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Growth Variability among and within African Countries: the Key to Sustained Development

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ABSTRACT

There is a considerable literature on the growth performance of the sub-Saharan countries, which tends to focus on 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, but, even more, for individual countries over time. The dispersion of country growth rates is not normally distributed; on the contrary, measures of dispersion are negatively correlated with long-term growth rates. It is argued that this instability, greater than in other regions, is the result of underdevelopment. Reducing instability is a task of long-run development policy, rather than short-term macro management. Further, it is probably the case that aspects of market deregulation make very poor countries more prone to instability.

Introduction

There is a considerable amount written on the growth performance of the sub-Saharan countries, but little of this focuses upon a central characteristic of their growth over the last forty years: the tremendous year-to year variability of growth rates. In part this is a result of the statistical techniques and analytical models used by various authors and international institutions. It also arises from a predilection of mainstream theory to view growth as an equilibrium process, and deviations from the ideal path to be the result of random 'shocks' or policy mistakes. This paper approaches growth variability from an agnostic point of view, first inspecting the degree to which it afflicts the sub-Saharan countries, then considering the causes of the considerable instability revealed by empirical evidence.

This an issue that must be approached with an analytically unbiased framework, that does not presume that causes of instability fall into the familiar and hackneyed categories of internal and external. Particularly problematic is the common use of 'internal' factors as synonymous with 'government policy. The categories used here are

1) structural characteristics of a country, 2) world market influences, and 3) policy measures by the government. Whether the latter be wise or foolish, the desired outcome by the policy makers can be thwarted by the structure of the country and world market influences. While this point may seem general to the point of banal and vacuous, one finds in the policy literature a tendency to make the leap from judging a policy to be appropriate (on theoretical or ideological criteria), to the presumption that it will produce the predicted outcome. All policies are implemented *ceterius paribus*, or *mutates mutandus*. As a result, the actual outcome can differ substantially from the intended outcome (as rational expectations theory showed). If the change is circumstances is particularly extreme, the *ex ante* 'sound' policy could produce an outcome worse than an 'unsound' policy.

Analysing the variability of growth is important for both analytical and policy purposes. The analytical importance lines in its implication for how one views average values, which conceal important clues about a country's economic performance. When one finds, for example, that over almost forty years, Burkina Faso and Rwanda had the same average growth rate (3.4 and 3.3 percent per annum, respectively), 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 12.2. With regard to policy, it will argued that the growth variability in sub-Saharan countries is so great, even excluding conflict-affected countries, that it cannot credibly to 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. As such, short-term macroeconomic policy may have limited impact on growth variability, though they may affect the average in the short term.

As we shall see, for some sub-Saharan countries, the variability of the growth rate was been associated with relatively low growth, for others there is no significant relationship, and for a few the relationship was positive. This paper does not enter into the discussion over the interaction between variability and average growth performance is positive or negative. Rather, we argue that growth instability among the sub-Saharan countries, considerably higher than for other reasons, indicates important structural

characteristics that can guide the analysis of how the region might achieve sustainable high growth. However, the paper does pass a general negative judgement on growth variability. As Collier and Gunning (1999) have argued, the sub-Saharan countries are characterised by high degrees of risk, which impacts negatively on domestic producers and potential foreign investors. Growth variability is perhaps the purest aggregate indicator of risk and uncertainty.

The Variability of Growth in the Sub-Sahara

In this paper, I am 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, which itself may or may not imply growth variability.

A country's average growth rate over a period reveals relatively little about the economy. The pattern of growth rates over time generates substantially more information about the nature of the economy and, to a certain extent, about the economy's relation to international markets. In this section an inspection is made of the variation in growth rates within and among sub-Saharan countries that will provide the basis of an analysis of policy.

The regional growth pattern is shown in Figure 1, where there two series, on for the countries with continuous data, 1961-1998 (complete data, 'CD', 31 countries), and one for all countries with data for any year ('all', maximum 42).[1] The two series hardly diverge, so the latter is used in Figure 2 to include as many countries as possible. Figure 2 displays the average growth rate and standard deviation of growth rates across

[1] The largest countries omitted are Liberia and Somalia.

countries. In only six of the thirty-eight years was the standard deviation lower than the cross-country growth rate, and these occur with apparent randomness.[2]

The standard deviation does not capture the full extend of growth variability, or its complexity. Table 1 provides several indicators of variability to attempt to do this. The first column of the table gives the number of years for which there are GDP growth statistics. For every country the series is continuous and ends in 1998. 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. These basic growth statistics are completed with the inclusion of the relative growth rate in column seven, 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, by decade (1960s, 1970s, etc.). The final three columns attempt to capture 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. This is followed by the percentage of years when this occurred, and, finally, the number of these shifts that were consecutive.

