Sources of Slow Growth in African Economies

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Published in *Journal of African Economies*, December 1997, Volume 6, Number 3, pp. 335-376

ABSTRACT

This paper offers some econometric evidence on the sources of slow growth in Sub-Saharan Africa. The evidence suggests that the continent's slow growth can be explained in an international cross-country framework, without the need to invoke a special explanation unique to Sub-Saharan Africa. We find that poor economic policies have played an especially important role in the slow growth, most importantly Africa's lack of openness to international markets. In addition, geographical factors such as lack of access to the sea and tropical climate have also contributed to Africa's slow growth.

This is a substantially revised version of "Sources of Slow Growth in African Economies", Development Discussion Paper No. 545, Harvard Institute for International Development, July 1996. We thank Malcolm McPherson, Steven Radelet, and Michael Roemer for helpful discussions.

This paper offers some calculations on the sources of slow economic growth in Sub-Saharan Africa (SSA) during the period 1965-1990, based on a cross-country regression model developed in Sachs and Warner (1995a,1995b,1997). Many African specialists emphasize Africa's colonial history, its ethnic and tribal divisions, and its climate and geography in explaining Africa's slow growth during the past 30 years.[1] The findings in this paper do not directly contradict these views, but they highlight several facts that are not generally known. Most importantly, the growth (or lack thereof) in SSA during 1965-90 can be accounted for within a cross-country regression model that covers a wide range of developing and developed countries in all parts of the world. Specifically, Africa's slow growth can be explained according to the same variables (e.g. measuring economic policy, initial conditions, demography, and physical geography) that account well for the growth performance of other parts of the developing world. There is no need for a special "Africa" theory, at least with regard to proximate causes of economic growth.

Our findings do not mean that Africa's colonial legacy, ethnic divisions, or particular geographical difficulties are unimportant. The colonial legacy or ethnic divisions, for example, may help to explain Africa's poor choices of economic policy, which in turn are responsible for much of the growth shortfall according to our regression estimates. Similarly, Africa's distinctive geography -- with a substantial population in landlocked countries, and a very high proportion of land in tropical climates -- surely have contributed to the poor economic outcomes in Africa, but in ways that are consistent with the effects of geography evident in other parts of the world. At the same time, however, our estimates support a more optimist view about Africa's future than is sometimes expressed, because the quantitative results suggest that poor policies and institutions explain a large share of the slow growth, and that better policies would contribute to stronger

[1] When we refer to Africa in this paper we always mean sub-Saharan Africa (SSA).

economic performance. Africa's physical geography, difficult as it is, does not pose an insurmountable challenge to faster growth, even if it will tend to diminish growth rates compared to some other parts of the developing world. We also note that where strong economic reforms have actually been implemented in SSA, the result has been rapid economic growth.

Table 1 shows some basic facts about Sub-Saharan Africa, and compares Africa with the rest of the developing world. African growth (measured as the annual average change in GDP per capita) averaged just 0.8 percent per year over the 25 year period 1965-1990. By contrast, growth in the seven[2] fastest-growing developing countries outside of Africa averaged 5.8 percent, and growth in the rest of the developing world averaged 1.8 percent. As a result of slow growth, African countries today are vastly poorer than the rest of the developing world. Back in 1965, GDP per-capita in sub-Saharan Africa was 60 percent of the average of the rest of the developing world (Table 1, 2nd row). By 1990, this figure had fallen to 35 percent. There is now considerable international evidence that poorer developing countries that followed market-oriented policies in the past 30 years did indeed grow faster and thus catch-up to the richer countries. The cross-country growth analysis that follows addresses the question of why such "convergent" growth did not occur in Africa.

I. Data used to explain growth.

Table 1 shows other basic variables that we have found to be helpful in explaining cross-country growth in recent decades. The theoretical underpinning for our choice of variables is explained in the next section. In general the variables are those that we, along with other authors, have previously found to be related to cross-country growth, i.e. Sachs and Warner(1995a, 1995b, 1997). Table 1 compares mean values for Africa with two other groups of developing economies: the seven fast-growing developing economies and all other developing countries. To

[2] Hong Kong, South Korea, Indonesia, Malaysia, Singapore, Taiwan and Thailand.

summarize, Africa has performed worse than other developing countries on the following economic policy variables: openness to international trade; average annual inflation; and national saving rates. Africa performed worse that the fast-growing economies but about the same (or better) than other developing countries on two other variables: central government saving and qualitative measures of institutional quality (as judged by businessmen respondents in a 1980 survey). Africa also possibly had natural disadvantages in the following: a larger fraction of landlocked countries, a higher fraction of area in tropical latitudes (with implications for disease, soil quality, and other climatic factors); higher dependence on natural resources, and greater ethno-linguistic fractionalization. Life expectancy in the initial period was also lower in Africa, probably due to a combination of lower income, poorer public health institutions and climatological factors that make the continent more susceptible to endemic infectious disease. Finally, Africa differs from other developing countries in that it has not proceeded far in the demographic transition to reduced fertility and reduced mortality, so that the growth of the young dependent population (15 years and under) outstripped the growth of the overall population. We now define some of these variables in more detail and later turn to regression analysis to examine the possible role of these variables in accounting for Africa's slower growth.

For each country we measure real gross domestic product per person, and also real gross domestic product per working-age person. The working-age population is defined as the population between the ages of 15 and 64. Real GDP is measured in constant dollar prices that are common across countries (the source is the Penn World Tables data described in Summers and Heston, 1991). Economic growth is measured as the average annual change in the natural logarithm of GDP per person between the years 1965 and 1990. When we use initial GDP in the regressions, we refer to real GDP per person in 1965.

The openness variable measures the proportion of years within the interval 1965-1990 in

which an economy is open to international trade by the criteria in Sachs and Warner (1995). An economy is deemed to be open to trade if it satisfies five tests: (1) average tariff rates below 40 percent; (2) average quota and licensing coverage of imports of less than 40 percent; (3) a black market exchange rate premium of less than 20 percent; and (4) no extreme controls (taxes, quotas, state monopolies) on exports; and (5) not considered a socialist country by the standard in Kornai (1992). Our earlier work, Sachs and Warner (1995a), as well as Sala-I-Martin (1997), and Edwards (1997) finds that this measure of openness is positively related to growth.

We also examine whether a country's geography affects growth. Countries that are geographically isolated from world markets will face higher costs for all international activities, and may end up with a lower division of labor and lower output per capita. Landlocked countries, in particular, face very high costs of shipping, since they must pay road transport costs across at least one international boundary in addition to sea freight costs. Although air shipments can help overcome many of these problems, only certain goods can be economically shipped by air, and most countries still import and export the majority of goods by the sea. We attempt to capture some of the disadvantages from being landlocked with a dummy variable that takes the value 1 for all economies that do not border international waters. Table 1 shows that about a third of all sub-Saharan African countries are landlocked, compared to none of the fast-growing countries and only about eleven percent of rest of the developing world. Therefore, the impact of this variable on growth is potentially important for African countries.

Africa also has a high proportion of the population in tropical climates. Casual observation suggests that countries located in the tropics tend to grow more slowly than countries in more temperate climates. At least two channels for this negative relationship seem likely. First, tropical countries face a wide variety of parasitic diseases that are much less prevalent in the temperate zones, and disease is one of the sources of low labor productivity. Second, soils tend

to be more fragile, rains less reliable, pests and veterinary disease more prevalent, and natural disasters more frequent, all of which impede sustained agricultural growth in the tropics. Tropical climate is measured by a variable that takes the value 1 for a country in which the entire land area is subject to a tropical climate, and 0 for a country with no land area subject to a tropical climate. Countries in between these two extremes are assigned a fraction representing the approximate proportion of land area subject to a tropical climate.

Central government saving is measured as current revenues minus current expenditures of the central government, expressed as a fraction of GDP. Variation in national saving rates across countries are a potentially important source of variation in growth rates, and national saving is by definition equal to the sum of private saving and government saving. As is well known (Barro 1994) the impact of an increase in government savings on national saving depends on the extent to which there is an offsetting decline in private saving. Recent empirical work in Edwards (1996) supports the idea that a rise in government saving raises national saving, but by less than one-for-one, so there is some offset but it is not complete. It should be mentioned however, that for lack of alternative data, our variable measures *central government* saving and as such misses public saving that comes from local governments, public enterprises or off-budget entities. Data for saving of the consolidated public sector is not available for a sufficient number of countries to be used in our regressions. Africa's mean of about 4 percent of GDP in Table 1 is sensitive to the influence of Botswana and Gabon, both of which have had quite high rates of government savings.

The national saving rate is measured as nominal saving divided by nominal GDP. It is obviously not a policy variable itself, but is rather the reflection of policy variables, tastes, market institutions, and so forth. The national saving rate is heavily influenced by the government saving rate, the nature of the public retirement system (pay-as-you-go systems tend to produce lower

private saving rates than mandatory individualized systems as in Malaysia and Singapore), and demographic variables.

We also use a general measure of institutional quality to help explain cross-country growth. This follows previous research by Keefer and Knack (1994) and Barro (1996). The institutional quality index is an average of 5 sub-indexes developed from data by Political Risk Services[3], measuring the following. The *rule of law index* "reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes" The *bureaucratic quality index* measures "autonomy from political pressure", and "strength and expertise to govern without drastic changes in policy or interruptions in government services." The *corruption in government* index measures whether "illegal payments are generally expected throughout .. government", in the form of "bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans." The *risk of expropriation index* measures high risk of "outright confiscation" or "forced nationalization." The *government repudiation of contracts index* measures the "risk of a modification in a contract taking the form of a repudiation, postponement or scaling down." These five sub-indexes are scaled and averaged together into our overall institutional quality index. We don't use these indexes separately because the country scores on the various sub-indexes tend to be highly correlated. As a result, the data do not permit a sharp distinction between these five elements of institutional quality.

