

NBER WORKING PAPER SERIES

THE ECONOMIC TRAGEDY OF THE XXth CENTURY:
GROWTH IN AFRICA

Elsa V. Artadi
Xavier Sala-i-Martin

Working Paper 9865
<http://www.nber.org/papers/w9865>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
July 2003

The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research

©2003 by Elsa V. Artadi and Xavier Sala-i-Martin. All rights reserved. Short sections of text not to exceed two paragraphs, may be quoted without explicit permission provided that full credit including © notice, is given to the source.

The Economic Tragedy of the XXth Century: Growth in Africa
Elsa V. Artadi and Xavier Sala-i-Martin
NBER Working Paper No. 9865
July 2003
JEL No. O0, O1, O5

ABSTRACT

The dismal growth performance of Africa is the worst economic tragedy of the XXth century. We document the evolution of per capita GDP for the continent as a whole and for subset of countries south of the Sahara desert. We document the worsening of various income inequality indexes and we estimate poverty rates and headcounts. We then analyze some of the central robust determinants of economic growth reported by Sala-i-Martin, Doppelhofer and Miller (2003) and project the annual growth rates Africa would have enjoyed if these key determinants had taken OECD rather than African values. Expensive investment goods, low levels of education, poor health, adverse geography, closed economies, too much public expenditure and too many military conflicts are seen as key explanations of the economic tragedy.

Elsa V. Artadi
Harvard University
vila@fas.harvard.edu

Xavier Sala-i-Martin
Department of Economics
Columbia University
420 West 118th Street, 1005
New York, NY 10027
and NBER
xs23@columbia.edu

(1) Growth

(i) Documenting a Tragedy

There should be no doubt that the worst economic disaster of the XXth century is the dismal growth performance of the African continent. The newly freed citizens had high hopes when their countries became independent during the second half of the century, but most of them are substantially poorer now than they were when their nations were born. Figure 1 displays the measure that summarizes the average performance of the continent in the clearest way, a measure that is closely related to income per person: per capita GDP. The period shown in the figure starts when a substantial amount of African countries became independent, 1960, and it runs all the way to 2002.¹ We see that, between 1960 and 1980, per capita GDP increased slightly from US\$1,500 to about \$2,000. It then stagnated at this very low level ever since.

The aggregate data for the entire continent masks the fact that, without being a miracle, Northern Africa has done a little better than the rest of the continent. Figure 1 also shows the evolution of per capita GDP for sub-Saharan Africa² and displays a number of disturbing trends. First, the level of GDP per capita is smaller than that of the whole continent. This, of course, reflects the fact that the North-African countries are

¹ The African GDP per capita is constructed aggregating the Penn World Tables Purchasing-Power-Parity-adjusted GDP data published by Summers-Heston-Aten (2002) for each country and dividing it by aggregate population. Since the data are measured in PPP-adjusted units, it is strictly comparable across countries and, therefore, can be aggregated up. The countries used to construct this measure of African GDP are: Algeria, Angola, Burundi, Benin, Burkina Faso, Botswana, Central African Republic, Cote d'Ivoire, Cameroon, Republic of Congo, Cape Verde, Egypt, Ethiopia, Gabon, Ghana, Guinea, The Gambia, Guinea-Bissau, Equatorial Guinea, Kenya, Lesotho, Madagascar, Mali, Mozambique, Mauritania, Mauritius, Malawi, Morocco, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Swaziland, Seychelles, Chad, Togo, Tanzania, Tunisia, Uganda, South Africa, Democratic Republic of Congo, Zambia, and Zimbabwe.

² The set of sub-Saharan African countries are the African countries minus Algeria, Egypt, Morocco and Tunisia

indeed a bit richer than their counterparts of the South. Second, and more significantly, the level of GDP started a long-term decline after its 1974 peak. Today, per capita GDP for Sub-Saharan Africa is 200 dollars smaller than it was in 1974, a decline of nearly 11% over a quarter of a century. This evolution is especially worrisome if we consider that Africa was already extremely poor in 1974.

Figure 2 decomposes the per capita growth rates over various sub-periods. Prior to the 1974 oil shock, the growth rates were positive: for the whole continent, they were around 3% in the early 60s, close to 2% in the late 60s, and slightly below 1.5% between 1970 and 1974. The growth rates for sub-Saharan Africa were only slightly smaller. Things changed dramatically in the second half of the 1970s. The growth rate for the countries south of the Sahara desert became negative 0.5% in the late 70s, negative 1.2% in the second half of the decade and zero between 1980 and 1985. The growth dropped dramatically to a record negative 1.5% per year in the first half of the 1990s. The continent seems to have recovered a bit since then with positive, albeit small, growth rates for the second half of the 1990s and the first two years of the new millennium.

The African growth performance is dismal in absolute terms, but it is worse if we take into account that, during this same period, the rest of the world has been growing at an annual rate of close to 2%. Moreover, the growth performance of the world's technological leader, the United States, was not particularly spectacular after the oil shocks of the 1970s, the African continent has been losing ground to America. Figure 3 displays GDP per capita for the African continent (and the sub-Saharan subset) relative to the United States. The evidence of absolute divergence is clear: Africa has been losing

ground dramatically and has been unable to catch up, perhaps benefiting of the fact that it started from a relatively backward position.

(ii) Distribution of Income and the Politics of Reform

If aggregate or average measures show that Africa has performed dismally over the last few decades, things do not look better when we estimate individual incomes. In a number of recent studies, Sala-i-Martin (2003) has devised a methodology that combines individual income surveys with aggregate national account data to estimate the entire distribution of income for each country in the world. Here we borrow from this work to construct the distribution for each country in Africa which we then aggregate to compute the distribution for the whole continent. Figure 4 reports the African income distributions for 1970, 1980, 1990 and 2000. A number of features of this figure are worth emphasizing. First, the bottom part of the distribution “shifts to the left” over time. This, of course, means that the incomes of the poorest citizens of Africa have deteriorated over the last thirty years. Second, the top part of the distribution did not change much. In other words, whereas the poorest citizens of the continent saw how their economic situation worsen, the richest people did not suffer much of a change. Third, since the poor tend to get poorer and the rich do not seem to get poorer, it must be the case that individual income inequalities in Africa have been increasing. It is easy to estimate various measures of income inequalities with the data used to construct Figure 4. Figure 5 displays one of the most popular measures of income inequality: the gini coefficient. As predicted, it shows an unambiguous upward trend. For the continent as a whole, the coefficient increases from a value of 0.57 in 1970 to a value of 0.63 in the year 2000, a

deterioration of inequality of over 10%. For Sub-Saharan Africa, the numbers are 0.58 and 0.65 respectively. It is interesting to note that most of the inequality within Africa can be accounted for by inequality within countries rather than across countries. Figure 6 shows an inequality measure that can be decomposed into its within-country component (which measures the amount of inequality that would exist in Africa if all countries had the same level of per capita income) and the across-country component (which measures the amount of inequality that would exist if all citizens within each country had the same level of income, but countries differed in their aggregate levels of income per capita). Figure 6 shows that inequality in Africa has increased both because rich countries in the continent have grown faster (so across-country inequality has deteriorated) and because rich citizens within each country have benefited more than poor citizens (so within-country inequality has also increased). Of course, if within and across country inequalities have increased, it must be the case that overall inequality in Africa has also dramatically gone up. The finding is particularly significant if we take into account that, as shown by Sala-i-Martin (2003a), worldwide income inequalities have been decreasing over the same period.

Before we leave the discussion of the distribution of income in Africa, it is worth mentioning one last aspect of Figure 4. The fact that the “rightmost” part of the income distribution does not seem to decrease over time has some potentially important implications. The reason is that the people who would have to implement the legal, social and economic reforms that could potentially turn Africa around do not seem to suffer much from the current situation. Thus, their incentives to introduce changes are slim. This phenomenon is even stronger for a number of individual countries, where the

income of the “rich” not only does not decline, but it actually increases. The clearest example of this perverse situation is Nigeria, whose income distribution is displayed in Figure 7. As it is the case for most Africa, the lower part of the Nigerian income distribution constantly shifts to the left reflecting the fact that the incomes of the lowest 80% of the population deteriorate over time. The shocking thing about this figure is that the upper part of the distribution moves to the right. In other words, the richest citizens of Nigeria actually benefit from the current disastrous economic situation. From a political economy point of view, the problem is these individuals whose incomes are improving are probably the decision makers..

(iii) The Humans Behind the Tragedy: Poverty Rates and Headcounts

The last interesting aspect of Figures 4 and 7 is the vertical line that represents the extreme poverty line. The first international poverty line was defined to be an **income** level of US\$ 200 in 1970 prices (Ahluwalia, Carter and Chenery (1979).) People were seen as poor if their incomes were smaller than that figure. The vertical line displayed in Figures 4 and 7 represents one such international poverty line. It corresponds to the widely accepted definition of one-dollar-per-day. The fraction of African citizens whose income is less than one dollar per day is represented by the area below the distribution and to the left of the poverty line. Inspection of Figure 4 shows that this fraction has been increasing.

In 1991, the World Bank adopted a definition of poverty in terms of **consumption** and proposed what is now widely used as the extreme poverty line: consumption level of one dollar per day (Ravallio, Datt and van de Walle (1991).) Since the original definition

used 1985 dollars and the data used to construct the distributions in this paper are in 1996 dollars, we adjusted the poverty line accordingly. Moreover, following Bhalla (2002), an additional adjustment in the poverty line has to be made to take account of the fact that rich citizens tend to underreport their income proportionally more than poor citizens. He suggests an adjustment of an additional 15%. We follow his advice here. Adding up the two adjustments, we arrive at a poverty line of 570 dollars per year. To estimate consumption poverty, Sala-i-Martin (2003b) computes individual country consumption distributions for each African country. Using these data, we calculate African poverty rates and headcounts and we report them in Figure 8. The fraction of African population whose consumption is less than one dollar a day was 42% in 1970. The corresponding number for Sub-Saharan Africa was a staggering 48%: almost one of every two African citizens lived in poverty in 1970. Although these poverty rates reflected a terrible human tragedy, the dismal economic performance over the following three decades made things worse, and actually raised the poverty rates to 50% for the continent as a whole and to 60% for sub-Saharan Africa by 1995. The positive growth rates of the second half of the 1990s implied a small reduction in poverty rates during those five years.

The negative evolution of African poverty rates between 1970 and 1995 is particularly troubling given the fact that the world as a whole has been improving dramatically in this dimension over the course of these three decades. Figure 8 shows that, while African poverty rates soared, worldwide poverty ratios fell from 37% in 1970 to 16% in the year 2000.

Figure 9 reports the overall number of poor citizens rather than the fraction of citizens that are poor. The figure shows that the total number of poor in the world

declined from 1.3 billion in 1975 to 900 million in 2000. During this period of overall improvement, however, Africa's poor increased from less than 140 million in 1975 to over 360 million in the year 2000.³ Naturally, the implication is that the fraction of the world's poor that live in Africa has increased dramatically. In 1970, one out of every ten (10.5%) poor citizens in the world lived in Africa. By the year 2000, the number was close to one out of every two (or 42%). Poverty used to be an essentially Asian phenomenon. The excellent economic performance of Asia paired with the disastrous growth performance of Africa has turned poverty into an essentially African problem.

Economic analysts tend to forget that negative growth rates have important consequences for human welfare. The case of Africa shows clearly that, when the economy does not grow, poverty expands and vice versa. Indeed, the only reliable way to reduce poverty in Africa in a permanent fashion is to jump start the continent and put it in the pathway for positive aggregate growth. But how?