Except for the familiar statistics in the first seven columns, a brief explanation of these measures is required. The 'league table' ordering of countries, whose details are shown in Figure 2, provides two relevant pieces of information. First, it indicates the decade standard for the fastest and slowest growers. It is reasonable to presume that under the best of policies and most favourable world market conditions, the regional growth rate could not have exceeded the average for the ten fastest growers. Given the performance over the four decades a realistic sustainable 'high-growth' target for the region would be in the range of five to six percent per annum.

Second, the league table measures indicate the relationship between the best and worst performances. If we subtract the fast average from the slow (the line 'F – S'), it appears that the gap was relatively stable, from about five to six percentage points, except for the 1970s all of the 'top ten' grew at seven percent or more, compared to only seven

[2] The ratio (coefficient of variation) is unity or less once in the 1960s, twice in the 1970s and 1980s, and one in the 1990s.

occurrences of such rates during the other three decades. The growth rates for the four decades suggest that world market conditions may shift the average growth performance for the region up and down, but have limited impact on the relationship between the best and worst performers.

It is to be expected that one would find that countries migrate in and out of the top and bottom ten. However, there are clear 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 times, and Mauritius, Malawi, Lesotho and Kenya. Three of the five can perhaps be explained by special circumstances, Botswana and Lesotho, small countries and contiguous to South Africa, and Mauritius, which is an island with little ethnic or structural similarities to the continental countries. The third member of the Southern African Customs Union, 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 both ten for all decades.

Much more striking than the persistent fast and slow growers are the nine countries (twenty percent of the total) 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 a select ten very decade: twice among the fastest, twice among the slowest. While such startling reversals might be attributed to being either conflict affected or a petroleum exporter, Cote d'Ivoire and Benin show the save switch between top and bottom. Thus, Table 2 shows an important characteristic of growth performances in the Sub-Saharan region: while in every decade the region had countries with outstanding growth rates, even ones in the range of the so-called High Performing Asian Economies, only one country of the forty-three could sustain such rates over the long run.

Perhaps the purest indicator of instability is extreme growth reversals. Of the 1350 country-years summarised in the table, in fifteen percent growth 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 192-1995 growth reversals of –16, 17, -20,

and 26 percent. The high frequency of consecutive growth reversals implies that large shifts 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, conflict, changes in government, or major policy shifts, though all these appear as influences during one period or another.

The final measure of instability is given in column three and may seem a bit odd. For each country the number of years that growth was above the regional average is expressed as a percentage of all years. If the actual growth rates were normally distributed around the mean, the correlation between this percentage and the mean should be close to unity. When the calculation is done the adjusted correlation coefficient proves to be .55. An extreme case is Mozambique, which over eighteen years, 1981-1998, had above average growth in ten years, but an average growth rate barely half the regional. The percentage of years above the average compared to relative growth means 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. Thus, sixty percent of growth rates lay below the average. There is a reverse pattern for first differences, with a mean (by definition) of zero, and a median of 0.1, though again with negative skewedness.

Table 3 shows that the growth variability for the Sub-Saharan countries was considerably greater than for other regions. While only twenty-one percent of the Sub-Saharan countries had either no growth shift of ten percent or more, or only one, the percents for Latin American and the Caribbean and Asia were almost double that number. Similarly, the umber of years of such growth shifts was half or less than the Sub-Saharan percentage in those tow regions. While the North Africa and West Asia region had a higher percentage of years with large growth shifts, almost a third were for one country, Syria. Coefficients of variation of growth rate show a similar pattern: though the Sub-Sahara, Latin America and the Caribbean, and North Africa and West Asia all had similar average rates of growth, that for the former was substantially above those for the other two regions. The Asian group had not only the lowest coefficient of variation, but also

the lowest standard error, and the order of regions by standard deviations is the same as for coefficients of variation.

Growth Variability and Growth Prospects

The foregoing discussion of growth variability provides the basis for a consideration of growth prospects for the sub-Saharan region in the medium term. Such an exercise is fraught with difficulties, and the analytical landscape of the sub-Sahara is littered with *ex ante* predictions that proved to be *ex post* embarrassments, usually due to excessive optimism. The approach here is to generate 'scenarios' on the basis of placing countries into categories, derived from the characteristics of their growth performances. For current purposes, the definition of 'sustainable' growth is a target rate maintained over the decade. The target itself is 2.5 percent per capita, which implies a doubling of per capita income by 2030. By comparison to Asia, this is a modest target, but would represent a substantial improvement for sub-Saharan countries.