Natural resource abundance is included as a determinant of growth following the research in Sachs and Warner (1995b). Our variable measures the ratio of natural resource exports to

[3] The index is constructed by the Center for Institutional Reform and the Informal Sector (IRIS) from data printed in the International Country Risk Guide, published by Political Risk Services.

GDP in 1970. Natural resource exports are defined as the sum of exports of primary agriculture, fuels and minerals.

Other variables include inflation, measured as the annual percentage growth in the GDP deflator, and life expectancy at birth (LEB), measured in years. The LEB is a broad indicator of the health of the population, which has been shown in earlier research to be a significant predictor of future economic growth. Presumably a low LEB reflects the economic costs of high infant mortality, high morbidity in the population, and a shorter time horizon for the accumulation of human capital.

We also measure growth of neighboring countries. This was derived as follows. We first summed GDP, measured in purchasing-power-adjusted dollars, and population of all countries that border a given country, and computed GDP per-capita for this aggregation of countries. Standard growth rates were then calculated for this aggregation between 1970 and 1989. This variables offers a way to test for the extent of neighborhood effects on growth.

The measure of ethno-linguistic fractionalization is taken from related work by Mauro (1995) and Easterly and Levine (1997). The variable measures the probability (between 0 and 100) that two randomly-selected people from a country will *not* belong to the same ethnic or linguistic group. Tanzania has the highest value at 93, and Korea has the lowest at 0. This variable is included to re-examine the hypothesis advanced by Easterly and Levine (1997) that Africa's greater ethnic and linguistic divisions help explain its slow growth.

Finally, we also measure the difference between the growth rate of the working-age population (between ages 15 and 65) and the growth rate of the whole population. Countries will have a higher per-capita growth if the working population is growing faster than the whole

population. This variable is used to control for such demographic influences on measured growth. We will see that this demographic effect accounts for an economically important part of the overall difference in growth rates between East Asia and Africa.

II. Theoretical background.

Our analytical approach follows Barro (1991) and a number of other authors in viewing economic growth as a transitional process in which countries are adjusting gradually from their current level of per-capita income to their steady-state level of per-capita income. For example, in a Ramsey model in which the production function is Cobb-Douglas, Barro and Sala-I-Martin (1995, p. 88) show that in the neighborhood of the steady state, the time path of the log of per-capita income is given by

$$y(t) = (1 - e^{\beta t})y^{ss} + e^{\beta t}y(0) \qquad \textbf{(1)}$$

This equation says that the log of real GDP will be equal to y(0) at time 0 and, if $\beta<0$, y^{ss} in the limit as t approaches infinity.[4] In between, output will be on a path that is concave with respect to time, that is, growth will be fast at first and then will slow down as real GDP approaches the steady state. Growth will also be faster the larger is the exponent β and the larger is the initial income gap y^{ss} - y(0).[5] In the cross-country empirical implementation of (1), y^{ss} may be thought of not as a constant value to which the economy is converging, but as a variable with a constant trend growth rate.

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[4] In theoretical works β is essentially assumed to be negative because otherwise the system would violate a transversality condition or output would collapse to 0. In empirical applications, estimates of β are virtually always negative after controlling for some determinants of steady-state income.

[5] These statements follow formally from the fact that the first derivative with respect to time is $\beta\, e^{\beta t}\, (y^{ss} - y(0))$, and the second derivative with respect to time is $\beta^2\, e^{\beta t}\, (y^{ss} - y(0))$.

Equation (1) also embodies the very general idea that the transition from current GDP to potential GDP (or the potential GDP *trend line*) takes time. This is not very restrictive because the data are allowed to estimate β, the parameter that governs the speed of adjustment, and to say whether it is high or low. What is more important is the issue of what determines steady-state or potential GDP. Here we use the general framework of the Solow growth model, in which steady state output per worker is a function of the national saving rate and the level of total factor productivity or efficiency.[6] Note that in the standard Solow model, the economy converges to a constant output per *efficiency* worker, i.e. the measure of the labor input is adjusted to account for an underlying trend of labor-augmenting technical change. In this sense, y^{ss} can have a constant underlying trend growth rate, equal to the rate of labor-augmenting technical change. We think of all of our explanatory variables as potentially affecting either the level of total-factor productivity or the national saving rate. Openness, tropical climate, landlockedness, institutional quality, natural resource abundance and life expectancy all potentially help to determine overall efficiency or total factor productivity. Government saving and life expectancy help determine saving rates[7].

In the Solow growth model, steady-state income is a function of total factor productivity, namely A(0) in production function notation. In addition, initial output also enters the growth

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[6] See Mankiw Romer and Weil (1992) or Sachs and Warner (1997) for derivations of Solow-type models. The crucial feature of these models is that savings are assumed to be a fixed fraction of output.

[7] A regression of saving rates on the log of life expectancy and government saving shows the following

saving / GDP = -102 + 29 log(life) + 0.72 government saving / GDP R^2 =0.59
(10.6) (6.3)

Both saving variables are averages for the period 1970-90; life expectancy is measured as close as possible to 1970.

equation, as in equation (1). These two facts together imply that unobserved variation in A(0) across countries will cause y(0) and growth to move together. This will tend to bias the estimated coefficient on initial income towards 0 (Mankiw, Romer and Weil, 1992 p. 424). That is, it will be less negative than it should be.

This bias can be diminished, but not eliminated, by controlling for as comprehensive a list of determinants of A(0) as possible. Our regressions explain a fairly large share of the variation in growth across countries (just under 90 percent) but we cannot exclude the possibility that there is some downward bias in our estimates of the speed of convergence.

III. Regression estimates.

The regression results are shown in Table 2. In order to ensure that the regression estimates do not depend on a few countries, we pre-tested for outliers and omitted five countries from the regression sample[8]. In general, the two sets of regressions (with and without these five countries) give similar results regarding the statistical significance of the variables, but the coefficient estimates we report in table 2 are less sensitive to the inclusion of single countries. For

[8] To check for outliers, we follow the criterion suggested by Belsley, Kuh and Welsch [1980, p. 28]. The basic idea is to exclude observations that have both extremely high residuals and high leverage on the regression results. The leverage of an observation is a multivariate measure of the distance of it's X values from the means in the sample. Belsley, Kuh and Welsch [1980] recommend using the DFITS statistic, due to Welsch and Kuh [1977], which combines these two into one measure, (DFITS=r/((h/(1-h))^(½)) and suggest excluding observations with high values. In the formulas above, r is the residual, h is the leverage, k is the number of regressors and n is the sample size. We applied this selection criterion to the first regression in Table A1 in the Appendix, and discovered that there were five cases of countries with DFITS values above 0.9 in absolute value: Botswana, Gabon, Madagascar, Guyana, and Israel. These five were omitted from all the regressions in table 2. Although it is possible that this procedure will miss *groups* of countries with outlying data, examination of the residuals and the leverage statistics showed that this was not an important issue with our data.

comparison, the regression results with the full sample are presented in Table A1 of the appendix. One slight change worth noting is that while the life expectancy terms are significant in the regressions without the five countries (Table 2), they are only marginally significant in the full-sample regressions (Appendix A1). However, we prefer the coefficient estimates in Table 2 that are less sensitive to the outliers.

We first discuss the results regarding convergence and openness to international trade. We find that openness to international trade affects growth in two ways: it affects the level of steady state income and it affects the speed of convergence to the steady state. The reason openness affects the level of steady-state income is a matter of ongoing research but probably reflects some combination of the following considerations. Openness encourages greater efficiency in the allocation of the economy's scarce resources; openness also promotes market competition and thus helps reduce monopolies; and trade is often a vehicle for the importation of technical innovations and improvements, which serve to raise total factor productivity in the entire economy. The reason that openness affects the speed of convergence is probably related to the fact that our openness variable is also a proxy for opportunities for international factor mobility. Basic theory suggests that the convergence process will be facilitated by opportunities for factor mobility across countries, especially in the form of financial and physical capital mobility. In the Solow growth model for example, real incomes across countries are a function of the capital-labor ratio, K/L, across countries. As long as factor mobility involves the migration of capital from regions where capital is abundant to regions where it is scarce, factor mobility will promote convergence in the ratio K/L and therefore also in real output per capita.

To understand the estimated quantitative impact of openness on growth and the speed of convergence, note that our growth equation may be written in simplified form as $g=\alpha*O+\beta*y+\delta*O*y+$ other terms. Therefore, the effect of openness on growth, holding constant

initial income is dg/dO=α+θ*y. According to the estimates of regression (1) in Table 2, when evaluated at the mean of (log) income of 8.05, dg/dO is 2.21 (=8.48-0.77*8.05). Therefore, for the average country in the sample, a switch from a closed regime to a completely open regime is estimated to raise the annual growth rate by 2.21 percentage points. The effect of openness on the growth rate is somewhat higher for a poorer country and somewhat lower for a country with income per capita above the mean.

Regarding the speed of convergence, our specification implies that dg/dy=β+θ*O. For a completely closed economy (O=0) dg/dy=-1.63. For a completely open economy (O=1), dg/dy=-2.40 (=-1.63-0.77). After some calculations, this implies that it would take a closed economy 33 years to close half the gap between its initial income and its steady-state income. By contrast, it would take an open economy 19 years to close half the gap[9]. These estimates imply that the speed of convergence is considerably faster for open economies.