(2) The Role of Investment

To find out what could be done to lead Africa back to growth, we need to figure out what went wrong over the last forty years. The easiest way to improve is to correct the mistakes of the past. So the pivotal question is: why didn't Africa grow?

In responding to this central question, the first thing economists are tempted to answer is that Africa did not grow because they did not invest enough. There are various reasons for this answer. First, some of the most widely accepted economic theories of economic growth (like the Solow-Swan) suggest that investment in physical capital plays

³ Bhalla (2002) finds very similar results. He estimates that the total number of poor in Sub-Saharan Africa increased by 174 million between 1980 and 2000 (see his Table 9.2).

a key role in the process of economic growth and development. Second, this belief was reinforced by the new theories of Endogenous Growth developed in the 1990s. Third, international development institutions such as the World Bank have long believed that physical capital accumulation was a central element in the process of economic development. This is why they have long used the doctrine of the “financing gap”. According to this doctrine, the World Bank would finance the difference between the investment rate needed to achieve a certain growth target and the investment rate that the country could finance out of their own savings, as if the only determinant of long-term growth were physical capital investment (see Easterly (2001).)

And finally, a simple look at the data confirms that the investment rate (the ratio of investment to GDP) in Africa was not only low, but it declined over the last 40 years. Figure 10 shows that during this whole time period, investment rates were always below 15%. Moreover, the rate declined after 1975 to a record low of 7.5% for Sub-Saharan Africa and 8.5% for the whole continent in the first half of the 1990s. In comparison, investment rates for the average-performing OECD economies lied between 20 and 25% whereas investment rates for the miracle East-Asian economies reached an average of 30%.

Many analysts are skeptical of the aggregate investment rates because they believe that what should lead to growth is private, rate-of-return-driven investment. Public investment tends not to be productive as projects tend to be chosen according to political or non-economic preferences. Examples of public infrastructures that had no impact on the economic performance of the country abound in Africa. The steel plant in Ajakouta (Nigeria) and the Akosombo dam on the Volta river in Ghana are just two of

the most famous examples of failed giant public investment projects (See Easterly (2001) for a colorful description of the gargantuan Akosombo failure). Figure 11 shows that Africa did very poorly in that area also as its ratio of private to public investment is extremely low:⁴ For the overall continent, the ratio was 1.3 in the 1980s and just above 2 in the 1990s. Decomposing this continent-wide numbers into a North and Sub-Saharan regions yields very similar results for the two parts of the continent. These numbers are extremely low if compared with OECD economies (with a ratio of private-to-public investment of 5.7 in the 1980s and 6.6 in the 1990s) or the extremely successful economies of East Asia (with a ratio of 4.8 and 5.1 in each of the last two decades respectively). The central point is that, not only overall investment rates in Africa were extremely low, but they were skewed in the wrong direction in the sense that a large portion of the investments were undertaken by the inefficient public sector. In this sense, a little piece of good news can be found in Figure 12, where the private investment rate is plotted for the 1990s. Although the rate is quite small, it picked up during the decade. This increase in overall private investment may reflect a better economic environment stemming from some of the reforms implemented in the 1990s, and may be one of the reasons behind the slight increase in growth rates of the second half of the decade and the first two years of the new century. But the level of private investment remains too low to be a driving force of improved growth prospects over the next several decades.

(3) Determinants of African Growth: Beyond Investment

(i) Distortions and the Cost of Investment

⁴ Collier and Gunning (1999) point out to this imbalance between public and private investment in Africa as one of the reasons behind its low rates of economic growth.

A pivotal question is: why were private investment rates so low in Africa? Why was the continent unable to attract the kind of investment that would have put it back on the road of economic growth and development. Many reasons have been discussed in the literature. For example, Collier and Pattillo (2000) argue that the rate of return to investment in Africa was about one third below that elsewhere. They also show that investment risk was very high for a variety of reasons. Among them, political instability, price volatility, the tendency of government to engage in large policy reversals, and an uncertain macroeconomic environment. An interesting point made in Collier and Pattillo (2000) is that the ratings of Africa may be overstating the true underlying risks and that this may be one of the reasons for low private investment in the region.

In recent research, Sala-i-Martin, Doppelhofer and Miller (2003) found a number of robust determinants of long-term economic growth over a large sample of countries. One of the important variables found was the investment price ratio: countries where investment goods tend to be expensive relative to consumption goods are countries that tend to have smaller growth rates. Figure 13 reports the average value of this relative price for Africa, the OECD and East Asia. For the African continent as a whole, the ratio is slightly above 120. For Sub-Saharan Africa, the ratio is exactly 120 whereas for North-Africa is more than 150. These ratios compare unfavorably with the ratio of 70 found in OECD or East Asia. Thus, the fact that investment goods were very expensive in Africa is an important explanation for its low growth performance.⁵

To estimate the impact of expensive investment goods on overall growth in Africa, Table 1 uses the econometric estimates of Sala-i-Martin et al. (2003) to estimate the growth rate that Africa would have achieved if the price of investment had been at the

⁵ Collier and Gunning (1999) reach a similar conclusion.

OECD levels rather than African levels. The result is reported in the first row: the growth rate of Africa would have been 0.44 percentage points larger every year.

(ii) Human Capital (1): Education

We continue using the findings of Sala-i-Martin et al. (2002) to pin down other important empirical factors that determine long-term growth rates. The next item in the list is human capital. Human capital has two important components: education and health. It turns out that the most significant measure of human education is the Primary School Enrollment in the 1960s.⁶ Figure 14 shows that Africa does not score well on these grounds relative to OECD or Asia. For example, Sub-Saharan Africa had a primary school enrollment rate of 40% in 1960 whereas North Africa had an average rate of 56%. The overall African rate averaged 42%. This contrasts with the nearly 100% rates in OECD or East Asia. The second row of Table 1 shows that if Africa had had enrollment rates at OECD levels the average growth rate of GDP per capita would have been 1.47% larger every year. In other words, instead of the annual 0.9%, the growth rate would have been a much healthier 2.37% per year and per capita incomes today would be two and a half times larger than they actually are.

African enrollment rates have improved dramatically since 1960. This, of course, means that the economic growth prospects over the next three to four decades are brighter than they were in the 1960s.

⁶ For econometric reasons, it is important to capture human capital at the beginning of the period because of its endogeneity: as the economy grows over time, it acquires more human capital. To alleviate endogeneity problems, econometric analyses typically use variables at the beginning of the period. Since the Sala-i-Martin et al (2003) study refers to the period 1960 to 2000, the exogeneous variables such as school enrollment are evaluated in 1960.

(iii) Human Capital (II): Health

The other important measure of human capital is related to the health of the population.⁷ Along these lines, the data picked two measures as robust determinants of long-term growth. Life Expectancy in 1960 (which has a positive association with growth) and Malaria Prevalence today (which is negatively correlated to growth). Figure 15 shows that Life Expectancy in 1960 was much lower in Africa than in OECD or East Asia (for the overall African continent, expectancy was just above 40 years whereas the corresponding values for OECD and East Asia were 67 and 62 years respectively). Table 1 shows that if Africa had had a life expectancy similar to the OECD, its annual growth rate would have been 2,07 percentage points larger. Life expectancy in Africa has increased substantially over the last 40 years, which means that we predict larger growth rates over the next few decades. The problem, of course, is that life expectancy began to deteriorate in the late 1990s due to the adverse impact of AIDS.

The other important measure of health picked by the data is malaria prevalence, and its average indexes are reported in Figure 16. Whereas OECD and East Asia have virtually no malaria prevalence, the index is close to 0.8 in Africa (and close to 0.9 in the Sub-Saharan subcontinent). This is another important reason behind the dismal growth performance of the continent as a whole. Table 1 estimates that if Africa had no malaria over the last four decades, its annual growth rate would have been 1.25 percentage points larger than it actually was.

To sum up, one of the most important challenges Africa faces today is its public health. The most effective way for rich nations to help Africa would be by helping them

⁷ This measure was first proposed by Jeffrey Sachs and his colleagues. See, for example, Gallup, Sachs and Mellinger (1998), Sachs (2003).

deal with the public health issues. In this sense, there is one thing Africans cannot do by themselves, both because they lack the expertise and the money: R&D. If Rich nations devoted ample resources (perhaps by reorienting current aid projects that are seen as systematic failures) to perform research and development to health issues, millions of lives would be saved. Moreover, our estimates show that such research would also improve the standard of living and the welfare of those that survive.

(iv) Geography, the Tropics and Institutions

Another robust determinant of the rate of economic growth is related to geography. For example, the fraction of a country that is located in the tropics turns out to have an important negatively impact on economic growth. For some reason, tropical weather is not good for growth. Figure 17 shows that, again, Africa does not fare well in this measure, since about 85% of its territory lies within the tropics (the fraction goes up to 92% if we consider Sub-Saharan countries only). This contrasts with the 3% of OECD or 60% of East Asian territory located in the tropics

Researchers have pointed out various reasons why tropical countries may have adverse growth prospects. Sachs and Warner (1997), Gallup, Sachs and Mellinger (1998) and Sachs (2003) for example, point to debilitating tropical diseases that reduce the productivity of workers and the incentives to invest in education and health. Other reasons include the fact that they tend to have less productive agriculture and that they cannot benefit from the technological progress enjoyed by rich countries (since their agricultural technologies are weather-specific. Finally, researchers like Acemoglu, Johnson and Robinson (2001) point to the institutions left by the colonies. Indeed, the

claim is that colonial powers established “extractive institutions” in inhospitable countries plagued by tropical diseases whereas they introduced “European-style institutions” that guaranteed the rule of law and property rights in those areas where they could actually move to live. When they abandoned the colonies, the institutions remained. And the current situation still reflects the colonial past.

Having bad institutions seems to be especially dangerous in countries that discover natural resources. A recent paper by Sala-i-Martin and Subramanian (2003) shows that natural resources that are “easy to steal” (like oil and mining) turn out to have a very adverse impact growth by triggering corruption chains that end up destroying institutions such as the rule of law. To solve this problem, they propose that the money generated by the sales of these natural resources could be distributed to the people directly by making them direct owners of the oil or diamonds. This way, corrupt officials would not have easy access to oil money unless they tax people directly. This is predicted to have a beneficial effect on institutions and, ultimately, growth.

Whether the impact of geography on growth is direct or through its effects on economic, political and social institutions, we can measure the impact geography had on the growth rate of Africa. Table 1 estimates that Africa’s annual growth rate was reduced by 1.21 percentage points by the fact that it had an adverse tropical geography.

(v) Openness

The next important determinant of economic growth of a country is its degree of openness. It is widely believed that economies that are open to international forces tend to benefit from trade and tend to have more access to foreign technological progress

through FDI. Figure 18 shows that African economies are quite closed. The index of economic openness postulated, for example, by Sachs and Warner (1997), is 0.10 for the African continent as a whole (slightly larger for North Africa than Sub-Saharan Africa, but still quite small in both sets of countries). This compares very unfavorably with the OECD (with an openness index of 0.65) or East Asia (with an even more spectacular value of 0.83). Table 1 estimates that if Africa had been as open as OECD over the last 40 years, its annual growth rate would have been 0.67 percentage points larger.

(vi) Excessive Public Spending

Another aspect worth emphasizing is the ratio of public consumption to GDP. Sala-i-Martin et al. (2003) show that more public spending is bad for economic growth. This true both for public consumption and public investment, but public consumption turns out to be more robust. This is hardly surprising because public consumption does not tend to have direct positive effects on economic growth, but it needs to be financed through distortionary taxes which do have a negative effect on growth (the same argument applies to public investment if it is wasteful, as is in so many occasions!). Once again, Africa does not score well on these grounds: the fraction of GDP devoted to public consumption spending is 0.16 (0.164 for Sub-Saharan Africa and 0.12 for North-Africa). The corresponding numbers are 0.07 for OECD and 0.06 for East Asia. If Africa had had a level of public spending similar to that of the OECD over the last 40 years, its annual growth rate would have been 0.40 percentage points larger.