The likelihood that the countries of the sub-Sahara could attain this target on average is analysed in Tables 5 and 6. Since sustained growth was defined as 2.5 percent per capita over a decade, for each country ten-year moving averages of the per capita growth rate were calculated. Table 5 reports the number of ten-year periods for which this average was achieved, by country, along with the time periods. On the basis of the number of time periods and the variations in growth (from the previous section), the countries are divided into six categories in Table 6. The table reports several statistics for each category: the average growth rate of countries, the standard deviation, and the percentage of ten-year periods for which the target rate was met or exceeded. The last statistic is taken as a rough proxy of the probability of the countries achieving the target rate during 2001-2010.

A country qualifies for category one if it that had moving averages at or above 2.5 percent per capita for at least half of the ten-year time periods. If the region as a whole were to achieve the target rate of growth, over half the countries would fall into this category. However, the five countries that *ex post* meet the criterion for this category

were not typical of the continent as a whole. Two were island states, and the other three closely linked to South Africa, especially Lesotho and Swaziland. Given the very slow rate of growth of the South African economy in the 1990s, it might be that the later two countries would have difficulty maintaining their historically high rate of growth.

Category two includes those countries that failed to sustain the target rate, but enjoyed strong growth for extended periods (three or more consecutive periods of 2.5 or higher). This category is sub-divided into countries whose strong performances were before 1990 ('old success stories'), and those were occurred after 1990s ('new success stories'). Both sub-sets of countries have virtually the same long-term growth rates, and very high standard deviations, relatively to those growth rates. As for those in category one, the four countries whose growth performances were strong in the 1990s (but not before) provide limited guidance for rejuvenating growth for the region as a whole. Equatorial Guinea's phenomenal growth was the result of the discovery of petroleum, not policy changes. The strong performances of Uganda and Mozambique reflect the end of debilitating internal conflicts, as well as large inflows of concessional finance. For countries still suffering conflict, there may be lessons to consider (see category 6). The Sudan was an interesting case, a country beset by conflict, yet with a strong growth performance in the 1990s. This unlikely combination might result form the regional concentration of the conflict.

Prior to the 1990s there were five countries that had shown the capacity for sustained rapid growth (category 2a), though two of the cases involved petroleum exports, which were highly sensitive to world prices. Perhaps most interesting of the five were Kenya and Malawi, which performed quite well in the 1970s, but deteriorated dramatically in subsequent years. These two countries would be logical candidates from which to seek lessons for reviving growth in the sub-Saharan region.

Categories one and two account for fourteen, or exactly one third, of the countries under review. It would be realistic, if somewhat optimistic, to anticipate that these could all achieve the target rate during 2001-2010. Among categories three, four and five, there are few additional candidates. The three countries in category three share the unfortunate characteristic of low and stable long-term growth, with no ten-year periods that meet the target. Category four is somewhat more promising, for all seven of the countries passed

through episodes of growth sustained at 2.5 percent or higher. However, for all the countries save one (Chad), these periods ended in the 1970s. High growth variability, negative on average, was the plight of the eleven countries in category five. Of these eleven, none sustained 2.5 percent for a decade. Finally, there are the countries affected by serious conflicts in the 1990s (excluding Sudan, see above). Even should 'peace breakout' in these countries, they have shown little potential for high growth, with the exceptions of Burundi and Rwanda.

The projection for growth during 2001-2010 is based on the following rather optimistic assumptions:

1. that the high growth countries achieve four percent, slightly above their long-term average;
2. that the intermittent 'success stories' (category 2) countries improve to an average of three percent;
3. that the low growth countries (categories 3 and 4) double their long-term average to two percent; and
4. that the zero-growth countries (category 5) and conflict-affected countries achieve one percent.

Were these growth rates achieved, the average across all forty-two countries would be slightly less than two percent per capita. While this average should be considered modest at best, it would represent a doubling of the long-term growth rate for the region. Growth at two percent would be insufficient for most countries to achieve a substantial reduction in poverty by 2010. Therefore, there is a strong case for redistributive policies, which can be effective even in low-income countries (Dagdeviren, van der Hoeven & Weeks 2001).