We now turn to the estimated effects of life expectancy on growth. We use life expectancy as a variable that summarizes both the quality of public health institutions in the country as well as a summary measure of the extent of sickness and disease. Poor health affects growth by reducing labor productivity, so that life expectancy may be interpreted as an additional measure of human capital. We also allow for the possibility that the impact of an additional year of life expectancy on growth varies according to the level of life expectancy. We do this by testing for, and finding, a quadratic effect of life expectancy on growth. According to our

[9] For a closed economy, the regression coefficient is an estimate of $100(e^{\beta 2\ T}-1)/T$ (with T=25 in our regressions). Solving for the (consistent) estimate of β2, we obtain -0.0206. For an open economy, the regression coefficient is an estimate of $100(e^{(\beta 2+\beta 3)T}-1)/T$. Solving for the estimate of β2+β3, we obtain -0.0359. This implies that the estimate for β3 is -0.0153. From equation (2), the half life is given by the time T in which the term $e^{(\beta 2+\beta 3*O)T}=0.5$. We get the half-lives for closed and open economies by solving this equation for T with O=0 and O=1, respectively.

estimates, the effect on growth of an additional year of life expectancy is *greater* at the *lower* levels of life expectancy in our sample, and is virtually zero at the higher end of our sample. Specifically, at the lowest level of life expectancy in our sample, that of Sierra Leone at about 32 years, raising life expectancy by one year, to 33 years, is associated with a rise in average annual growth of 0.24 percentage points. At higher levels of life expectancy, such as 70 in the U.S. or France, our estimates imply that the impact of an additional year of life expectancy on GDP growth per capita is almost exactly zero. One possible reason for this result is that at lower levels of life expectancy, improvements in life expectancy tend to come from basic improvements in public health and eradication of disease, both of which should have a large effect on economy-wide efficiency and growth. But at high levels of life expectancy, improvements tend to be achieved by increases in old-age survival rates, which affect people after they have left the labor force, and therefore have less economic impact.

The regression results also suggest that geographic variables play a role in explaining growth. The landlocked and tropical variables are significant in all regressions. A landlocked country's growth is on average -0.58 percentage points lower than a country with access to the sea. A tropical country's growth is on average -0.85 percentage points lower than a country outside of the tropics.

We also find that higher initial endowments of natural resources are correlated with *slower* growth, as in our earlier work (Sachs and Warner, 1995b). An increase in the initial share of natural resource exports in GDP from 0.1 to 0.2 (10 to 20 percent) is predicted to reduce subsequent growth by 0.33 percentage points per annum. The reasons for this negative association are open to question, but probably reflect a combination of dynamic Dutch disease effects, and greater incentives for rent-seeking in resource-abundant economies.

The regression model also includes several policy variables (in addition to openness to international trade, discussed above). Higher rates of central government saving as a percent of GDP are associated with faster growth. The reason is presumably that as long as private saving does not decline one-for-one with public savings, an increase in public savings will serve to raise the overall national saving rate and thus promote capital accumulation. This variable is measured with some error, since it does not account for local government saving or deficits of public social funds or public enterprises. Nevertheless it is significant in all regressions and is the best proxy for government saving that is available with sufficient country coverage. Our estimates indicate that an increase in central government saving by one percentage point of GDP is, on average, associated with a rise in the growth rate of 0.12 percentage points.

The institutional quality index is also significantly related to growth in all the regressions. This index ranges from 2.3 to 10 and has a mean of 5.7. We find that a unit change in this index is associated with an extra 0.28 percentage points of growth per year. In Sub-Saharan Africa, the country with the lowest value for this index is Sudan at 2.7, and the two highest countries are South Africa at 6.9 and Botswana at 7. However, since this index was measured circa 1980, so there may be some causality running from growth in the 1970's to this index value in 1980, which would lead to a positive bias in the regression coefficient.

The final variable in the first regression estimate is the difference between growth in the population in the working ages (defined here as ages 15-64) and growth in the total population, a difference which we denote as $g_w - g_p$. Since GDP growth is measured in per-capita terms, this variable is needed to control for differences in cross-country per capita growth that arise from a changing ratio of working-aged population to total population. For example, when $g_w - g_p$ is positive, the country is experiencing a rise in the proportion of the population that is of working age. A rising proportion of the population at working age should raise GDP per capita, so that

$g_w - g_p > 0$ should be associated with a higher rate of GDP growth per capita. In fact, we expect this variable to have a coefficient of one if GDP is produced by the working aged population, while GDP growth is measured relative to the entire population. The estimated values in Table 2 are slightly above one, but not significantly different from one. We find that African countries tend to have lower values of $g_w - g_p$ than in the rest of the world, since the demographic transition is at a very early stage in most of Sub-Saharan Africa. As a result, the youth-dependent population is growing as rapidly or more rapidly than the total population, thereby reducing GDP growth per capita.

This completes our discussion of the variables in the baseline regression. Of course, these ten variables are only a subset of the large number of variables that have been proposed in the recent literature on the determinants of cross-country growth. Our choice of variables is based on our reading of this literature as well as our own empirical research in recent years on this question. We have tried many, but not all, of the other variables proposed in the literature and have found the alternative variables *not* to be significant in the presence of the ten regressors listed in Table 2, but we cannot claim to have done an exhaustive study of the question[10]. It is worth noting that the ten variables listed in regression 1 of Table 2 account for about 90 percent of the variation in cross-country growth between 1965 and 1990.

Regarding the *relative* quantitative impact of these ten variables in explaining cross country growth, we have performed some simple calculations where we multiply the estimated coefficients by the standard deviations of each variable. The rankings, in absolute values from highest impact to lowest impact, are openness (a one standard deviation increase in openness is associated with an additional 0.9 percentage points in annual growth), life expectancy (0.7),

[10] For two recent robustness studies that provide useful discussions of the issues, see Levine and Renelt (1992) and Sala-I-Martin (1997).

institutional quality (0.6), central government saving (0.6), natural resource abundance (0.5), differential growth in the economically-active population (0.4), tropical climate (0.4), and landlocked (0.3). This shows that the policy variables over which societies have the most control, such as trade policy, quality of institutions, and government saving, have had a very large association with growth. Geographic and resource variables tend to be of lesser significance. Life expectancy, which is a combination of nature (e.g. endemicity of infectious diseases in tropical climates, soil fecundity) and public health measures, among other variables, is also very important.

Now we examine several variables that others have advanced to account for slow growth in Africa. Previous empirical growth studies have found that a dummy variables for Sub-Saharan Africa is negative and statistically significant, indicating that previous studies failed to account for some 'missing element' in explaining Africa's slow growth. The path-breaking cross-country growth study by Barro (1991) contained this result, and more recently Easterly and Levine (1997) echo this finding. They find further that the Africa dummy variable is eliminated only when they allow for 'neighborhood effects', in which a countries growth depends also on growth of neighboring countries. This result was viewed as interesting because it suggested that individual countries in Africa are held back not just by their own policies but by the policies of their neighbors as well. If true, reform would best be coordinated to be fully effective.

Our results on these issues are summarized in the second and third regressions in Table 2. First, after controlling for the ten basic variables, we *do not* find that the Sub-Saharan African dummy variable is significant. This is shown in regression 2, where it is not even close to statistical significance. Second, we *do not* find that average growth of a country's neighbors is significant. This is shown in regression 3, where both the estimated coefficient and t-statistic are virtually 0.

Why the differing results? The Sub-Saharan Africa dummy variable is rendered insignificant by the openness variable, and to a lesser extent the life expectancy variable. That is, if we start with regression 2 in Table 2 and simply drop the SOPEN variable, the t-ratio on the Sub-Saharan Africa variables rises to -2.2. If we do the same with the life expectancy variable, the t-ratio on the Sub-Saharan Africa variables rises to -1.4. The first result suggests that an important missing ingredient in previous studies is the failure to account for the effect on growth of Africa's closed trade policies, which had the effect of cutting Africa off from the growth dynamism of world markets. Most of the continent has followed protectionist and inward-looking economic policies since independence. It is only recently that several African economies have opened to the rest of the world. On the insignificance of neighborhood growth, we also find that the main reason is the presence of the openness variable. Without openness in the regression, this variable is significant; with openness in the regression, it is not.

In regression 5 of Table 2, we add the national saving rate (calculated as [GDP - C - G]/GDP, with C and G being private and public consumption spending). This is a way to check our assumption that our explanatory variables explain saving rates across countries. If this is correct, we should find that the saving rate itself is insignificant after controlling for these variables. Regression 5 shows that the saving rate is insignificant when added to the regressions. This is suggestive, although certainly far from definitive, that many of the regressors are also helping to account for saving rates across countries. Another explanation for the small and insignificant coefficient on national saving is large measurement error of the saving rate. It is also worth mentioning (regression 6 in Table 2) that average inflation does not add anything to the explanation of growth after controlling for our ten variables.

Another major theme in recent research is the importance of Africa's ethnic and linguistic divisions in retarding growth. This is related to the long-standing view that the peculiar way that

Africa's national borders were drawn by the colonial powers has impeded the development of effective nation-states and effective economic development. Easterly and Levine (1997) have argued this point recently using cross-country evidence.

Easterly and Levine (1997) specific argument is that ethnic diversity leads to social and political divisions that divert attention from sound policy making. Greater ethnic diversity therefore harms growth since it leads to poorer policy choices. We investigate this general point in our context by examining the relation between our policy variables and the measure of ethnic diversity in Easterly and Levine (1997). We first confirm that ethnic diversity does *not* enter the growth regressions significantly. This result, shown in regression 4 of Table 2, is consistent with the argument in Easterly and Levine (1997) that if ethnic diversity matters, it does so by causing poorer policies. Controlling for the policies, ethno-linguistic fractionalization has no further effect on growth. The next question is whether ethnic diversity might help to explain the policy variables we include in the growth regressions.

There are three variables that we would classify as policy variables: openness, government saving and institutional quality. In bivariate regressions, ethnic diversity is significantly correlated with openness and institutional quality but not with government savings. Specifically, more ethnically diverse countries were *less* likely to be open during the period 1965-1990 and tended to have *poorer* institutions. At face value, these results support the Easterly and Levine (1997) hypothesis that ethnic fractionalization leads to poorer policies, at least regarding openness and institutions.