(vii) Military Conflict and Ethno-Linguistic Fractionalization

We leave one of Africa's most obvious problems for last: violence. It should not surprise anyone if we say that wars have plagued the continent since it began to become independent in the 1960s. Military conflicts have involved countries like Algeria, Angola, Burundi, Chad, Cote d'Ivoire, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, Guinea-Bissau, Liberia, Libya, Mauritania, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sierra Leone, Somalia, South Africa, Sudan, Togo, Uganda or Zimbabwe. Some of these conflicts have been short. Some have lasted decades. Human tragedies have mushroomed. But the tragedy goes way beyond the suffering directly from violence and spreads over to the citizenry past and future through its impacts on economic growth and, therefore, the expansion of poverty and further misery.

Some of the military conflicts have to do with natural resources (for example, the Biafran war in Nigeria, the Sierra Leone conflict and the war in Congo/Zaire). Others reflect ethnic or tribal wars (the fights between Tutsies and Hutus in Rwanda-Burundi being the most famous example of ethnic rivalries).

Easterly and Levine (1997) postulate that a central problem for most African economies was its unusually large ethno-linguistic fractionalization. Such fractionalization could have arisen from the fact that the colonial powers divided the continent in ways that were arbitrary and unrelated to ethnicities. But, whatever the origin, ethno-linguistic fights tend to generate to inefficient economic outcomes. Of course the worst economic outcome arises when ethnic conflicts lead to war. But bad economic consequences could also come from groups fighting over the appropriation of resources through regular politics or through the government budget. Figure 20 shows that, indeed, Africa (and especially Sub-Saharan Africa) is unusually fragmented. The

index lies around 0.6. This contrasts with the values of 0.12 and 0.20 for OECD and East Asia respectively. Easterly and Levine's insight turns out to be a robust finding as confirmed by Sala-i-Martin et al. (2003). Table 1 shows that if Africa had the same amount of ethno-linguistic fractionalization as the OECD, its annual growth rate would have been 0.52 percentage points larger.⁸

(4) Conclusions

The economic growth performance of the African continent has been tragically disappointing. We use the word "tragic" because it has had enormous consequences on human welfare: hundreds of millions of citizens have become poor directly as a consequence of this dismal economic performance.

Hopefully, this study will contribute to the understanding of what went wrong. Perhaps more importantly, it may help us understand what could be done to improve this situation. For example, it seems clear that the massive international aid programs of the past have not helped much. Easterly (2001) and the body of research led by Paul Collier provide some clues as to why international aid may have failed in the past and suggest some possible ways to amend the errors. Perhaps a more efficient way to help would be for the rich to undertake the tasks that the poor cannot possibly do. One of the most important is the research needed to tackle the health problems that are threatening to devastate the continent. Africans have neither the resources nor the expertise to discover vaccines that prevent AIDS or malaria. Rich countries have little incentive to invest in

⁸ On top of the variables reported here, Sala-i-Martin et al. (2003)'s list includes other variables such as an East Asian dummy or Spanish Colony. Since these variables take the same value for OECD and Africa, we conclude that Africa would not have benefited from having OECD values for such variables. Thus, we have excluded them from our analysis.

these lines of research because the discoveries will help people with little ability to buy the products. If international aid financed by bilateral donors as well as multilateral institutions were to be redirected towards the financing of the most important global public good, health, and dealing with the epidemics currently threatening the poorest continent in the world, the situation of Africa might improve dramatically.

Among the other factors that contribute to the tragedy of Africa there are the dramatic and devastating military conflicts that have plagued the continent over the last half a century. Africa's economies will not grow until all these conflicts stop.

Other important factors that, if changed, will contribute to African growth include the kinds of institutions that guarantee the rule of law and property rights, investments in education, the reduction of policy distortions that make investment excessively expensive, and the reduction of wasteful consumption expenditures.

Opening up the African economies to the forces of trade, FDI, and technological diffusion is also important. African governments could do a lot to make sure that economies open up. But Europe, Japan and the United States could also contribute by facilitating the access of African products to their markets and by reducing subsidies to their agricultural products.

Africa's growth performance was the largest economic disaster of the XXth century. We can prevent it from being the largest disaster of the next century.

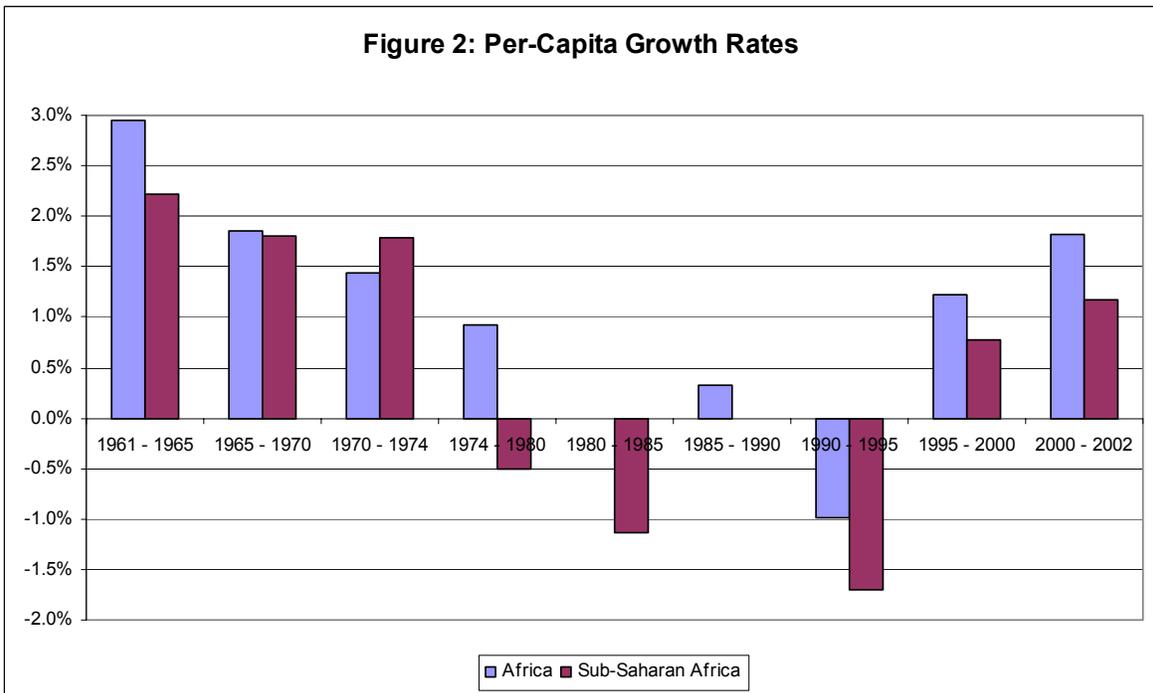
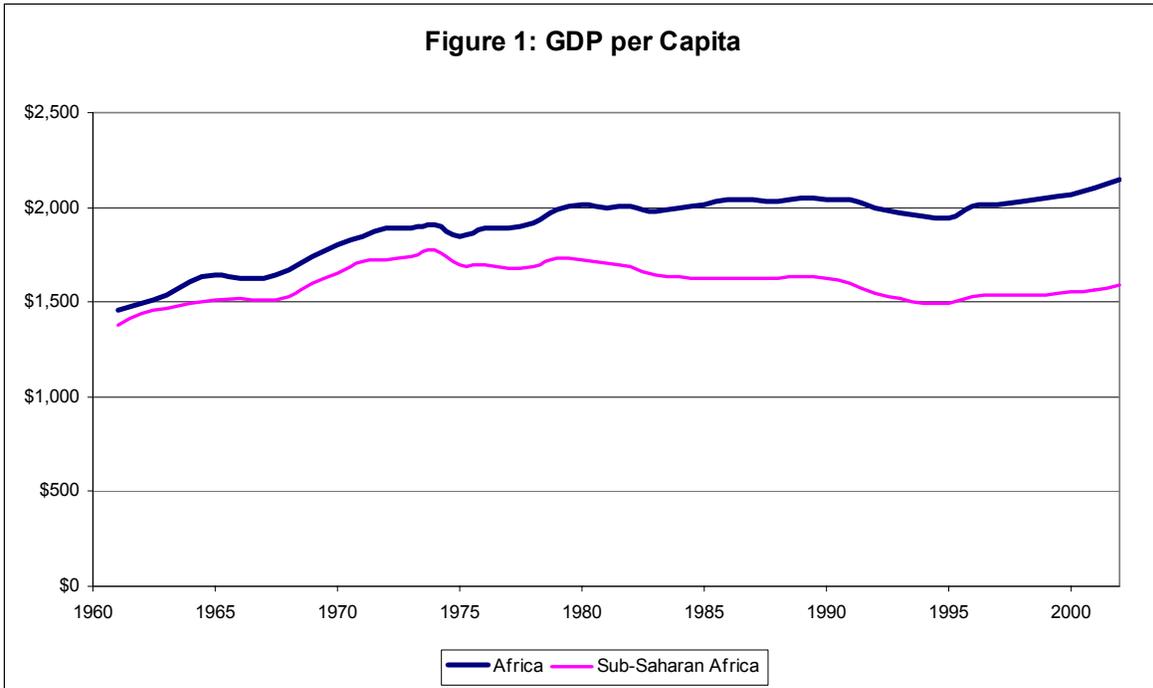