Drawing Conclusions from Low Growth and Growth Variability

The discussion has stressed the importance of the variability of growth in the analysis of growth prospects for the sub-Saharan region. To complete the discussion, a consideration of the causes of variability is necessary. The general hypothesis proposed

is that growth variability is a negative function of the level of development. That is, it is in the nature of the development process that societies produce mechanisms that reduce the tendency of an economy to expand or contract by extreme values. This basic relationship is modified by the particular circumstances of each country. First, that hypothesis is tested in a simple manner,[3] then its implications pursued.

The hypothesis is tested using average values over the entire period for which data are available, using taking the coefficient of variation of the growth rate as the dependent variable and per capita income as an approximate measure ('proxy') for the level of development. Two other obvious factors affecting variability are included as binary variables, whether a country is a petroleum exporter, and whether it has experienced severe conflict. In a latter version, petroleum exports as a share of GDP, and proportion of years that were conflict affected will be used.[4] The results are sown in Table 4. With thirty-eight degrees of freedom, the significance of the coefficient on per capita income falls below the .05 level, and the sign is as hypothesised. Without more precise measurement of the other two variables, it is inappropriate to draw conclusion about the size of the coefficient. The coefficient on the binary variable for petroleum exporters is of the predicted sign, but its t-statistic is above the conventional ten percent level. However, the near-significance of the statistic suggests that a numerical variable might produce the predicted result. The conflict variable conforms to expectations, though the significance is close to the minimally acceptable level. Overall, I take this initial hypothesis test to justify an analytical discussion in which the principal cause of variability of growth is the level of development.

One should expect variability to be negatively affected by the level of development for three broad reasons: predominance of agriculture, the underdevelopment of markets, and a weak state structure. To labour an obvious point, agriculture is the only sector of the economy that is overwhelmingly dependent upon natural phenomena. This dependence arises from the fertility of the soil, weather, and living organisms (pests and disease). Further, the more underdeveloped a country, the less able are its agricultural producers to mitigate the impact of natural phenomena. As

[3] The hypothesis will be tested in more sophisticated manner in the revision of this paper.
[4] For identifying conflict years, see Cramer & Weeks (2000) and Messer, Cohen & D'Costa (1998).

countries develop, producers mitigate the impact through a range of practices and technologies: disease and drought resistant varieties, pesticides and herbicides, fertilisers, irrigation, and crop insurance, to name the most obvious. Underdevelopment delivers a double blow with regard to agriculture: on the one hand, the sector is large, and, on the other, producers are less able to use the available methods for reducing the impact of natural phenomena. The latter is the result of lack of information due to poor communications and limited extension services, lack of affordable credit (in part due to high risk premia), and the markets that would supply the mitigating goods and services. Collier and Gunning (1999) have correctly characterised the sub-Saharan as 'high risk', and nowhere is this more destabilising than what is typically the largest sector of the economy, agriculture.

With regard to markets, there is considerable confusion, reflected in the conventional dichotomy between state and market, and the presumption that the so-called failures of the latter are the result of actions by the former. Within this simplified framework, standard economics frequently fails to analyse usefully the constraints facing producers in low-income countries because of its strong tendency (somewhat changed in recent years) to take markets as natural phenomenon that arise spontaneously from individual acts of exchange. Part of the problem is that the word ' market' is frequently used with considerable ambiguity. The word has a number of meanings relevant to economics, which include: *a concrete usage*, markets as entities that are socially constructed; *a theoretical usage* that typically abstracts from the social context of markets; and, *a political usage*, that endorses a particular form of organisation for society. Stated briefly, these can be organised under the following categories:

1. 'Market' can refer to a concrete place, where at specific times under formal and often strict rules, buying and selling occurs. In this sense the London Stock Exchange or the collection of money changers in the Kano (Nigeria) old city are markets.
2. 'Market' can refer to a more abstract and broader institution through which information is transmitted, in the form of 'market signals'.

3. ‘Market’ may involve a complete abstraction from concrete trading places and individuals, meant to personify a collective will. Something of this sort is meant when one reads that ‘financial markets will not tolerate high fiscal deficits’.
4. Used as an adjective, ‘ market’ can refer to a system of regulation, or even a form of organisation for society as a whole. It is this sense in which one uses the term ‘market forces’ and ‘ reliance on markets’, as opposed to social regulation through collective action implemented by civil society or public sector institutions.