We note, however, that there are some alternative explanations for Africa's policy choices, other than ethnic diversity. We have argued separately (Sachs and Warner, 1995a) that the decision to pursue state-led development (an important part of which was closure to international trade) in newly-independent developing countries in the 1960s was in part a reaction against the

economic policies associated with colonialism. To be sure, many observers, not only in Africa, though that market-led economic development and free trade had been discredited by the example of the Great Depression and (what appeared to be) the economic success of the Soviet bloc. But among African leaders seeking to lead their countries sharply away from their colonial past, free trade and market-led development had an additional stigma as being the policies of the colonial rulers. When we examine the cross-country evidence, we find that countries with a colonial past were more likely to follow closed economic policies, and that this effect diminishes the association between ethnic diversity and closed economic policies. Specifically, a regression of our openness variable on dummy variable that takes the value 1 for ex-colonies and the ethnic diversity variable yields the following.

open6590 = 0.62 - 0.002 ethling - 0.32 colony $R^2 = 0.20$

(-1.33) (-3.38)

This result (t-ratio in parentheses) provides evidence that ex-colonies were more closed to international trade than other countries. More ethnically diverse countries were also more closed, but this relationship is no longer statistically significant after controling for the colony variable.

We would also suggest that the ethno-linguistic fractionalization might itself be caused by poor economic and geographical conditions. Linguistic diversity tends to be high, for example, in mountanous, remote, landlocked, and tropical environments. It may well be that such difficult physical environments lead to linguistic "niches," and make difficult the diffusion of a single linguistic standard. We are now exploring this possibility in further research.

4. The problem of missing countries.

An important issue when examining Africa in cross-country regressions is that African

countries do not have as comprehensive economic data as most other regions. As a consequence, many African countries tend to get left out of the regressions. Therefore we have done some additional analysis to see whether this biases our results. Do we appear to 'explain' Africa by a sample-selection process in which the readily-explained countries tend to have good data, and therefore remain in our sample, while the difficult cases happen to have missing data, and therefore get omitted from our sample? In Table 3 we show the 23 African countries in our regression sample, along with their actual per-capita growth rates and their predicted growth from the regressions. This sample includes the three African countries with large residuals, Botswana, Gabon and Madagascar. Overall, however, predicted growth (0.44 percent per year) is close to actual growth (0.41) for this subset of countries. The errors for most of the countries are not large.

What about African countries not in the regression sample? In table 4 we list 23 African countries that lacked some of the regression data. Several of these countries were omitted from the regression sample for having missing values for only one or two of the eleven explanatory variables. (The exact reason for omission can be seen in the data appendix where we report the data country by country.) For those countries that lack three or fewer variables, we have replaced the missing values with the average value for all other African countries. This allows us to compute a quasi-predicted value for growth, which can then be compared with actual growth.

The results are that we predict higher growth on average than actually occurred for these countries. The first column of Table 4 reports the actual growth rates; the second column reports the quasi-predicted growth rates, and the third column reports how many imputations were necessary in order to perform the calculations. Average growth across all 23 countries was 0.67 percent per year and 'predicted' growth was 1.02 percent per year. This is a larger gap than among the 23 African countries in the regression, where average actual and average predicted

were virtually identical, but it is not an enormous average error.

Overall, there are four countries in Africa where our predictions are quite different from measured growth: Chad, Gabon, Madagascar and Mozambique. Two of these, Chad and Mozambique were involved in a civil war during much of the sample, so it is not surprising that they have lower growth than we predict. Gabon and Madagascar have no simple explanation. According to the available data, Gabon's growth was tremendously fast up to about 1980, and then per-capita GDP declined rapidly over the next 15 years. This appears to be a case of two sharply different episodes, which we do not explain well by the formal econometrics. Madagascar has had a declining per-capita GDP for many years; we also do not explain this case very well in the context of the growth equation.

Apart from these countries, there is little evidence that our growth analysis does significantly worse for Africa than for other regions of the world. The standard error of the regression with all regions the world included is 0.67. The standard error for the 23 African countries in the regression (Table 3) is 0.89. The standard error for the 23 African countries in table 4 is 1.00. This is slightly higher than 0.67, but not tremendously higher when one considers the inevitable errors that arise from our data imputations.

V. Policy Implications

The African economies have paid an enormous economic price as a result of highly distorted trade policies since independence. A small number of African economies adopted open trade: Botswana and Mauritius by the early 1970s, Morocco and Tunisia in the mid-1980s. These economies have out-performed the rest of Africa by a wide margin. (Morocco and Tunisia have presumably benefited as well by their close proximity to Europe, which has facilitated their

successes in export processing industries, especially textiles and apparel.) Many other African economies have begun to liberalize trade by the end of the 1980s. The CFA Franc devaluation in January 1994, nearly a decade overdue, should help West Africa to reorient towards export-led growth. The African economies also suffer from relatively poorly functioning markets, as the result of weak market supporting institutions.

In Table 5, we examine the possible growth implications of changes in key policies, using the earlier regression results. To understand this table, we start with an estimated 2.5 percent growth rate for a *baseline developing economy*. As we read down the second column, we include the deviations from this growth rate that a country could expect if it had average African geographical and structural characteristics, but policies (openness, institutional quality, and government saving) at average levels of all developing countries. First, since Africa had lower initial income than the typical LDC, such a country would have benefited from catch-up growth, which we estimate would have added 1.0 percentage point to annual growth. Further down we see that greater landlockedness of Africa compared to other LDC's would have taken 0.1 percent from growth, etc. Taking all the African characteristics together, our final estimate is that a country with African structure and LDC policies could have grown at 1.4 percent per year.

In the first column, we include the changes that would have come about if the representative country has average African *policies* in addition to average African geography and structure. Our estimates are that Africa's greater closure to international trade than the average LDC cost it about 0.7 percentage points in growth compared to the baseline. Africa's slightly higher government savings added about 0.2 percentage points, and Africa's lower level of institutional quality was too small a difference (with the average LDC country) to have a significant quantitative impact. The sum of these changes, reported in the last row is growth of 0.8 percent per year, about the same as the average African country actually achieved during

1965-90 (Table 1).

How fast would Africa have grown had it followed the *policies* of the fast-growing East Asian countries, but still had the adverse geographic and structural conditions of Africa? In the final column of Table 5, we estimate that if Africa had East-Asia's level of openness, the rate of convergence would have been faster, that is, the catch-up effect would have added 1.2 percentage points to growth rather than 0.9. Greater openness would also have raised potential income and added an extra 1.4 percentage points to growth. Higher levels of government saving and institutional quality would have added an additional 0.5 percentage points to growth. The final row of the table shows that even with African levels of life expectancy, climate, geography and demographic trends, all of which are estimated to hinder growth, we estimate that Africa could have achieved per capita growth of 4.3 percent per annum if it had followed fast-growth policies. This is not as fast as the 6 percent rates achieved in East Asia, but with 4.3 percent growth real incomes double every 16 years.

6. Evidence on growth and reform in Africa.

This section looks at the impact on GDP growth of the reforms that have been implemented so far in Africa. Our evidence in this paper, as well as in related work (Sachs and Warner, 1995a), suggests that openness to the international marketplace of goods, foreign investment and technology is a crucial element of any pro-growth reform package. Trade openness not only promotes more efficient allocation of resources, opens the door to technological diffusion from abroad, and undermines local monopolies, but it also tends to constrain countries from adopting other anti-growth policies that would lead to exchange rate crises or problems with its foreign payments. With this in mind, we use trade liberalization to rate which countries in Africa have reformed and to assess the effect on growth of economic reform.

We divided African economies into three groups. The first group are countries which have reformed trade policy to qualify as "open" by the standards in Sachs and Warner (1995a). The second group are countries which have either engaged in an partial reforms or are sometimes classified as reformers by independent observers (e.g. the international institutions). The final group are countries which have not reformed by the standards of most or all observers. For the reformers we also present our best estimate of the date for the onset of reforms.

Our assessment of the impact of pro-growth reform in Africa is given in the set of graphs in Figure 1. The graphs present the log of real per-capita GDP for the seven reformist countries. We simply draw a line to represent our estimated date of reform. In most cases openness to international markets in Africa has resulted in fast growth. This has been true of Mauritius and Botswana for decades. It is also the case in Ghana, Guinea-Bissau, Guinea and Uganda more recently. The Gambia experienced rapid per-capita immediately after the reforms in 1986 and then a leveling off[11]. On the whole, the record -- though limited in number of countries and time periods -- is a promising one, especially in light of the poor performance of non-reformers in Africa (see figures at the end of the Appendix). The evidence simply does not support the pessimism that market-oriented pro-growth reforms would not work in Africa. Where such reforms have been tried in a serious, sustained manner, economic reforms appear to have raised growth in Africa as they have in other parts of the world.

7. Concluding remarks.

Our evidence suggests that Africa is not structurally incapable of rapid rates of economic growth seen in other parts of the developing world in recent years. Our regression evidence

[11] Following McPherson and Radelet (1995), Figure 1 uses IMF data for The Gambia. The rest of the data are from the World Banks CD ROM: World Data 1995.

suggests that part of the explanation for Africa's slow growth lies with natural factors such as limited access to the sea, natural resource abundance, and tropical climate. However, the evidence also suggests that basic economic policies such as openness to international trade, government saving and market-supporting institutions have had an even larger quantitative impact on economic growth rates. We also find that differences in life expectancy and demographic factors help account for Africa's slow growth compared to other developing countries.

After controlling for all these variables, we find little evidence for other variables that have been suggested in the literature on African and developing-country growth. First, we do not find that neighborhood effects (i.e. growth rates of contiguous countries) are especially important in explaining an individual country's growth. We also do not find evidence that sub-Saharan Africa as a region has any additional unmeasured growth deterrent, or that the regression residuals are significantly higher for Africa than other countries. An important reason for this result, which differs form previous studies, is our emphasis on the role of openness (both geographical and via trade policy) on the growth process, as well as other geographical and demographic variables.

Africa's closure to the outside world had several dimensions. The export marketing boards typically evolved into institutions which bought agricultural products at very low prices and then re-sold them at much higher world prices, an arrangement that was essentially equivalent to high export taxes. Prospective manufacturing exporters in Africa typically faced prohibitive trade barriers and geographical barriers in importing intermediate inputs or capital equipment. The Franco-phone countries of the CFA zone experienced currency overvaluation that reduced the profitability of exporting.