Figure 3: Divergence: Per Capita GDP Relative to United States

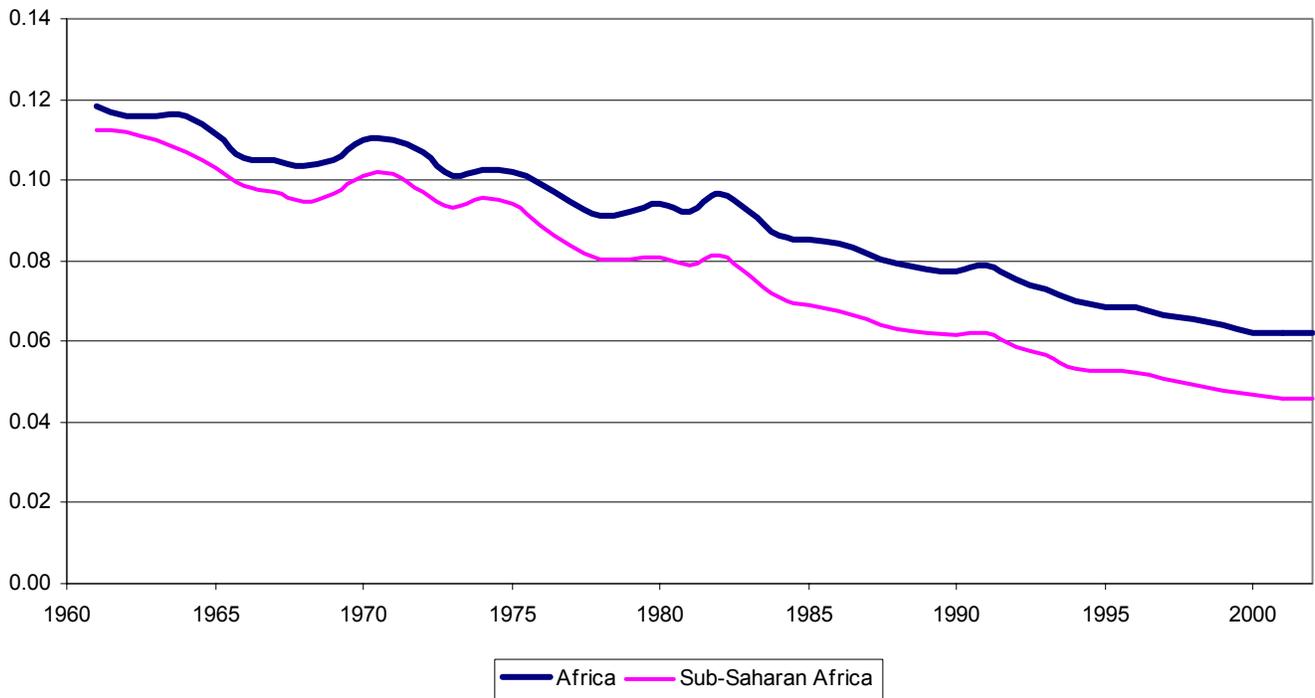


Figure 4: Distribution of Income in Africa

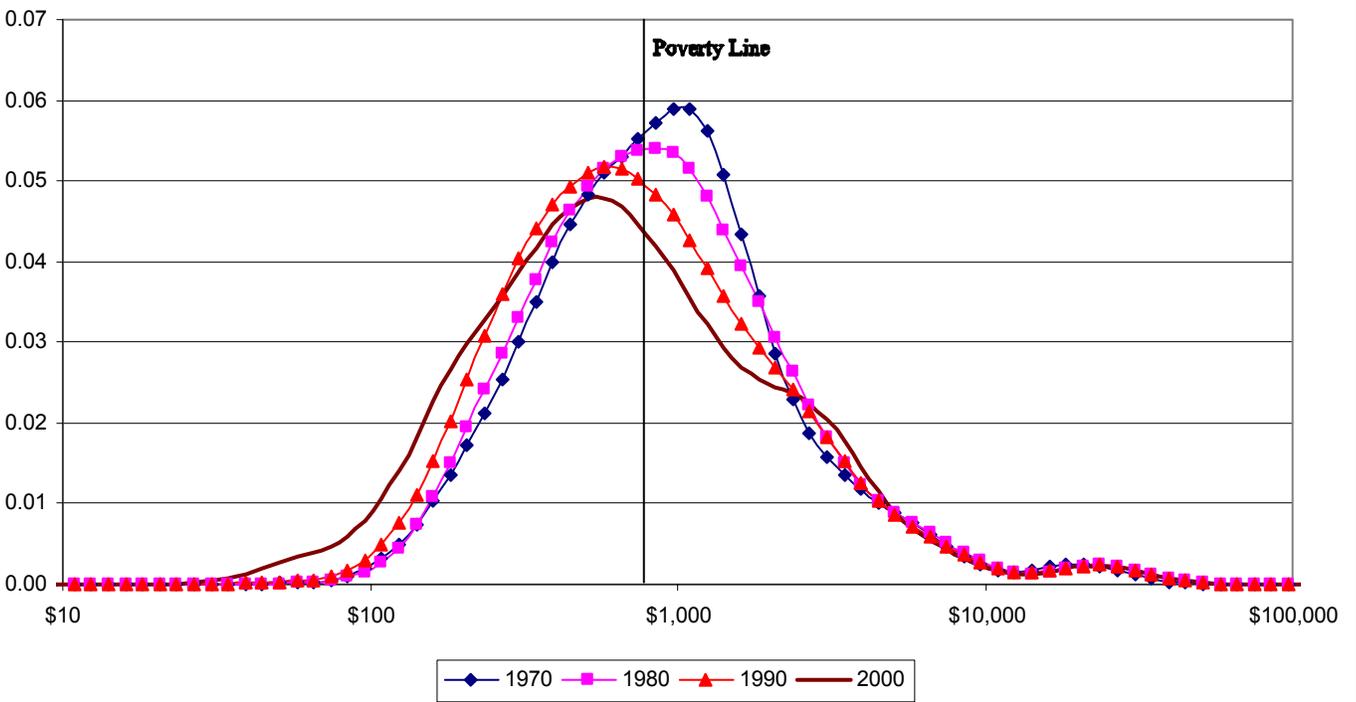


Figure 5: Gini Coefficient

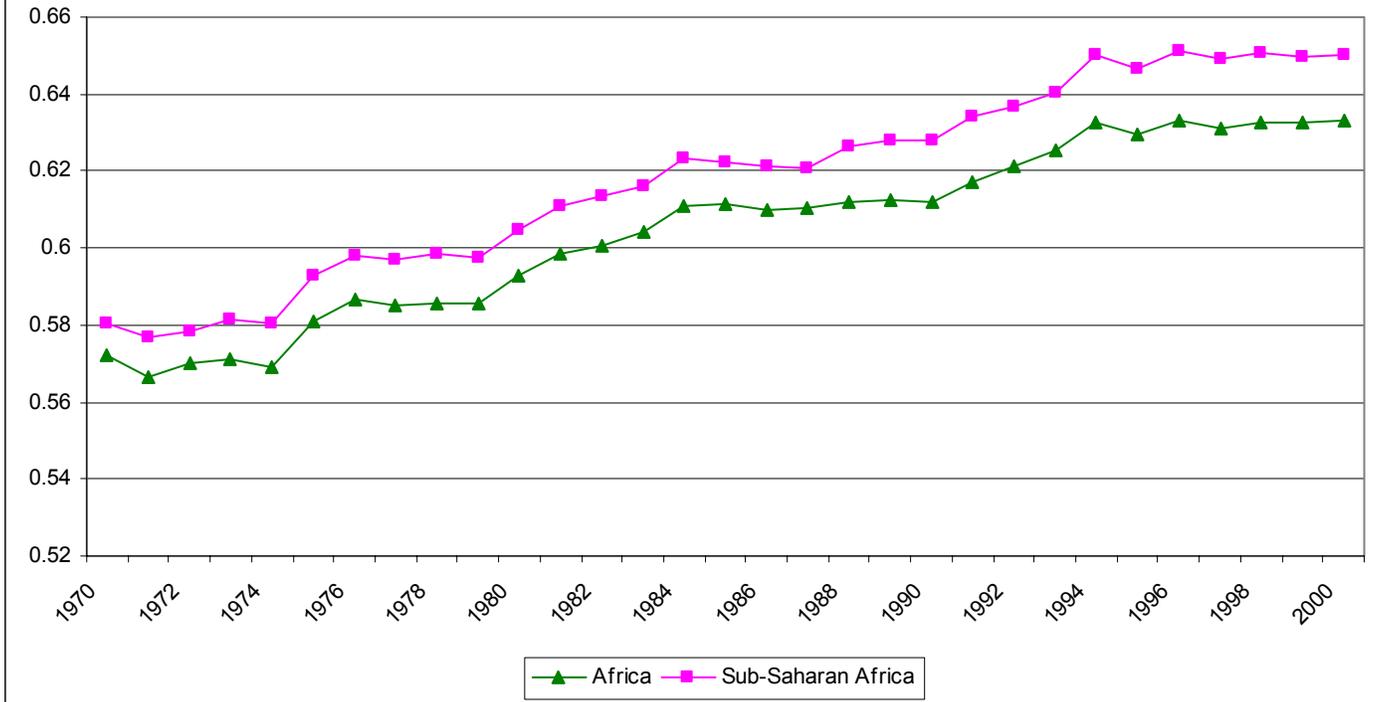


Figure 6: Theil Index for Sub-Saharan Africa

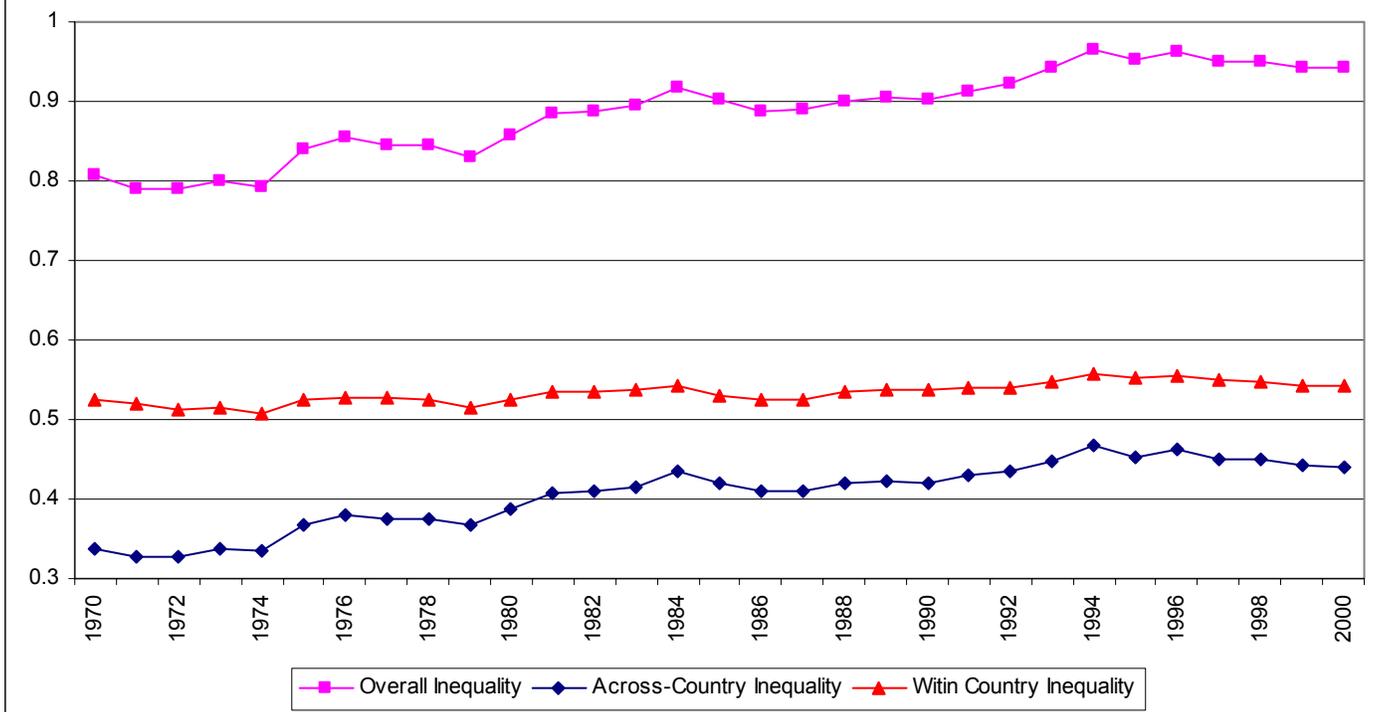


Figure 7: Income Distribution in Nigeria

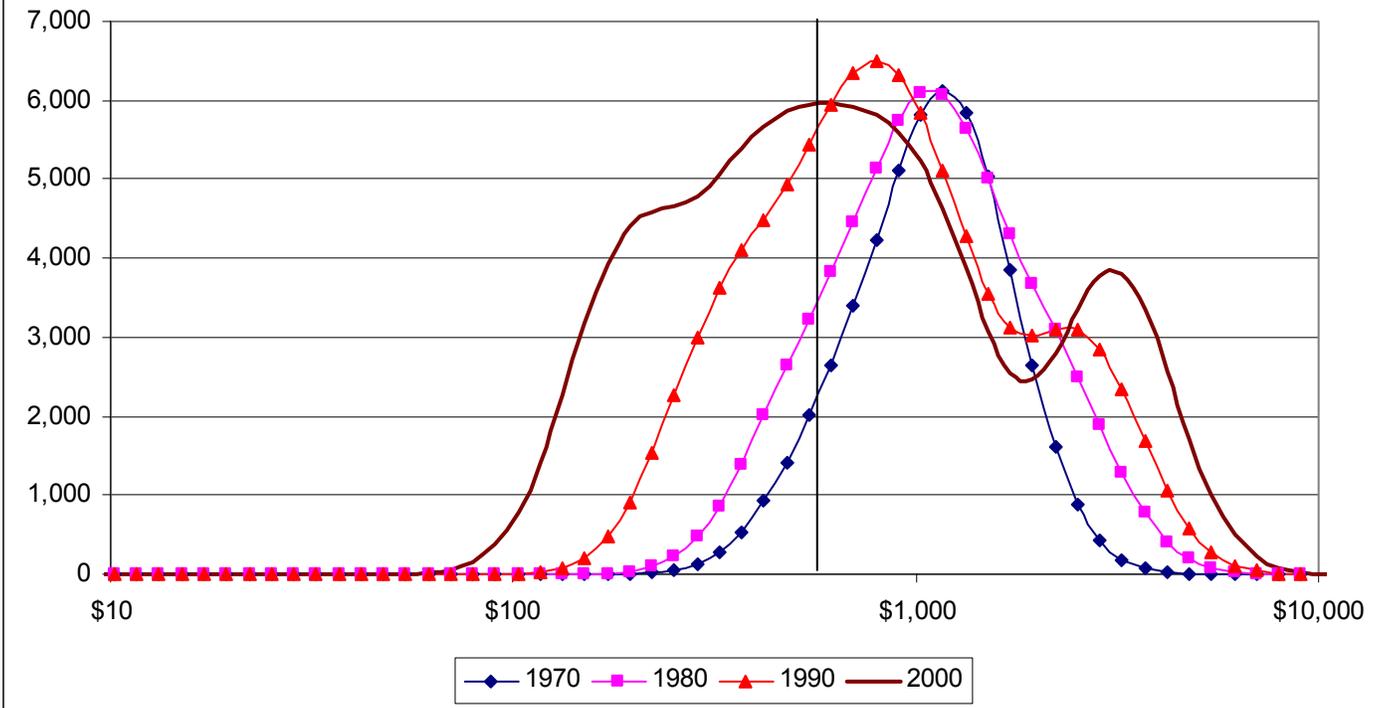


Figure 8: Absolute Consumption Poverty Rates

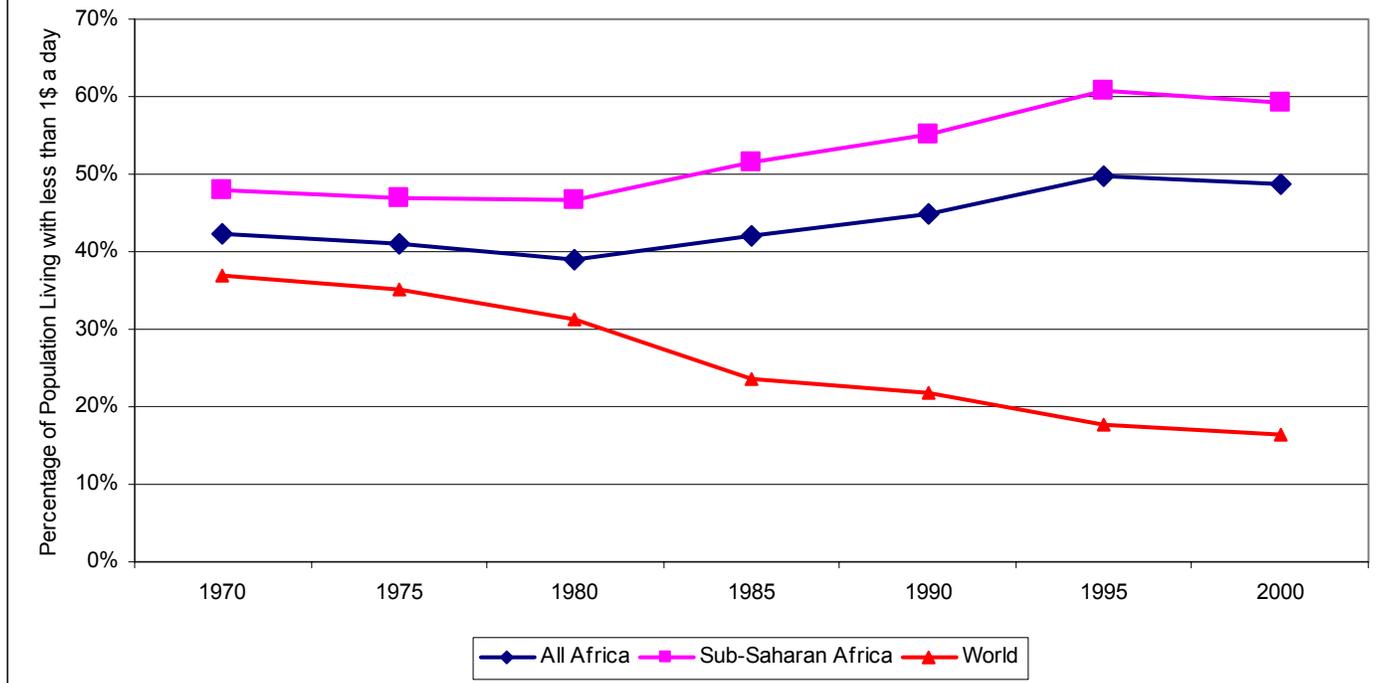


Figure 9: Absolute Consumption Poverty Head Counts

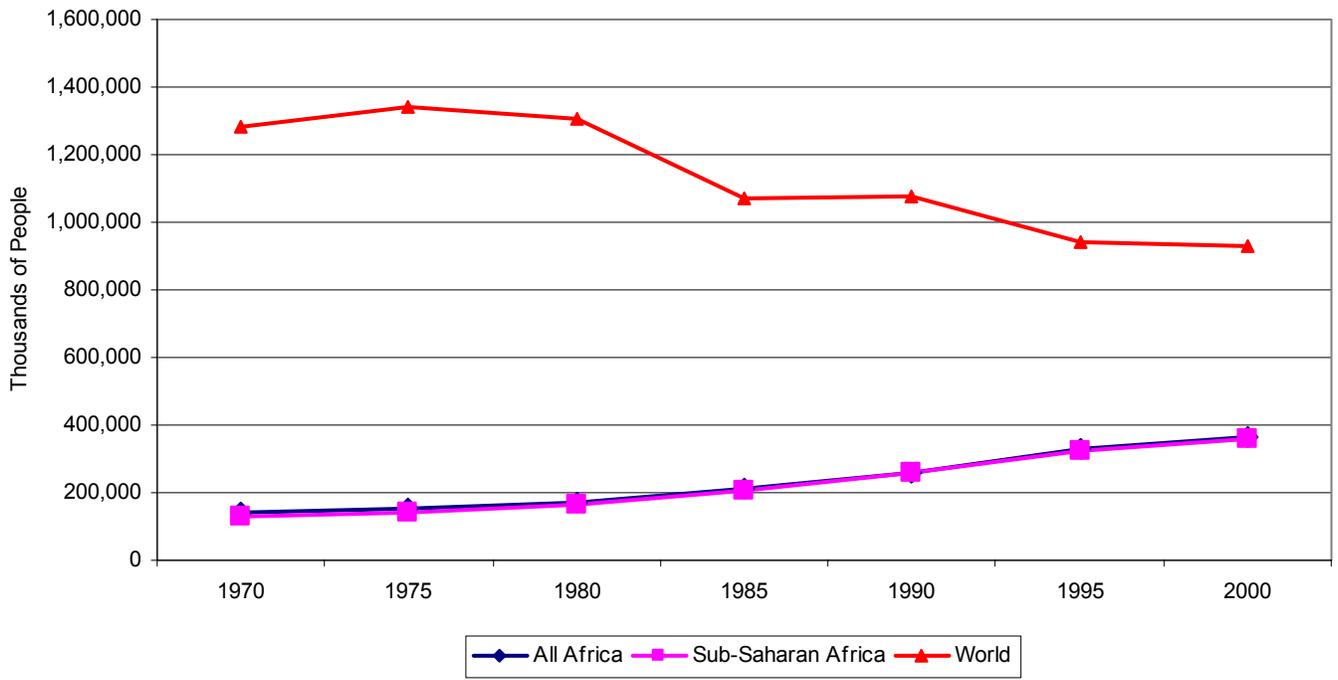


Figure 10: Investment Rates

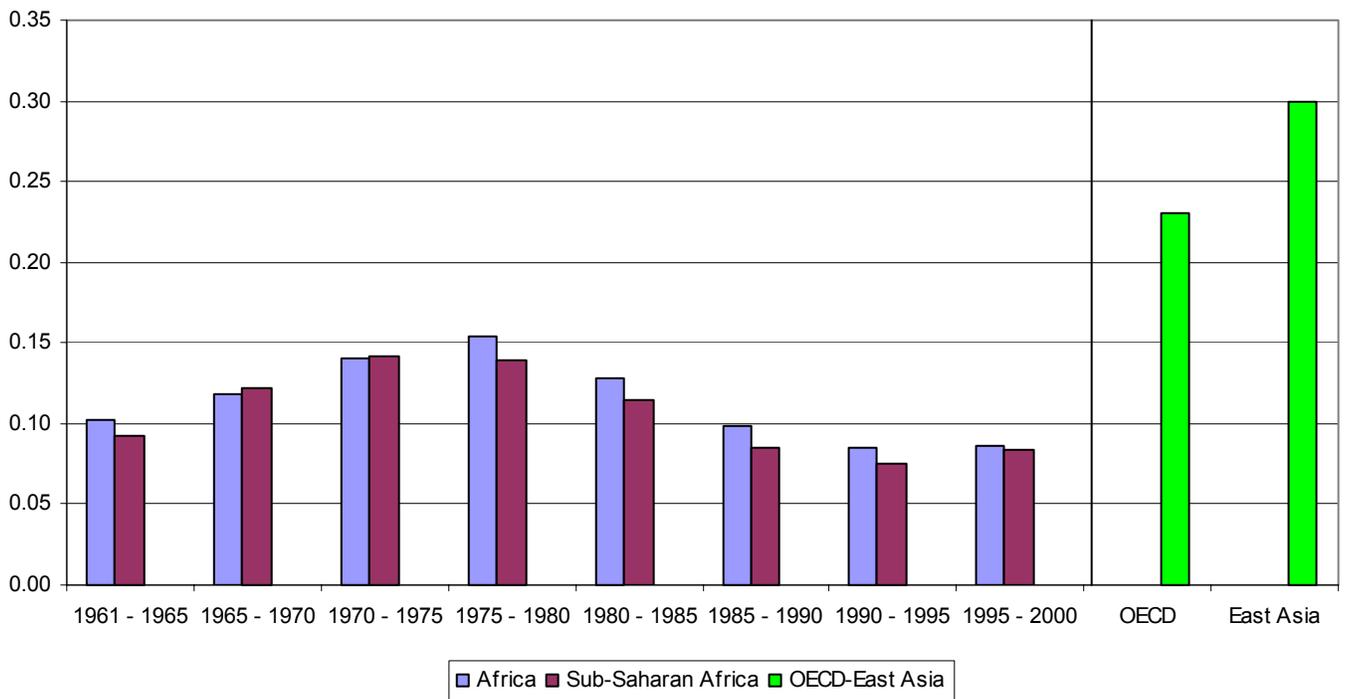


Figure 11: Private to Public Investment Ratio

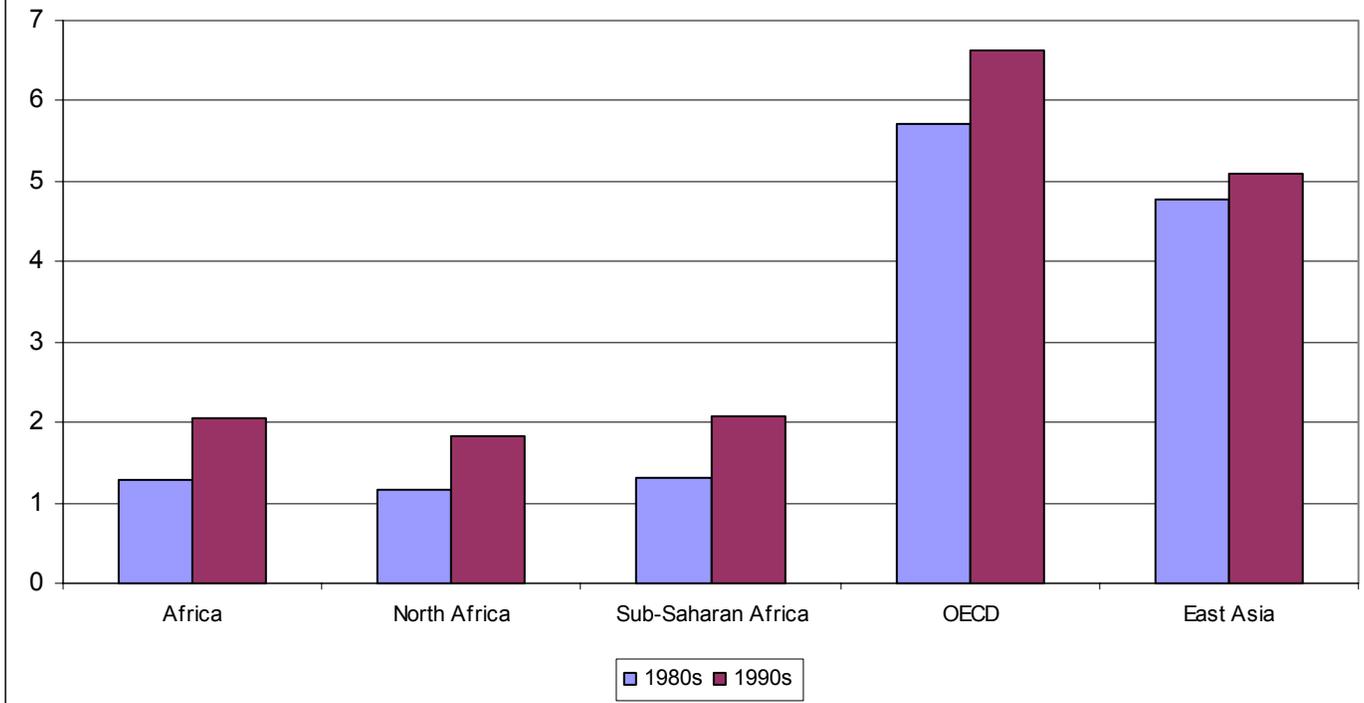


Figure 12: Private Investment in the 1990s

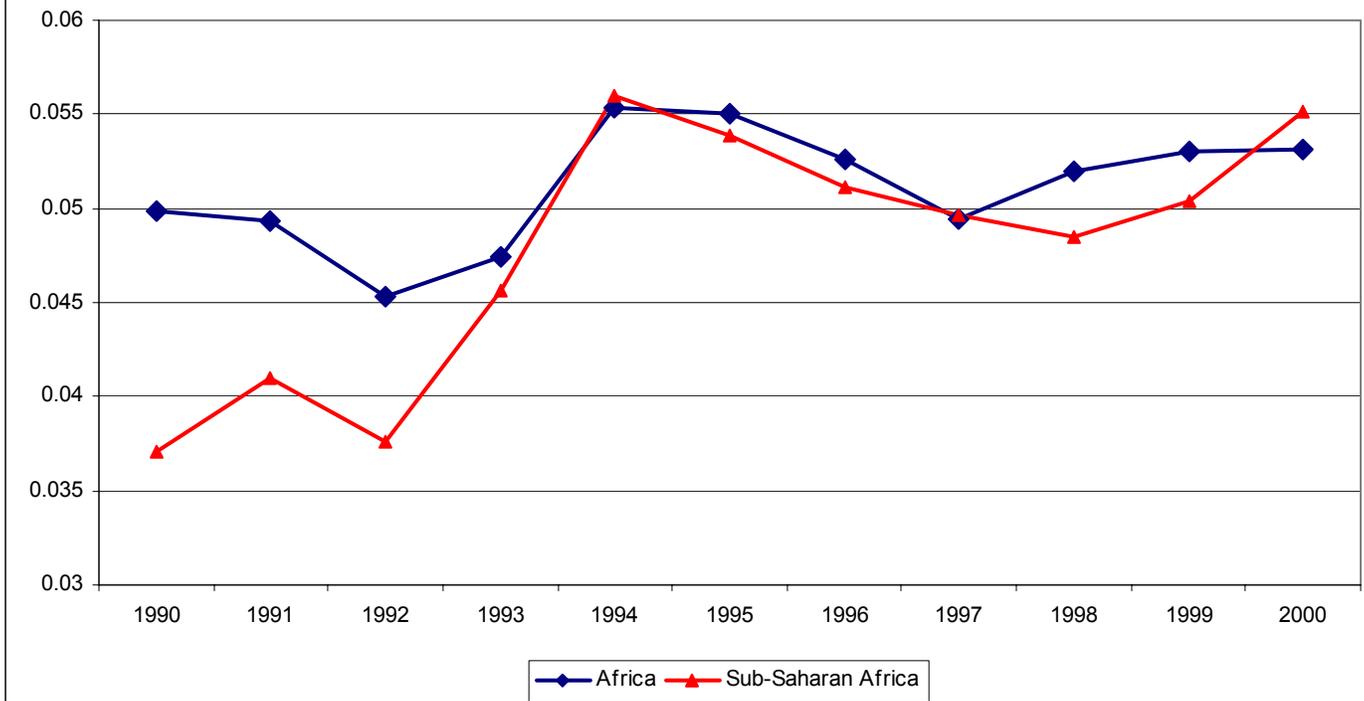


Figure 13: Relative Price of Investment

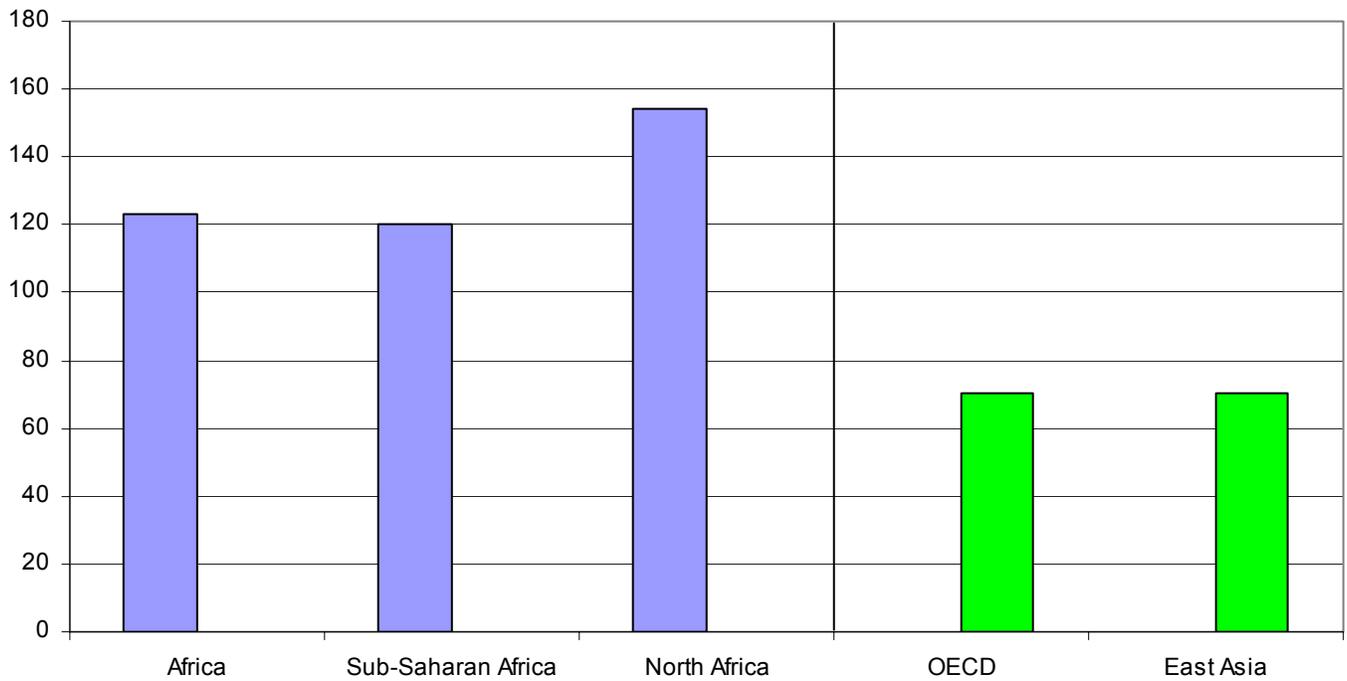


Figure 14: Primary School Enrollment