The potential for confusion can be demonstrated by taking an example. In a paper on rural poverty, Ghai writes (Gaiha 1993, p. 64) that rather than intervene directly in ‘markets’, ‘ a more appropriate role for the government would be to reduce information…costs’ (Gaiha 1993, p. 64). This begs the question of what a market is. How does a government reduce information costs in markets? If improving information flows refers to concrete markets (#1), the task is a relatively simple one in developed countries of expanding communications systems, standardisation of weights and measures, improving market stalls, etc. But, improving the efficiency of markets means considerably than these concrete activities, for it refers to the efficiency of market signals (#2). Facilitating efficient market signals requires enforcing competition, and ensuring that private costs cover social costs (e.g., pollution costs). Market signals will serve their function of regulating the allocation of resources if producers are ruled by market forces (#3). For this to be the case, there must be a free market in land (which in many sub-Saharan countries there is not), labour must be mobile (ethnic and other social distinctions may limit this), and the market-facilitating institutional framework established and clear.

In other words, improving the efficiency of markets is, in effect, the process of development itself. This is obvious even for the apparently mundane task of improving information flows. When villages have no modern communications, producers are illiterate in relevant languages, and there is distrust among regions or ethnic groups, improving information flows, much less creating the environment for market signals to rule decision making, is a long term task of education, infrastructure development and the emergence of commercial institutions, such as for product grading.

Some markets are the source of tremendous instability even in developed countries, with currency markets being a case in point. However, overall markets create the possibility of hedging against unforeseen occurrences. This hedging can take quite simple forms. If an agricultural producer operates in an environment of relative cheap and reliable transport costs, he or she can shift between crops as prices fluctuate. If transport is expensive and unreliable, there is no institution for product grading, etc., the producer's options are limited to subsistence crops which can be sold be consumed or sold within the local community. Thus, the underdevelopment of markets, part of underdevelopment in general, increases growth variability by reducing the options for adjusting to shocks, be they natural or market in origin.

Third, a weak state structure is a fundamental characteristic of underdevelopment. This takes several forms, and here the focus will be on policy instruments and implementation. The principal vehicles of macroeconomic policy are taxation, expenditure, monetary instruments, and the exchange rate. It is obvious that the first three are of limited use in reducing short-term growth variability in low-income countries. Taxation is limited by the income inelasticity of the taxes which Sub-Saharan governments are capable of collecting. Countercyclical expenditure is extremely difficult to implement, due to the heavy weight of inflexible spending in the total budget (health and education, for example). The effectiveness of monetary instruments is directly correlated with the breadth of bond markets and, more fundamentally, the extent to which the formal banking system covers economic activity. The great majority of Sub-Saharan countries haven o bond market at all, and those that exist are much too narrow to effective in counter-cyclical management of foreign exchange flows. Thus, central governments are left with but one instrument for country-cyclical policy, the exchange rate. However, many Sub-Saharan governments have chosen to 'float' their exchange rates within the context of stabilisation and structural adjustment programmes.

With producers limited in their ability to adjust to shocks due to absent or incomplete markets, and governments with virtually no countercyclical policy instruments, the potential for growth variability for Sub-Saharan countries is extremely high. The previous section demonstrated that the potential has been realised to a striking degree. Short-term growth variability has the tendency to reduce long term growth

stability for at least two reasons. First, variability increases the cost of planning for the future by generating a demand for various forms of insurance against disaster. In the case of subsistence producers, these forms can involve reduction of investment activity. Second, as the international economy has become increasingly integrated, and Sub-Saharan countries have become more open to international markets, growth variability has increasingly negative implications for foreign investment. It is reasonable to assume that, other things equal, a foreign investor will feel more secure in a relatively stable growth environment than in a volatile one. Unfortunately for the Sub-Saharan countries, other things are not equal: compared to other regions, growth rates are lower and more unstable.

Conclusion

Over forty years, growth variability has been striking high in the Sub-Saharan countries. Even should the optimistic projections proposed here be realised, the growth outcome would be quite modest. The argument has been that the low growth is closely associated with growth variability: the inability to sustain strong rates of growth. The general explanation for this variability is underdevelopment itself. This explanation implies that variability is only marginally responsive to short-term policy intervention. Certainly, unwise policy can make matters worse, but the instruments for short-term economic management are extremely ineffective in reducing variability. Thus, a fundamental re-thinking of 'appropriate macroeconomic policy' is necessary. This re-thinking would be based upon the insight that macro instruments can do very little in the short run, and should be focused primarily on long-term growth.