Recently, Africa has lagged behind other regions in trade liberalization. In a comprehensive review of the recent trade policy revolution in developing countries, Judith Dean

concludes that "Only in Africa do we find little progress towards a liberalized trade regime. Here there have been important cases of reversal of policy, no liberalization, or increased import impediments during this period."[12] Most countries in Africa still have a variety of quantitative restrictions and exchange controls that make importing very costly and difficult (Dean, Desai and Riedel, 1994).

Our estimates suggest that even with its natural disadvantages, Africa could have grown at over 4 percent per year in per capita terms with appropriate policies. In addition, the available evidence so far is that African countries that have engaged in serious pro-growth economic reforms have achieved impressive growth rates. Overall, we find little compelling empirical evidence in favor of growth pessimism for Sub-Saharan Africa.

However, even after the policy changes, the African economies will continue to suffer from at least three structural conditions: landlockedness for no fewer than 14 economies (representing around one third of the African population); a high natural-resource dependence, with the consequent Dutch-disease costs to long-term growth; and (apparently) higher incidence of disease and lower life expectancy, probably linked to the very difficult geographical conditions in tropical Africa. All three of these conditions can and should be addressed. It is a very high priority for landlocked countries to gain efficient, low-cost transport to coastal port facilities. The international community can help to assure this, partly through infrastructure financing and partly through mediation of political conflicts that hamper the market access of landlocked countries. As for natural resource abundance, we need to learn more about the growth experiences of the few successful resource-rich developing countries (especially Chile and Malaysia), to identify the best strategies for managing resource wealth while spurring the growth of non-traditional exports.

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[12] Dean (1995), p. 187, based on research reported in Dean, Desai and Riedel (1994).

Finally, the health deficit in tropical Africa needs to be addressed through a combination of enhanced social policies (e.g. improved primary health and education for rural Africans), as well as increased scientific efforts to control or eradicate major tropical diseases such as malaria.

Table 1. Africa compared with other developing countries

	Africa	Fast-growth Economies	All other Developing Economies
Real Growth per Capita 1965-1990	0.80	5.83	1.76
Real GDP per Economically-Active Population 1965 (PPP 85 $)	1480	2703	2585
Openness to international trade (share of country-years open 1965 - 1990, range 0-1)	0.07	0.81	0.19
Fraction of land-locked countries	0.33	0.00	0.11
Life expectancy (circa 1970)	41.6	57.1	51.9
Average National Saving Ratio 1970-1990	7.18	22.64	10.13
Central government saving (current expenditures -current revenues, 1970-1990)	4.14	4.97	1.18
Fraction of country-months in tropical climates	0.89	0.69	0.59
Institutional Quality Index (ICRG average c. 1980, higher better)	4.54	6.86	4.29
Natural Resource Abundance (n.r. exports divided by GDP in 1970)	0.18	0.09	0.12
Average annual Inflation	149.07	54.69	91.79
Growth of Neighboring Economies, 70-89	0.50	3.81	1.80
Index of Ethno-linguistic Fractionalization	64.54	42.86	32.44
Growth of economically active population - total population growth	-0.09	0.82	0.33

Table 2. Regression estimates
Dependent variable: Growth per-capita of ppp-adjusted GDP, 1965-1990

Log of Real GDP per						
Economically-Active	-1.63	-1.63	-1.63	-1.74	-1.63	-1.64
Population in 1965	-8.47	-7.89	-8.03	-8.64	-8.34	-7.43
Openness times log	-0.77	-0.77	-0.77	-0.66	-0.81	-0.81
GDP per ea in 65	-2.54	-2.52	-2.36	-2.17	-2.63	-2.42
Openness to international						
trade (share of years	8.48	8.48	8.50	7.57	8.82	8.77
open 65-90)	3.44	3.41	3.22	3.02	3.50	2.75
Land-locked	-0.58	-0.58	-0.58	-0.58	-0.58	-0.47
Dummy variable	-2.69	-2.63	-2.57	-2.64	-2.64	-1.94
Log life expectancy	45.48	45.53	45.46	48.38	46.94	43.87
Circa 1970	2.60	2.58	2.55	2.73	2.65	2.41
Square of log life	-5.40	-5.40	-5.39	-5.79	-5.58	-5.15
Expectancy	-2.41	-2.39	-2.36	-2.54	-2.45	-2.20
Central Government	0.12	0.12	0.12	0.12	0.12	0.12
Saving, 70-90	5.40	5.34	5.28	5.29	5.10	4.85
Dummy for	-0.85	-0.85	-0.85	-0.91	-0.80	-0.81
Tropical climate	-3.64	-3.54	-3.58	-3.72	-3.34	-3.37
Institutional	0.28	0.28	0.28	0.30	0.29	0.26
Quality Index	3.95	3.49	3.60	4.05	3.92	3.49
Natural Resource	-3.26	-3.28	-3.27	-3.12	-3.31	-3.38
Exports / GDP 1970	-3.41	-3.30	-3.28	-3.21	-3.35	-3.44
growth in e.a. pop	1.19	1.20	1.19	1.28	1.11	1.11
minus pop growth	3.82	3.41	3.74	3.87	3.40	3.42
Dummy for Sub-		0.02				
Saharan Africa		0.05				
Growth of			-0.002			
neighboring countries			-0.035			
Ethno-linguistic				-0.002		
Fractionalization				-0.72		
Average national saving					0.0017	
ratio, 70-90					0.14	
Average						-0.004
Inflation 70-90						-0.88
Adjusted R^2	0.89	0.89	0.89	0.89	0.87	0.88
Number of countries	79	79	78	77	77	74

Table 3. Actual and predicted growth: 23 African countries in the regression sample

Country	Actual Growth	Predicted Growth from Regression
BOTSWANA	5.71	6.53
BURKINA FASO	1.26	1.06
CAMEROON	2.40	1.75
CONGO	2.85	1.68
GABON	1.73	0.13
GAMBIA	0.35	0.00
GHANA	0.07	0.92
IVORY COAST	-0.56	-0.02
KENYA	1.61	1.89
MADAGASCAR	-1.99	0.47
MALAWI	0.92	0.32
MALI	0.82	0.95
NIGER	-0.69	0.55
NIGERIA	1.89	1.04
SENEGAL	-0.01	0.00
SIERRA LEONE	-0.83	-1.32
SOMALIA	-0.98	-0.41
SOUTH AFRICA	0.85	1.40
TANZANIA	1.93	1.69
UGANDA	-0.41	-0.32
ZAIRE	-1.15	-0.11
ZAMBIA	-1.88	-2.63
ZIMBABWE	0.86	-0.16
Average	**0.41**	**0.44**
Root Mean Squared Error	**0.89**	

Table 4. Actual and "predicted" growth for African countries not in the regression sample

Country	Actual Growth	"Predicted" Growth based on regression evidence and best available data	Number of times that missing data was replaced by Africa averages
ANGOLA	.	.	.
BENIN	-0.96	0.96	1
BURUNDI	1.39	2.15	1
CAPE VERDE IS.	3.63	.	.
CENTRAL AFR.R.	-0.50	0.05	1
CHAD	-2.37	-0.60	2
COMOROS	-0.53	.	.
DJIBOUTI	.	.	.
ETHIOPIA	.	.	.
GUINEA	1.36	1.75	1
GUINEA-BISS	0.49	1.26	2
LESOTHO	3.45	3.16	3
LIBERIA	.	.	.
MAURITANIA	-0.43	-0.49	1
MAURITIUS	2.50	1.92	1
MOZAMBIQUE	-2.03	-0.59	2
NAMIBIA	0.88	.	.
REUNION	.	.	.
RWANDA	3.05	2.07	1
SEYCHELLES	4.39	.	.
SUDAN	.	.	.
SWAZILAND	1.71	0.61	3
TOGO	1.07	1.04	1
Average for 13 countries with 3 or fewer imputations	**0.67**	**1.02**	
Root Mean Squared Error	**1.00**		

Table 5. African Growth: with average African policies, average less-developed-country policies and average fast-growing-economy policies.

	African Policies	LDC Policies	Fast-growth Policies
Baseline Growth	2.5	2.5	2.5
Catch-up	0.9	1.0	1.2
Openness	-0.7	0.0	1.4
Interaction (Openness*GDP)	-0.1	0.0	0.2
Government surplus	0.2	0.0	0.3
Institutional Quality	-0.0	0.0	0.6
Landlocked	-0.1	-0.1	-0.1
Life Expectancy	-0.9	-0.9	-0.9
Tropics	-0.2	-0.2	-0.2
Natural Resource Endowments	-0.2	-0.2	-0.2
Growth of ec. Active pop	-0.6	-0.6	-0.6
Predicted Growth	0.8	1.4	4.3

Table 6. Market-oriented pro-growth economic reform in Africa, the record

Consensus reformers	year of reform
Botswana	1979
The Gambia	1986
Ghana	1991
Guinea	1986
Guinea-Bissau	1987
Mauritius	1968 (independence)
Uganda	1988

Ambiguous cases

Benin
Cameroon
Kenya
Madagascar
Malawi
Mali
Mauritania
Nigeria
South Africa
Zambia

Consensus non-reformers

Burkina Faso
Burundi
Central African Republic
Chad
Congo
Ethiopia
Gabon
Cote D'Ivoire
Mozambique
Niger
Senegal
Sierra Leone
Somalia
Sudan
Tanzania
Togo
Zaire
Zimbabwe

Appendix Table A1. Regression estimates
Dependent variable: Growth per-capita of ppp-adjusted GDP, 1965-1990