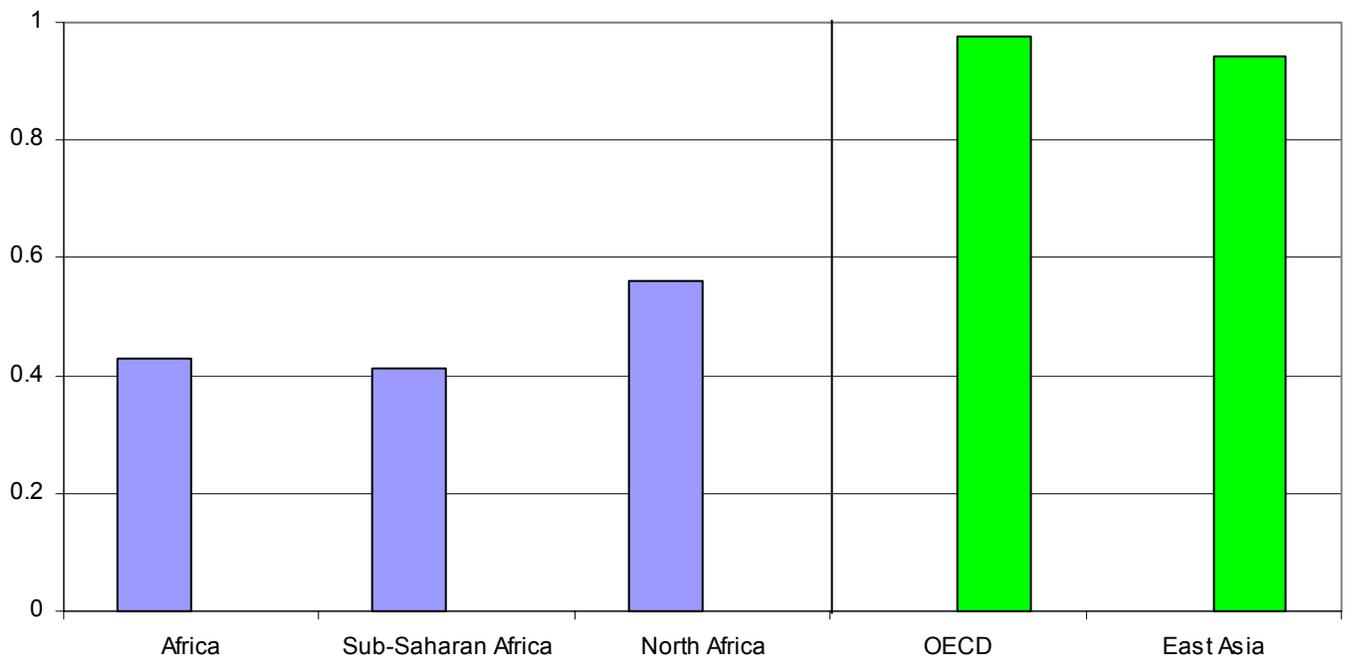


Figure 15: Health (1): Life Expectancy

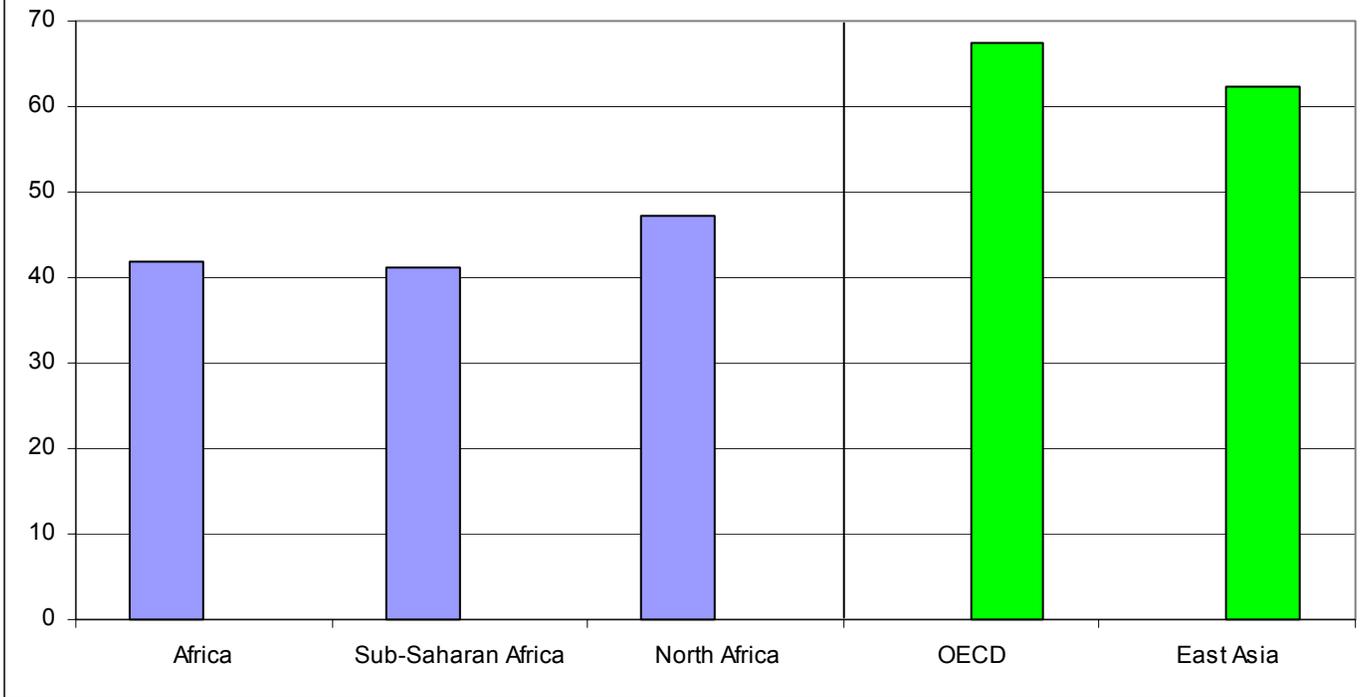


Figure 16: Health (2): Malaria Prevalence

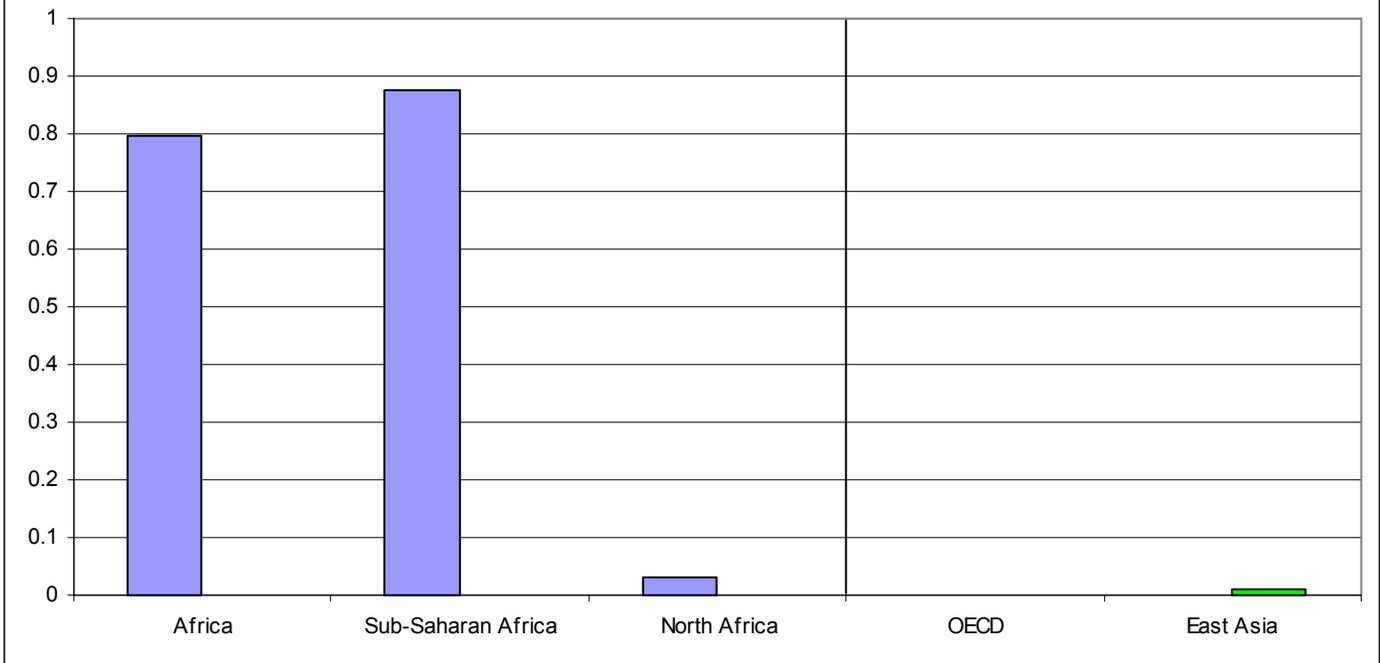


Figure 17: Geography: Tropical Area

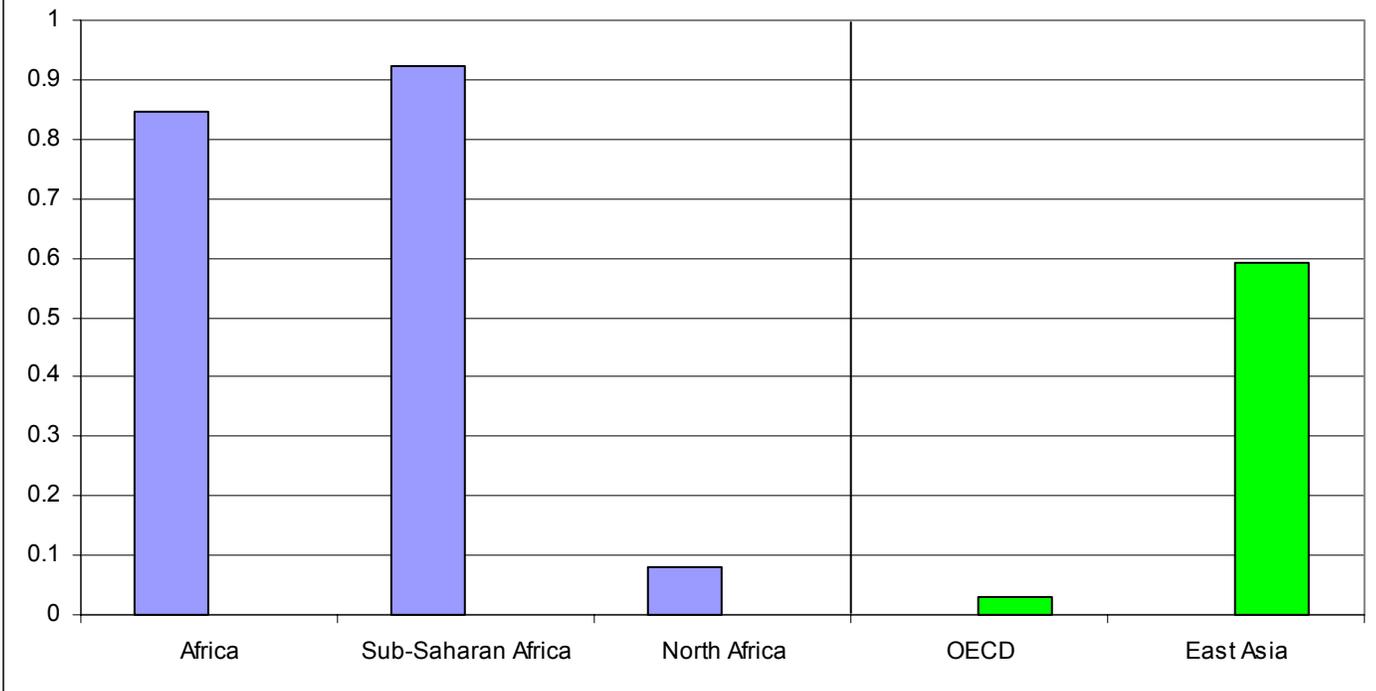


Figure 18: Openness

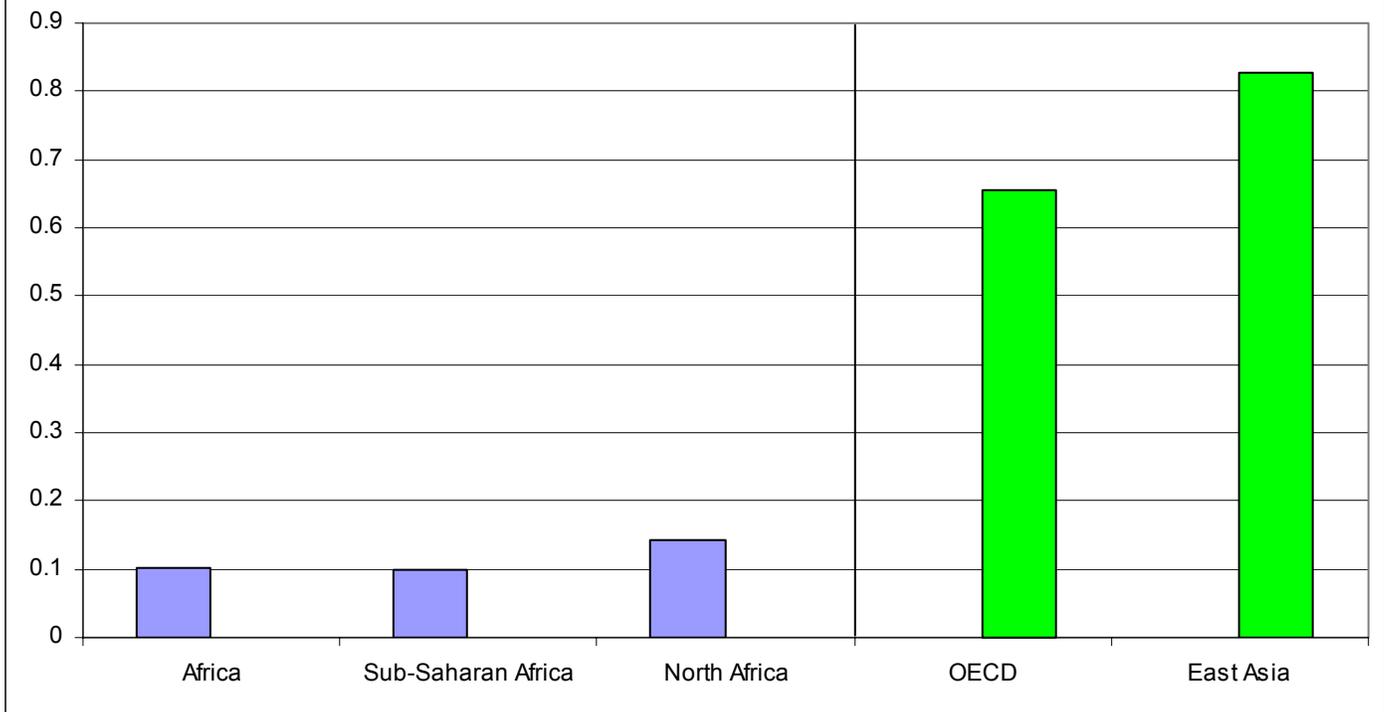


Figure 19: Government Consumption Share of GDP

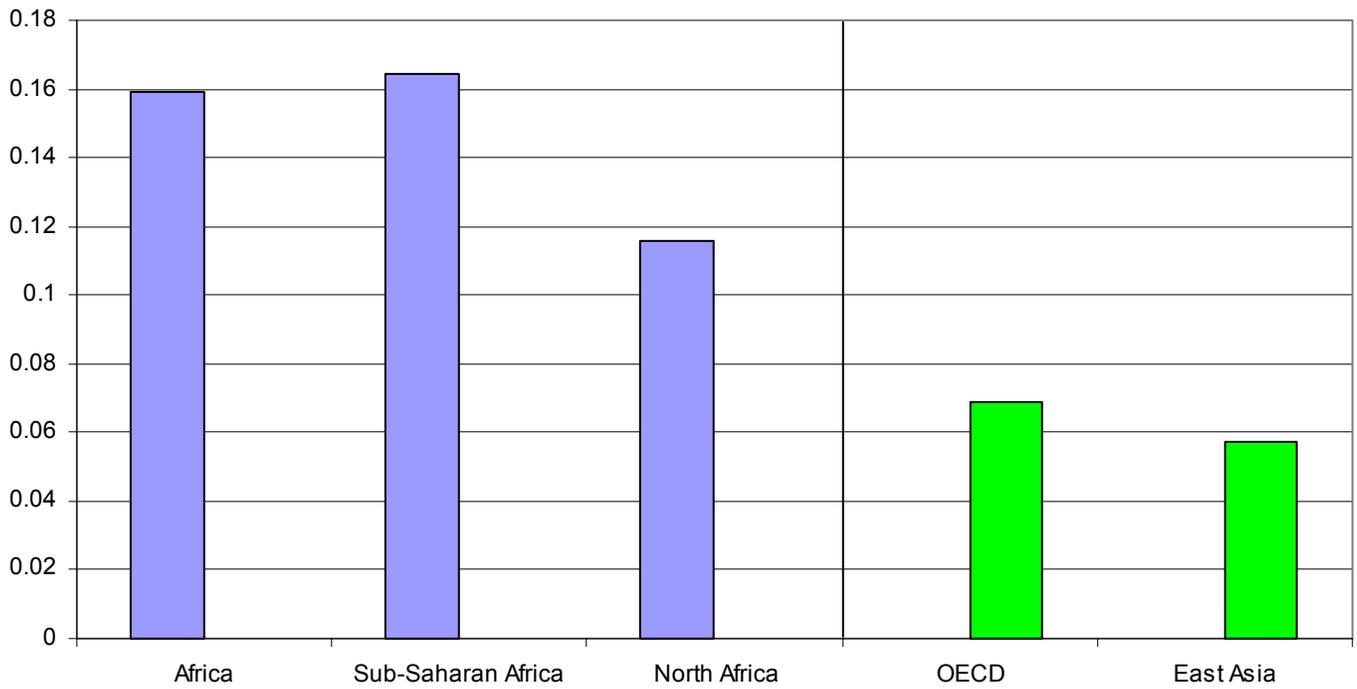


Figure 20: Ethnolinguistic Fractionalization

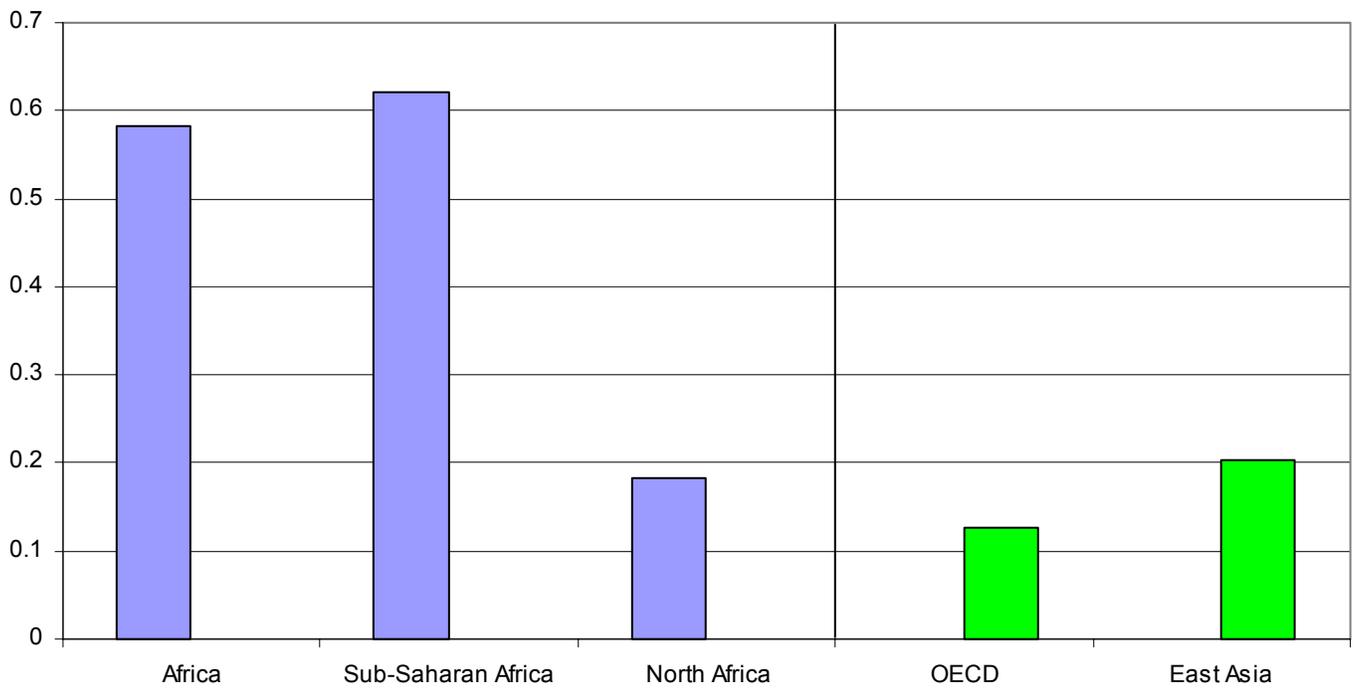


TABLE 1: WHY AFRICA GREW SO LITTLE:

Name of Variable (1)	African Value (2)	OECD Value (3)	Foregone Annual Growth (4)
Price of Investment Goods	123	70	0.44%
Human Capital (I): Primary School Enrollment	0.42	0.97	1.47%
Human Capital (II): Life Expectancy	42	68	2.07%
Human Capital (III): Malaria Prevalence	0.80	0.00	1.25%
Geography: Fraction of Area in the Tropics	0.85	0.03	1.21%
Openness	0.10	0.66	0.67%
Public Spending in Consumption	0.16	0.07	0.40%