Table 1: Indicators of Growth Instability for the Sub-Saharan, 1961-1998

Countries ordered by Percentage of Years >> aver SSA growth						Relative	By decade (max = 4):		No. yrs	% of	No. +/-
Country	Data yrs	%>aver	Grw rate	Stdev	Coef Var	grw rate	Top 10	Bot 10	>>|10|	years	consec
Botswana	38	92	9.9	5.7	**.57**	2.73	4		1	3	0
Guinea*	12	83	4.2	1.0	**.23**	1.38	1		0	0	0
Uganda*	16	81	2.2	8.6	3.87	0.75	1		0	0	0
Gabon	38	68	5.5	11.1	2.02	1.52	2		8	22	8
Eq Guin*	14	64	5.2	5.0	**.96**	1.73	1	1	1	8	0
Mauritius	38	63	5.2	6.5	1.26	1.43	3		10	27	6
Swazild*	28	61	5.4	4.5	**.84**	1.61	1		1	4	0
Cote d'Ivoire	38	61	4.7	5.8	1.24	1.29	2	1	5	14	4
Malawi	38	61	4.4	5.6	1.29	1.21	3		7	19	6
Lesotho	38	58	5.9	7.9	1.33	1.63	3		12	32	7
Moz'que*	18	56	2.9	8.1	2.75	0.52	1	1	4	24	2
Kenya	38	55	4.9	5.3	1.09	1.35	3		6	16	4
Seychelles	38	55	4.7	6.5	1.39	1.29	1		4	11	3
Gambia*	32	53	4.0	3.4	**.87**	1.13			1	3	0
Ethiopia*	17	53	2.6	8.0	3.03	0.47			5	14	3
Togo	38	53	4.1	6.8	1.66	1.13	1		7	19	6
Rwanda	38	53	3.3	12.2	3.76	0.90		1	10	27	7
Congo, Rp	38	53	4.5	6.4	1.43	1.24	1	1	2	5	0
Angola*	18	50	1.8	8.0	4.55	0.31		1	2	12	2
Benin	38	50	3.2	3.4	1.06	0.89	1	1	1	3	0
Mauritania	38	50	3.6	6.6	1.82	1.01	1	2	11	30	9
Eritrea*	6	50	4.6	4.4	**.96**	1.37	1		1	20	0
Zimbabwe	38	47	4.3	5.8	1.37	1.18	2		6	16	4
Nigeria	38	47	3.6	8.0	2.24	0.98	1	1	13	35	8
Guinea-B*	28	46	2.2	8.6	3.87	0.66		1	9	33	6
Ghana	38	45	2.5	4.6	1.87	0.68		2	3	8	0
Burk Faso	38	45	3.4	3.4	1.00	0.95			2	5	0
Senegal	38	45	2.5	4.5	1.83	0.68		1	8	22	6
So Africa	38	42	3.3	3.9	1.20	0.90	1		3	8	2
Sudan	38	42	3.3	6.4	1.90	0.92	1	1	6	16	4
Cameroon	38	42	3.5	6.6	1.93	0.95	2	2	6	16	4
Burundi	38	42	2.7	6.6	2.45	0.75	1	2	9	24	4
Tanzania*	10	40	3.3	5.2	1.57	1.14			3	33	3
Mali*	31	39	2.9	5.1	1.78	0.81		2	5	17	4
Niger	38	39	1.7	6.5	3.73	0.48		2	6	16	6
Chad	38	34	2.0	7.8	3.93	0.55	1	2	11	30	10
CAR	38	32	1.5	4.1	2.79	0.41		4	3	8	2
Congo DR	38	32	.2	6.3	27.82	0.06		2	2	5	2
Namibia*	18	28	2.1	3.4	1.59	0.37		1	1	6	2
Zambia	38	26	1.9	4.8	2.57	0.52		2	6	16	4
Mad'car	38	24	1.5	3.5	2.39	0.40		4	2	5	0
Srr Leone	38	21	.9	5.5	5.89	0.26		2	4	11	4
Totals	1350		3.5	6.5	1.87	1.00	40	40	206	15.3	140
									Prct all yrs > 10:		68.0

Notes:

Number of years refers to those with the GDP growth statistic.

%>average 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.

CoefVar is the standard deviation divided by the average (mean).

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

Average growth rate by decade, no. of times, ranks the countries by growth rates, ten fastest growers and ten slowest.

No of 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.

Percentage of years is the percentage of years in which there was a change in the growth rate of an absolute value of ten percentage points or more.

No. +/- consecutive, gives the number of years for which a greater than ten percentage point change was followed by another change greater than ten percent of the opposite sign.