Log of Real GDP per Economically-Active Population in 1965	-1.47 -6.41	-1.51 -6.16	-1.42 -6.05	-1.51 -6.23	-1.51 -6.68	-1.44 -5.45
Openness times log GDP per ea in 65	-1.14 -3.29	-1.14 -3.26	-1.18 -3.23	-1.09 -3.06	-1.16 -3.38	-1.21 -3.01
Openness to international trade (share of years open 65-90)	11.43 4.02	11.34 3.96	11.52 3.88	11.00 3.73	11.49 4.06	11.93 3.67
Land-locked Dummy variable	-0.59 -2.36	-0.56 -2.18	-0.48 -1.86	-0.60 -2.32	-0.60 -2.45	-0.49 -1.74
Log life expectancy Circa 1970	37.79 1.91	37.27 1.87	43.03 2.15	38.17 1.89	37.96 1.94	36.79 1.74
Square of log life Expectancy	-4.39 -1.74	-4.34 -1.71	-5.07 -1.98	-4.44 -1.72	-4.44 -1.78	-4.24 -1.57
Central Government Saving, 70-90	0.11 5.22	0.12 5.20	0.11 4.98	0.11 5.03	0.10 4.34	0.11 4.56
Dummy for Tropical climate	-0.84 -3.01	-0.81 -2.83	-0.83 -2.99	-0.91 -3.08	-0.81 -2.91	-0.82 -2.75
Institutional Quality Index	0.31 3.79	0.33 3.57	0.34 3.86	0.31 3.66	0.29 3.56	0.29 3.27
Natural Resource Exports / GDP 1970	-3.95 -4.01	-3.81 -3.70	-3.74 -3.76	-4.00 -3.87	-3.78 -3.87	-4.10 -3.99
growth in e.a. pop minus pop growth	0.86 2.48	0.75 1.89	0.80 2.30	0.94 2.58	0.76 2.18	0.77 2.11
Dummy for Sub-Saharan Africa		-0.21 -0.52				
Growth of neighboring countries			0.087 1.50			
Ethno-linguistic Fractionalization				0.0009 0.24		
Average national saving ratio, 70-90					0.023 2.03	
Average Inflation 70-90						-0.005 -0.82
Adjusted R^2	0.85	0.85	0.85	0.84	0.84	0.86
Number of countries	84	84	83	82	82	79

Appendix Table A2. Data for 23 African countries in the regression sample

country	g6590 cgb7090	lgdpea65 sxp	gea-gpop g7089n	open6590 ethling	access	tropics	icrge80	lifee(years)
BOTSWANA	5.71	7.10	0.43	0.42	1.00	0.50	7.00	46.60
	20.86	0.05	-0.05	51.00				
BURKINA FASO	1.26	6.52	-0.14	0.00	1.00	1.00	4.75	37.20
	1.82	0.04	-0.80	68.00				
CAMEROON	2.40	7.10	-0.28	0.00	0.00	1.00	5.66	44.20
	5.56	0.18	1.05	89.00				
CONGO	2.85	7.60	-0.22	0.00	0.00	1.00	3.69	48.20
	9.45	0.08	-0.42	66.00				
GABON	1.73	8.35	-0.34	0.00	0.00	1.00	5.38	41.40
	16.21	0.33	2.53	69.00				
GAMBIA	0.35	7.17	-0.11	0.19	0.00	1.00	5.63	33.00
	5.35	0.36	-0.03	73.00				
GHANA	0.07	7.45	0.01	0.23	0.00	1.00	3.70	46.20
	-0.74	0.21	-0.19	71.00				
IVORY COAST	-0.56	7.89	-0.23	0.00	0.00	1.00	6.70	40.20
	5.27	0.29	0.15	86.00				
KENYA	1.61	7.14	-0.05	0.12	0.00	1.00	5.56	45.80
	1.01	0.18	1.81	83.00				
MADAGASCAR	-1.99	7.63	-0.23	0.00	0.00	0.90	4.67	41.80
	3.18	0.12	-3.36	6.00				
MALAWI	0.92	6.68	-0.12	0.00	1.00	1.00	4.47	38.40
	1.94	0.21	-0.77	62.00				
MALI	0.82	6.71	-0.17	0.12	1.00	1.00	3.00	36.80
	6.37	0.08	1.45	78.00				
NIGER	-0.69	7.12	-0.15	0.00	1.00	1.00	5.83	36.00
	4.03	0.05	1.64	73.00				
NIGERIA	1.89	7.09	0.02	0.00	0.00	1.00	3.08	40.60
	6.04	0.14	-0.21	87.00				
SENEGAL	-0.01	7.69	-0.08	0.00	0.00	1.00	4.75	40.20
	1.20	0.14	1.49	75.00				
SIERRA LEONE	-0.83	7.60	-0.16	0.00	0.00	1.00	5.42	32.00
	-1.58	0.09	1.29	77.00				
SOMALIA	-0.98	7.51	-0.18	0.00	0.00	1.00	3.73	37.00
	1.33	0.09	5.55	8.00				
SOUTH AFRICA	0.85	8.48	0.22	0.00	0.00	0.00	6.92	50.00
	1.03	0.17	-1.17	88.00				
TANZANIA	1.93	6.58	-0.03	0.00	0.00	1.00	4.64	41.60
	1.30	0.17	-0.55	93.00				
UGANDA	-0.41	7.10	-0.14	0.12	1.00	1.00	2.97	44.00
	-1.45	0.27	0.30	.				
ZAIRE	-1.15	6.93	-0.26	0.00	1.00	1.00	2.98	42.40
	-0.00	0.15	0.22	90.00				
ZAMBIA	-1.88	7.66	-0.18	0.00	1.00	1.00	4.14	42.80
	-3.31	0.54	-1.20	82.00				
ZIMBABWE	0.86	7.58	0.33	0.00	1.00	1.00	4.44	46.20
	-3.34	0.17	-2.45	54.00				
AVERAGE	**0.64**	**7.33**	**-0.09**	**0.05**	**0.39**	**0.93**	**4.74**	**41.14**
	3.55	**0.18**	**0.27**	**69.50**				

Appendix Table A3. Data for African Countries not in the regression sample

country	g6590 cgb7090	lgdpea65 sxp	gea-gpop g7089n	open6590 ethling	access	tropics	icrge80	lifee(years)
ANGOLA	.	7.57	-0.38	0.00	0.00	1.00	4.27	.
	.	.	-1.44	78.00				
BENIN	-0.96	7.72	-0.15	0.04	0.00	1.00	.	40.00
	9.60	0.08	0.93	62.00				
BURUNDI	1.39	6.62	-0.04	0.0	1.00	1.00	.	42.60
	6.94	0.10	-1.14	4.00				
CAPE VERDE IS.	3.63	6.76	0.15	.	0.00	1.00	.	53.00
	.	0.04	.	.				
CENTRAL AFR.R.	-0.50	7.06	-0.21	0.00	1.00	1.00	.	39.80
	0.03	0.09	-0.30	83.00				
CHAD	-2.37	7.17	-0.18	0.00	1.00	1.00	.	35.40
	.	0.08	0.92	69.00				
COMOROS	-0.53	.	.	.	0.00	1.00	.	44.80
	.	.	.	.				
DJIBOUTI	.	.	.	.	0.00	.	.	.
	.	.	6.45	.				
ETHIOPIA	.	6.32	-0.11	0.00	0.00	1.00	4.42	42.40
	.	.	1.62	69.00				
GUINEA	1.36	6.95	-0.13	0.19	0.00	1.00	4.42	.
	.	.	-0.38	75.00				
GUINEA-BISS	0.49	6.93	-0.33	0.15	0.00	1.00	3.23	35.00
	12.57	.	1.11	.				
LESOTHO	3.45	6.60	-0.17	.	1.00	0.00	.	48.00
	6.10	.	0.14	22.00				
LIBERIA	.	7.32	-0.26	.	0.00	1.00	2.93	42.20
	2.92	0.49	-0.29	83.00				
MAURITANIA	-0.43	7.39	-0.16	0.00	0.00	0.80	.	36.00
	6.91	0.41	2.34	33.00				
MAURITIUS	2.50	8.72	0.97	1.00	0.00	1.00	.	60.20
	0.49	0.29	2.22	58.00				
MOZAMBIQUE	-2.03	7.74	-0.19	0.00	0.00	0.60	5.22	36.20
	.	.	0.89	65.00				
NAMIBIA	0.88	8.34	-0.07	0.00	0.00	0.50	.	.
	.	.	-0.14	.				
REUNION	.	.	.	.	0.00	.	.	.
	.	.	.	.				
RWANDA	3.05	6.52	-0.14	0.00	1.00	1.00	.	47.80
	2.25	0.11	-1.10	14.00				
SEYCHELLES	4.39	.	.	.	0.00	1.00	.	.
	.	.	.	.				
SUDAN	.	.	-0.04	0.00	0.00	1.00	2.73	39.40
	1.19	0.16	2.27	73.00				
SWAZILAND	1.71	8.07	-0.05	0.00	1.00	0.00	.	41.60
	10.10	.	-0.28	.				
TOGO	1.07	6.82	-0.16	0.00	0.00	1.00	4.35	40.60
	.	0.19	0.76	71.00				
AVERAGE	**0.89**	**7.35**	**-0.09**	**0.08**	**0.26**	**0.85**	**4.08**	**42.89**
	5.50	**0.20**	**0.71**	**54.28**				

Figure 1 : Log of real per-capita GDP, Seven Reformist African Economies. (Data for 1993 and 1994 are projections)

Appendix figures : Log of real per-capita GDP, Non-reforming African Economies. (Data for 1993 and 1994 are projections)

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Data Appendix: List of Variables

