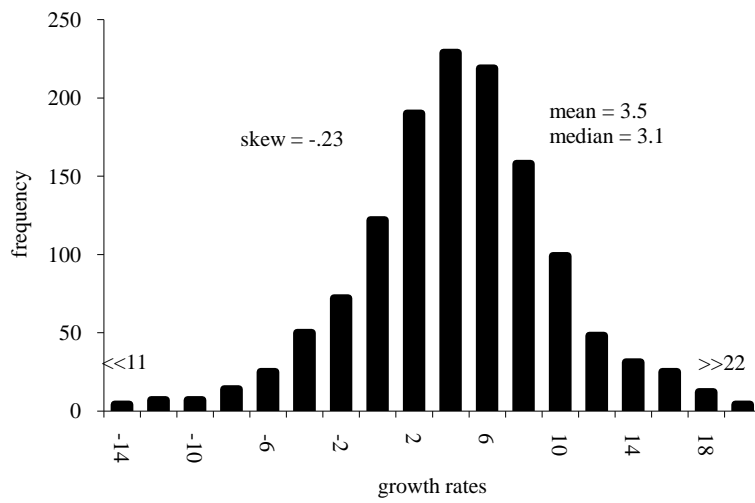


Figure 4: Distribution of the First Difference in Growth Rate in the Sub-Saharan, 1961-1998 (1316 of 1349 shown)

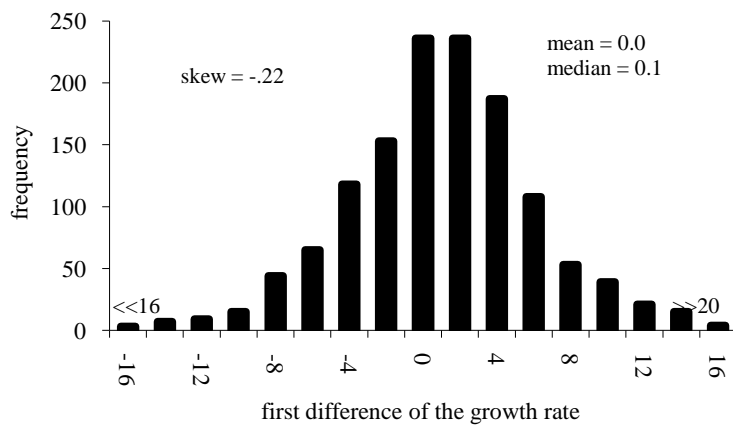
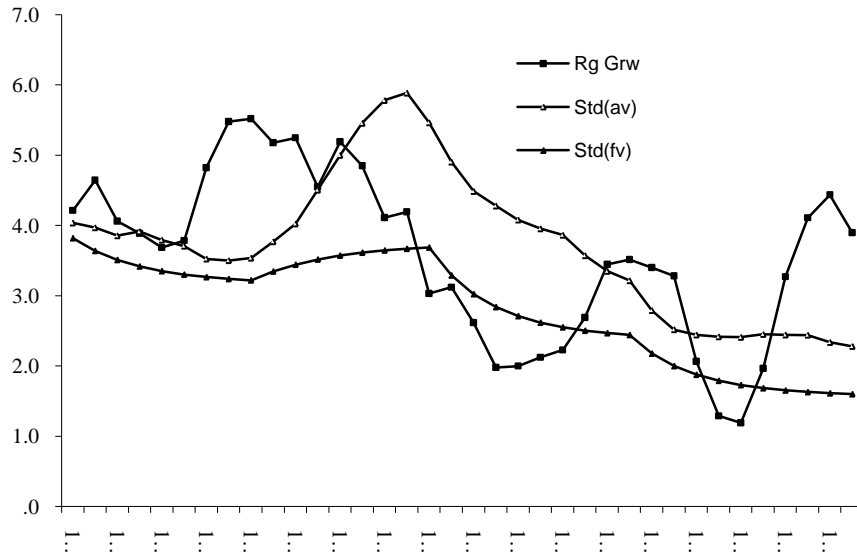


Figure 5: Growth Rate and Simulated Standard Deviations

Across 39 African Countries, 1961-1999

(four year moving averages)



Legend: Rg grw - cross-country average growth rate

Std - Standard deviation of growth rate from partial adjustment model,

Using actual values of variables (av) and fixed values (fv) using lowest annual value for each.



## Annex:

The data used in this paper are from the World Bank's CD Rom, *World Development Indicators 2001*. The time series ends with 1999, because at the time of writing, statistics for some variables for 2000 and 2001 were either not available or subject to revision. The variables in the regression exercise are explained below.

Variable name	Statistical definition and method of calculation
Stdev[SSA grw] Standard deviation of the annual growth rate	GDP growth in constant US dollars of 1995, with the standard deviation calculated over four years
Stdev[TrmTrd] Coefficient of variation of the terms of trade	The US dollar price index of exports of goods and services, divided by the US dollar price index of imports of goods and services; the price indices were calculated by dividing the value of exports (imports) of goods and services in current US dollars by the value of exports (imports) of goods and services in constant US dollars of 1995; standard deviations calculated over four years.
Stdevr[ODA/GDP] Standard deviation of variation of the share of development assistance in GDP	Official development assistance as a proportion of GDP (current prices), using the OECD definition of ODA; standard deviation calculated over four years.
stdev[OECD grw] Coefficient of variation of the OECD growth effect	The growth effect is calculated as the following product: $[\text{OECD grw}]_t = [.5 * (X+M)/\text{GDP}]_{a,t}$ Where 'a' stands for the African country in question, and the shares are in current prices; coefficient of variation calculated over four years.

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