The simple correlation between the relative growth rate and the coefficient of variation of growth (omitting the extreme value for Congo DR, is .58, with an elasticity of -.76.

Table 2: Fastest and Slowest Growing Sub-Saharan Countries, by decades

Fastest	(of 33)								
of 42	all years	of 33	1960s	of 33	1970s	of 41	1980s	of 42	1990s
Botswana	9.9	Togo	9.1	Botswana	15.7	Botswana	10.6	Eq Guinea	7.1
Lesotho	5.9	Cote d'Iv	8.7	Gabon	9.9	Congo, Rp	6.8	Uganda	6.8
Gabon	5.5	Mauritania	8.1	Seychelles	9.2	Swaziland	6.8	Sudan	6.6
Swaziland	5.4	Botswana	7.7	Lesotho	8.5	Chad	5.4	Lesotho	5.7
Mauritius	5.2	Gabon	6.7	Cote d'Iv	7.6	Zimbabwe	5.2	Mauritius	5.4
Kenya	4.9	SouAfrica	6.2	Cameroon	7.3	Guinea	4.5	Moz'bique	5.4
Seychelles	4.7	Kenya	5.7	Kenya	7.2	Burundi	4.3	Botswana	4.8
Cote d'I	4.7	Lesotho	5.5	Malawi	6.3	Mauritius	4.3	Eritrea	4.6
Malawi	4.4	Malawi	5.3	Mauritius	7.2	Kenya	4.2	Benin	4.5
Zimbabwe	4.3	Zimbabwe	4.7	Nigeria	7.0	Cameroon	4.0	Malawi	4.3
average =	5.5		6.8		8.6		5.6		5.5
stdev =	1.63		1.54		2.73		2.03		1.02
Slowest									
Congo, DR	.2	Chad	1.0	Chad	-1.0	Cote d'Iv	-.2	Congo DR	-5.1
Srra Leone	.9	Sudan	1.2	Congo DR	.3	Niger	.0	Srr Leone	-4.1
CAfRep	1.5	Senegal	1.3	Ghana	1.4	Moz'bique	.4	Burundi	-1.2
Mad'car	1.5	CAfRep	1.9	Mad'car	1.5	Mad'car	.4	Cameroon	.0
Niger	1.7	Mali	2.0	Zambia	1.6	Mali	.5	Guinea-B	.4
Zambia	1.9	Cameroon	2.1	CAfRep	2.0	Mauritania	.9	Zambia	.8
Chad	2.0	Ghana	2.3	Niger	2.2	Eq Guinea	.9	Angola	.8
Ghana	2.5	Rwanda	2.6	Benin	2.3	CAfRp	.9	CAfRep	1.0
Senegal	2.5	Mad'car	2.8	Mauritania	2.6	Namibia	.9	Congo Rep	1.3
Burundi	2.7	Burundi	2.9	Srr Leone	2.7	Nigeria	.9	Mad'car	1.3
average =	1.7		2.0		1.6		.6		-.5
stdev =	.76		.69		1.15		.42		2.30

Table 3: Summary of Instability Measures by Region, 1961-1998

Region	Number of countries	Growth rate	Percent of Countries for 0 & 1	>|10|, % of all years	Consecutive, % of >|10|	gdp grw: coef var
Sub-Sahara	42	3.5	21.4	15.3	68.0	2.05*
Latin America & Carib	28	3.8	39.3	7.7	66.3	1.66
Asia	20	5.7	40.0	6.3	28.2	.84
NA&WE	16	3.6	31.3	19.6	68.2	1.53
Totals	106		31.1	12.2	60.1	1.64

*Omits Congo DR, with a coefficient of variation of 27.8. The next largest was Angola at 4.6.

Notes:

Except for the sub-Sahara 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).

Table 4: Accounting for Growth Instability among
Across Sub-Saharan Countries, 1961-1998

Dep variable: Coefficient of Variation of GDP Growth

Variables	Coefficient	T-statistic	Signif
Constant	1.972	2.84	.01
Per cap Y	-.247	-2.24	.05
Petrol xpt	.424	1.53	nsgn
Conflict	.485	1.83	.10
Adjusted R-square =	.338		
F-stat =	6.17	@ .01	
DF =	38		

Notes: The growth rate and per capita income are averages for the years for which there are data.
Natural logarithm values were used.
The simple correlation between the export share in GDP and per capita income is .48.