G6590	Average annual growth in real GDP per person between 1965 and 1990. GDP data are from the Penn World Tables, Mark 5.6, and are adjusted for differences in the purchasing power across countries (see Summers and Heston 1981). The population data is from the *World Data CD-ROM, 1995, World Bank.*
LGDPEA65	The log of real GDP per head of the economically active population in 1965. As above, GDP data are from the Penn World Tables, Mark 5.6, and are adjusted for differences in the purchasing power across countries (see Summers and Heston 1981). The economically active population is defined as the population between the ages 15-64. The population data is from the *World Data CD-ROM, 1995, World Bank.*
OPEN6590	The fraction of years during the period 1965-1990 in which the country is rated as an open economy according to the criteria in Sachs and Warner [1995].
ACCESS	Dummy variable that takes the value 1 if a country is completely landlocked; 0 otherwise. Source: Authors.
LIFEE	Life Expectancy in years, circa 1970. Source: Jong-wha Lee.
CGB7090	Average value of central government savings over the period 1970-1990. Savings is defined as current revenues minus current expenditure, and is measured in percent of GDP. Source: *World Data CD-ROM, 1995, World Bank.*
TROPICS	Approximate fraction of a country's land area that is subject to a tropical climate. Source: Authors.
ICRGE80	Institutional quality index. This is an unweighted average of 5 sub-indexes developed from data by Political Risk Services, measuring the following. The *rule of law index* "reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes" The *bureaucratic quality index* measures "autonomy from political pressure", and "strength and expertise to govern without drastic changes in policy or interruptions in government services." The *corruption in government* index measures whether "illegal payments are generally expected throughout .. government", in the form of "bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans." The *risk of expropriation index* measures high risk of "outright confiscation" or "forced nationalization." The *government repudiation of contracts index* measures the "risk of a modification in a contract taking the form of a repudiation, postponement or scaling down." These five sub-indexes are scaled and averaged together into our overall institutional quality index. This index was originally constructed by the Center for Institutional Reform and the Informal Sector (IRIS) from data printed in the International Country Risk Guide published by Political Risk Services. See Knack and Keefer (1994) for further details.
SXP	Share of exports of primary products in GNP in 1970. Primary products or natural resource exports are exports of "fuels" and "non-fuel primary products" from the *World Data 1995 CD-ROM* disk, produced by the World Bank. Non-fuel primary products correspond to SITC categories 0, 1, 2, 4, and 68. Fuels correspond to SITC category 3. These categories are from revision 1 of the SITC. GNP is taken from the same source. Both numerator and denominator are measured in nominal dollars. The *World Data* uses a smoothed exchange rate to convert local currency GNP to dollars. This describes the basic data. In addition, we made the following modifications. Bangladesh: 1975 data. Bahrain: 1980 data. Botswana:

	Exports of Diamonds in 1970 taken from Modise (1996). Cape Verde: export data for 1972 taken from World Tables 1994, World Bank; GNP data taken from the *World Data 1995 CD-ROM* disk. China: 1980 data. Cyprus: 1975 data. Jordan 1985 data. Iran: GNP in 1970 calculated with data in the *Penn World Tables, mark 5.6* together with price and exchange rate data in the *World Data 1995 CD-ROM* disk. Myanmar: 1970 GNP converted to dollars by the authors using the 1970 nominal exchange rate. Taiwan: Exports taken from *Taiwan Statistical Data Book 1995*, page 194 and GNP taken from 1996 volume, page 1. Uganda: 1980 data. South Africa: the published trade statistics do not include raw diamonds and gold, so these were added by the authors using data in *Bulletin of Statistics*, The Republic of South Africa, Pretoria, December 1972 and June 1992. Singapore: used *net* exports of natural resources because Singapore simply re-exports a lot of natural resources which originate elsewhere. Trinidad: used net exports for the same reason as Singapore. United Arab Emirates: 1973 data. Zimbabwe: 1980 data.
INFL6590	Average annual inflation. Measured as the difference in the log of the GDP deflator between 1990 and 1965 divided by 25 and multiplied by 100. Source: *World Data CD-ROM, 1995, World Bank.*
INV7089	Ratio of real gross domestic investment (public plus private) to real GDP, averaged over the period 1970-1989. Source: Barro and Lee, 1994, who in turn used Summers and Heston v. 5.5.
SSAFRICA	Dummy variable equal to 1 for sub-Saharan African countries, 0 otherwise.
G7089N	Average annual growth of neighboring economies. For each country, we summed GDP and population of all neighboring economies. Then standard growth rates for GDP per-capita were calculated for this aggregation.
NS7089	National saving as a percent of GDP. Source: World Bank, *World Data 1995*, CD-ROM.
GEA-GPOP	Average annual growth of the economically active population minus average annual growth of the total population 1965-1990. Source: World Bank, *World Data 1995*, CD-ROM.
ETHLING	Measure of Ethno-linguistic fractionalization used previously in Easterly and Levine (1997) This variable measures the probability that two randomly-selected people from a country will *not* belong to the same ethnic or linguistic group.

Data Appendix: Data

COUNTRY	SHCODE56	G6590	LGDPEA65	LGDPEA65* OPEN6590
AFRICA				
BOTSWANA	4	5.71	7.10	3.00
BURKINA FASO	5	1.26	6.52	0.00
CAMEROON	7	2.40	7.10	0.00
CONGO	12	2.85	7.60	0.00
EGYPT	14	2.51	7.58	0.00
GABON	16	1.73	8.35	0.00
GAMBIA	17	0.35	7.17	1.38
GHANA	18	0.07	7.45	1.72
IVORY COAST	21	-0.56	7.89	0.00
KENYA	22	1.61	7.14	0.82
MADAGASCAR	25	-1.99	7.63	0.00
MALAWI	26	0.92	6.68	0.00
MALI	27	0.82	6.71	0.77
MOROCCO	30	2.22	7.80	1.80
NIGER	33	-0.69	7.12	0.00
NIGERIA	34	1.89	7.09	0.00
SENEGAL	37	-0.01	7.69	0.00
SIERRA LEONE	39	-0.83	7.60	0.00
SOMALIA	40	-0.98	7.51	0.00
SOUTH AFRICA	41	0.85	8.48	0.00
TANZANIA	44	1.93	6.58	0.00
TUNISIA	46	3.44	7.81	0.60
UGANDA	47	-0.41	7.10	0.82
ZAIRE	48	-1.15	6.93	0.00
ZAMBIA	49	-1.88	7.66	0.00
ZIMBABWE	50	0.86	7.58	0.00
NORTH AMERICA				
CANADA	54	2.74	9.60	9.60
COSTA RICA	55	1.41	8.52	1.31
DOMINICAN REP.	57	2.12	7.85	0.00
EL SALVADOR	58	0.19	8.15	0.31
GUATEMALA	60	0.71	8.16	0.94
HAITI	61	-0.25	7.40	0.00
HONDURAS	62	0.84	7.71	0.00
JAMAICA	63	0.78	8.32	3.20
MEXICO	64	2.22	8.82	1.70
NICARAGUA	65	-2.24	8.45	0.00
TRINIDAD & TOBAGO	71	0.76	9.39	0.00
U.S.A.	72	1.76	9.87	9.87
SOUTH AMERICA				
ARGENTINA	73	-0.25	8.97	0.00
BOLIVIA	74	0.85	7.82	6.02
BRAZIL	75	3.10	8.16	0.00
CHILE	76	1.13	8.69	5.01
COLOMBIA	77	2.39	8.19	1.58
ECUADOR	78	2.21	8.05	5.57
GUYANA	79	-1.47	8.06	0.97
PARAGUAY	80	2.06	7.88	0.61
PERU	81	-0.56	8.48	0.98
URUGUAY	83	0.88	8.67	0.33

VENEZUELA	84	-0.84	9.60	0.74
ASIA				
CHINA	88	3.35	6.94	0.00
HONG KONG	89	5.78	8.73	8.73
INDIA	90	2.03	7.21	0.00
INDONESIA	91	4.74	6.99	5.65
ISRAEL	94	2.81	8.95	2.07
JAPAN	95	4.66	8.79	8.79
JORDAN	96	2.43	8.04	8.04
KOREA, SOUTH	97	7.41	7.58	6.70
MALAYSIA	100	4.49	8.10	8.10
PAKISTAN	105	1.76	7.49	0.00
PHILIPPINES	106	1.39	7.78	0.90
SINGAPORE	109	7.39	8.15	8.15
SRI LANKA	110	2.30	7.67	1.77
SYRIA	111	2.65	8.37	0.32
TAIWAN	112	6.35	8.05	8.05
THAILAND	113	4.59	7.71	7.71
EUROPE				
AUSTRIA	116	2.91	9.18	9.18
BELGIUM	117	2.70	9.27	9.27
DENMARK	121	2.01	9.47	9.47
FINLAND	122	3.08	9.21	9.21
FRANCE	123	2.58	9.37	9.37
GERMANY, WEST	125	2.37	9.41	9.41
GREECE	126	3.17	8.45	8.45
IRELAND	129	3.37	8.84	8.50
ITALY	130	3.15	9.07	9.07
NETHERLANDS	133	2.27	9.38	9.38
NORWAY	134	3.05	9.30	9.30
PORTUGAL	136	4.54	8.25	8.25
SPAIN	138	2.95	8.87	8.87
SWEDEN	139	1.80	9.56	9.56
SWITZERLAND	140	1.57	9.74	9.74
TURKEY	141	2.92	8.12	0.62
U.K.	142	2.18	9.38	9.38
SOUTH PACIFIC				
AUSTRALIA	145	1.97	9.57	9.57
NEW ZEALAND	147	0.97	9.63	1.85