Conflict: Ethno-linguistic Fractionalization	0.58	0.12	0.52%

Notes: Column 1 displays the name of the variable. Column 2 shows the average value that the variable has for African countries. Column 3 reports the corresponding value for OECD economies. Finally, Column 4 uses the empirical estimates of Sala-i-Martin, Doppelhoffer and Miller (2003) to compute the additional annual growth rate that Africa would have enjoyed if, instead of the values reported in Column 2, it had had the OECD values reported in Column 3. For example, the average relative price of investment for Africa was 123. The corresponding price for OECD was 70. If investment in Africa had been as low as in OECD, Africa's annual growth rate would have been 0.44 percentage points larger.

References:

- Acemoglu, Daron, Simon Johnson and James Robinson (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation", *American Economic Review*, December, vol 91. pp. 1369-1401.
- Ahluwalia, Montek, Nicholas Carter and Hollis Chenery, (1979), "Growth and Poverty in Developing Countries", *Journal of Development Economics*, 41, 40:25-52.
- Bhalla, Surtit (2002), *Imagine there is No Country: Poverty, Inequality and Growth in the Era of Globalization*, Institute for International Economics Editor, Washington, DC.
- Collier, Paul and Jan Willem Gunning, (1999), "Why Has Africa Grown so Slowly?", *Journal of Economic Perspectives*, vol 13, number 3, Summer.
- Collier, Paul and Catherine Pattillo, eds (2000), *Investment and Risk in Africa*, Macmillan, London.
- Easterly, William (2001), *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics*, M.I.T. press, Cambridge, Massachusetts.
- Easterly, William and Ross Levine (1997), "Africa's Growth Tragedy: Policies and Ethnic Divisions", *Quarterly Journal of Economics*, CXII, pp 1203-1250.
- Gallup, John Luke, Jeffrey Sachs and Andrew Mellinger (1998), "Geography and Economic Development", *Annual Bank Conference on Development Economics*, April. The World Bank Ed., Washington, DC.
- Ravallion, Martin, G. Datt, and D. Van de Walle (1991), "Quantifying Absolute Poverty in the Developing World", *Review of Income and Wealth* 37, 4, December, 345-61.
- Sachs, Jeffrey, (2003), "Institutions Don't Rule: Direct Effects of Geography on Per Capita Income", NBER Working Paper W9490, February.
- Sachs, Jeffrey and Andrew Warner (1997), "Sources of Slow Growth in African Economies", *Journal of African Economics*.
- Sala-i-Martin, Xavier (2003a), "Convergence, Period", mimeo Columbia University.

Sala-i-Martin, Xavier (2003b), “World Poverty 1970-2000: Estimates from the World Distribution of Consumption”. Mimeo Columbia University

Sala-i-Martin, Xavier, Gernot Doppelhoffer, and Ronald Miller, (2003), “The Empirical Determinants of Growth: A Bayesian Averages of Classical Estimates (BACE) approach”, forthcoming *American Economic Review*.

Sala-i-Martin, Xavier and Arvind Subramanian (2003), “Addressing the Natural Resource Curse: Nigeria”, mimeo Columbia University