Table 5: Number of Incidents of Per Capita Growth Equal to Or Greater Than 2.5 percent, Ten year Moving Average, Sub-Saharan Countries, 1961-1998

Country	10 year periods @ ≥ 2.5	Consecutive @ ≥ 2.5 (dates)	Country Category
Angola	0		6
Benin	0		5
Botswana	29	every year	1
Burkina Faso	0		3
Burundi	10	1971-79	6
Cameroon	7	1981-87	4
Central Afr Rep.	0		5
Chad	4	1989-92	4
Congo, Dem. Rep.	0		6
Congo, Rep.	17	1973-89	2b
Cote d'Ivoire	10	1970-79	2b
Eq Guinea	3	1996-98	2a
Eritrea*	0		6
Ethiopia	0		6
Gabon	14	1970-83	2b
Gambia, The	1		5
Ghana	0		5
Guinea	0		3
Guinea-Bissau	0		5
Kenya	11	1971-81	2b
Lesotho	19	1976-82, 1993-98	1
Madagascar	0		5
Malawi	9	1971-76, 1978-80	2b
Mali	0		5
Mauritania	5	1970-74	4
Mauritius	23	1976-98	1
Mozambique	5	1994-98	2a
Namibia	0		5
Niger	0		5
Nigeria	9	1970-78	4
Rwanda	5	1981-84	6
Senegal	0		5
Seychelles	24	1971-82, 1990-98	1
Sierra Leone	2		6
South Africa	7	1970-76	4
Sudan	5	1995-98	2a
Swaziland	11	1987-96	1
Tanzania	0		5
Togo	5	1970-74	4
Uganda	3	1995-98	2a
Zambia	0		5
Zimbabwe	8	1970-77	4

*Time series too short to yield 10 year moving average.

Table 6: Categorisation of Sub-Saharan Countries by Long-Term Growth Of Per Capita Income, 1961-1998

Categories:	Criteria	Countries (no. of periods and/or dates)	Probability of g = 2.5 & comment
1. Consistently high growth Aver: 3.9 Stdev: 6.2	Long term growth ≥ 2.5 pc for more than half of 10 year periods	Botswana (29), Lesotho (19), Mauritius (23), Seychelles (24), Swaziland (11) [**five**]	Probability: 79% Redistributive policies for poverty reduction
2. Many periods of high growth			
a. 1990s 'New success stories' Aver: 1.7 Stdev: 5.8	Growth ≥ 2.5 pc in 3 or more 10 year periods, ending in 1998	Eq Guinea (1996-98), Mozambique (1994-98), Sudan (5, 1995-98), Uganda (1995-98) [**four**]	Probability: 48% Policies for short-term stability
b. Before 1990s 'Old success stories' Aver: 1.8 Stdev: 7.0	Growth ≥ 2.5 pc in 3 or more consecutive 10 year periods, before 1990s	Cameroon (1981-87), Congo Rep (1973-89), Gabon (1970-83), Kenya (1971-81), Malawi (1971-76, 1978-80) [**five**]	Probability: 42%
3. Consistently low growth Aver: 1.1 Stdev: 2.4	No periods ≥ 2.5, average over 1.0	Burkina Faso, The Gambia, Guinea [**three**]	Probability: 1%
4. Unstable, low growth Aver: 0.9 Stdev: 6.4	Occasional high growth, unsustained (at least 5 periods ≥ 2.5)	Chad (1989-92), Cote d'Ivoire (1971-79), Mauritania (5, 1971-74), Nigeria (9, 1970-78), South Africa (1970-76), Togo (1970-74), Zimbabwe (1970-77) [**seven**]	Probability: 25% Policies for long term stability
5. Consistently near-zero growth Aver: -0.4 Stdev: 5.0	No periods ≥ 2.5 pc, average < 1.0	Benin, CAR, Ghana, Guinea-B, Madagascar, Mali, Namibia, Niger, Senegal, Tanzania, Zambia [**eleven**]	Probability: 0%
6. Conflict affected (1990s) Aver: -0.7 Stdev: 7.5	Affected by conflicts in 1990s	Angola, Burundi (1970-79), Congo DR, Eritrea*, Ethiopia, Rwanda (5, 1981-85), Sierra Leone (2) [**seven**]	Probability: 10% End conflicts

Notes:

The dates in parenthesis are years of consecutive 10 year moving averages equal to or greater than 2.5 percent per capita. If these do not exhaust the incidence of such averages, the total number is given before the dates (the maximum for most countries is 29). The numbers in bold are the country counts. For the countries with more than half of years equal to or greater than 2.5 (category 1), only the number of years is given.

*Excluded from long-term average because of short time series.

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