COUNTRY	OPEN6590	ACCESS	ln(LIFEE)	ln(LIFEE)^2
AFRICA				
BOTSWANA	0.42	1	3.84	14.76
BURKINA FASO	0.00	1	3.62	13.08
CAMEROON	0.00	0	3.79	14.35
CONGO	0.00	0	3.88	15.02
EGYPT	0.00	0	3.85	14.86
GABON	0.00	0	3.72	13.86
GAMBIA	0.19	0	3.50	12.23
GHANA	0.23	0	3.83	14.69
IVORY COAST	0.00	0	3.69	13.64
KENYA	0.12	0	3.82	14.63
MADAGASCAR	0.00	0	3.73	13.93
MALAWI	0.00	1	3.65	13.31
MALI	0.12	1	3.61	13.00
MOROCCO	0.23	0	3.87	14.95
NIGER	0.00	1	3.58	12.84
NIGERIA	0.00	0	3.70	13.72
SENEGAL	0.00	0	3.69	13.64
SIERRA LEONE	0.00	0	3.47	12.01
SOMALIA	0.00	0	3.61	13.04
SOUTH AFRICA	0.00	0	3.91	15.30
TANZANIA	0.00	0	3.73	13.90
TUNISIA	0.08	0	3.91	15.27
UGANDA	0.12	1	3.78	14.32
ZAIRE	0.00	1	3.75	14.04
ZAMBIA	0.00	1	3.76	14.11
ZIMBABWE	0.00	1	3.83	14.69
NORTH AMERICA				
CANADA	1.00	0	4.27	18.22
COSTA RICA	0.15	0	4.14	17.17
DOMINICAN REP.	0.00	0	3.98	15.85
EL SALVADOR	0.04	0	3.96	15.67
GUATEMALA	0.12	0	3.85	14.82
HAITI	0.00	0	3.78	14.25
HONDURAS	0.00	0	3.87	14.99
JAMAICA	0.38	0	4.16	17.27
MEXICO	0.19	0	4.07	16.54
NICARAGUA	0.00	0	3.88	15.08
TRINIDAD & TOBAGO	0.00	0	4.17	17.37
U.S.A.	1.00	0	4.25	18.05
SOUTH AMERICA				
ARGENTINA	0.00	0	4.18	17.48
BOLIVIA	0.77	1	3.77	14.22
BRAZIL	0.00	0	4.02	16.17
CHILE	0.58	0	4.06	16.52
COLOMBIA	0.19	0	4.00	15.97
ECUADOR	0.69	0	4.00	16.00
GUYANA	0.12	0	4.11	16.90
PARAGUAY	0.08	1	4.17	17.35
PERU	0.12	0	3.90	15.18
URUGUAY	0.04	0	4.21	17.73
VENEZUELA	0.08	0	4.11	16.90
ASIA				
CHINA	0.00	0	3.84	14.72

HONG KONG	1.00	0	4.20	17.65
INDIA	0.00	0	3.78	14.29
INDONESIA	0.81	0	3.75	14.08
ISRAEL	0.23	0	4.28	18.29
JAPAN	1.00	0	4.23	17.93
JORDAN	1.00	1	3.88	15.05
KOREA, SOUTH	0.88	0	4.01	16.09
MALAYSIA	1.00	0	4.02	16.15
PAKISTAN	0.00	0	3.79	14.35
PHILIPPINES	0.12	0	4.00	15.97
SINGAPORE	1.00	0	4.17	17.37
SRI LANKA	0.23	0	4.15	17.19
SYRIA	0.04	0	3.94	15.49
TAIWAN	1.00	0	4.18	17.48
THAILAND	1.00	0	3.99	15.88
EUROPE				
AUSTRIA	1.00	1	4.24	17.95
BELGIUM	1.00	0	4.26	18.12
DENMARK	1.00	0	4.28	18.34
FINLAND	1.00	0	4.23	17.88
FRANCE	1.00	0	4.26	18.15
GERMANY, WEST	1.00	0	4.25	18.03
GREECE	1.00	0	4.24	18.00
IRELAND	0.96	0	4.25	18.07
ITALY	1.00	0	4.25	18.03
NETHERLANDS	1.00	0	4.29	18.41
NORWAY	1.00	0	4.30	18.45
PORTUGAL	1.00	0	4.17	17.37
SPAIN	1.00	0	4.24	18.00
SWEDEN	1.00	0	4.30	18.48
SWITZERLAND	1.00	1	4.27	18.24
TURKEY	0.08	0	3.95	15.58
U.K.	1.00	0	4.26	18.17
SOUTH PACIFIC				
AUSTRALIA	1.00	0	4.26	18.17
NEW ZEALAND	0.19	0	4.16	17.32

COUNTRY	TROPICS	CGB7090	ICRGE80	GEA-GPOP
AFRICA				
BOTSWANA	0.5	20.86	7.00	0.43
BURKINA FASO	1.0	1.82	4.75	-0.14
CAMEROON	1.0	5.56	5.66	-0.28
CONGO	1.0	9.45	3.69	-0.22
EGYPT	1.0	1.24	4.35	0.23
GABON	1.0	16.21	5.38	-0.34
GAMBIA	1.0	5.35	5.63	-0.11
GHANA	1.0	-0.74	3.70	0.01
IVORY COAST	1.0	5.27	6.70	-0.23
KENYA	1.0	1.01	5.56	-0.05
MADAGASCAR	0.9	3.18	4.67	-0.23
MALAWI	1.0	1.94	4.47	-0.12
MALI	1.0	6.37	3.00	-0.17
MOROCCO	0.0	1.95	4.30	0.50
NIGER	1.0	4.03	5.83	-0.15
NIGERIA	1.0	6.04	3.08	0.02
SENEGAL	1.0	1.20	4.75	-0.08
SIERRA LEONE	1.0	-1.58	5.42	-0.16
SOMALIA	1.0	1.33	3.73	-0.18
SOUTH AFRICA	0.0	1.03	6.92	0.22
TANZANIA	1.0	1.30	4.64	-0.03
TUNISIA	0.0	7.48	4.59	0.57
UGANDA	1.0	-1.45	2.97	-0.14
ZAIRE	1.0	-0.00	2.98	-0.26
ZAMBIA	1.0	-3.31	4.14	-0.18
ZIMBABWE	1.0	-3.34	4.44	0.33
NORTH AMERICA				
CANADA	0.0	-2.53	9.67	0.57
COSTA RICA	1.0	0.78	5.47	0.76
DOMINICAN REP.	1.0	5.09	4.52	0.73
EL SALVADOR	1.0	1.84	2.58	0.17
GUATEMALA	1.0	1.40	2.84	0.05
HAITI	1.0	-4.72	2.58	0.08
HONDURAS	1.0	2.95	3.39	0.14
JAMAICA	1.0	-1.39	4.70	0.64
MEXICO	0.5	-1.71	5.41	0.62
NICARAGUA	1.0	-4.23	3.00	0.05
TRINIDAD & TOBAGO	1.0	9.37	6.09	0.47
U.S.A.	0.0	-1.61	9.80	0.36
SOUTH AMERICA				
ARGENTINA	0.0	-0.82	4.28	-0.15
BOLIVIA	1.0	1.25	2.27	-0.07
BRAZIL	0.5	-0.92	6.36	0.55
CHILE	0.1	2.66	6.33	0.59
COLOMBIA	1.0	2.09	5.30	0.74
ECUADOR	1.0	1.55	5.42	0.45
GUYANA	1.0	0.79	2.84	0.93
PARAGUAY	0.5	2.62	4.40	0.59
PERU	1.0	-0.17	3.23	0.44
URUGUAY	0.0	-0.29	5.12	-0.07
VENEZUELA	1.0	7.73	5.56	0.53
ASIA				
CHINA	0.1	0.43	5.69	0.80

HONG KONG	0.0	3.60	8.02	0.84
INDIA	0.5	0.20	5.76	0.20
INDONESIA	1.0	8.21	3.67	0.31
ISRAEL	0.0	-5.24	6.09	0.01
JAPAN	0.0	-1.16	9.37	0.10
JORDAN	0.0	-4.84	4.08	-0.07
KOREA, SOUTH	0.0	3.20	6.36	1.03
MALAYSIA	1.0	2.25	6.90	0.63
PAKISTAN	0.0	0.24	4.11	0.14
PHILIPPINES	1.0	2.04	2.97	0.36
SINGAPORE	1.0	8.88	8.56	1.12
SRI LANKA	1.0	1.81	4.33	0.48
SYRIA	0.0	9.24	3.08	0.20
TAIWAN	0.8	7.31	8.24	0.96
THAILAND	1.0	1.34	6.26	0.87
EUROPE				
AUSTRIA	0.0	0.44	9.45	0.26
BELGIUM	0.0	-2.64	9.71	0.20
DENMARK	0.0	1.73	9.68	0.15
FINLAND	0.0	3.81	9.68	0.14
FRANCE	0.0	1.08	9.26	0.22
GERMANY, WEST	0.0	1.04	9.59	0.26
GREECE	0.0	-4.14	5.50	0.08
IRELAND	0.0	-2.85	8.32	0.25
ITALY	0.0	-3.77	8.20	0.18
NETHERLANDS	0.0	0.76	9.81	0.41
NORWAY	0.0	4.93	9.60	0.09
PORTUGAL	0.0	-2.56	7.74	0.20
SPAIN	0.0	0.88	7.64	0.17
SWEDEN	0.0	1.90	9.65	-0.13
SWITZERLAND	0.0	1.98	9.98	0.20
TURKEY	0.0	2.12	5.26	0.50
U.K.	0.0	0.90	9.34	0.03
SOUTH PACIFIC				
AUSTRALIA	0.1	1.59	9.43	0.32
NEW ZEALAND	0.0	0.16	9.65	0.40

COUNTRY	SXP	SSAFRICA	ETHLING	NS7089
AFRICA				
BOTSWANA	0.05	1	51	8.11
BURKINA FASO	0.04	1	68	2.64
CAMEROON	0.18	1	89	4.59
CONGO	0.08	1	66	-0.80
EGYPT	0.07	0	4	-5.09
GABON	0.33	1	69	46.16
GAMBIA	0.36	1	73	-9.13
GHANA	0.21	1	71	3.96
IVORY COAST	0.29	1	86	-0.21
KENYA	0.18	1	83	4.87
MADAGASCAR	0.12	1	6	-4.92
MALAWI	0.21	1	62	3.64
MALI	0.08	1	78	14.21
MOROCCO	0.11	0	53	2.07
NIGER	0.05	1	73	11.10
NIGERIA	0.14	1	87	11.12
SENEGAL	0.14	1	75	-1.65
SIERRA LEONE	0.09	1	77	-2.52
SOMALIA	0.09	1	8	-1.94
SOUTH AFRICA	0.17	1	88	10.71
TANZANIA	0.17	1	93	4.07
TUNISIA	0.10	0	16	8.39
UGANDA	0.27	1		5.69
ZAIRE	0.15	1	90	-1.39
ZAMBIA	0.54	1	82	-0.49
ZIMBABWE	0.17	1	54	11.53
NORTH AMERICA				
CANADA	0.10	0	75	23.12
COSTA RICA	0.19	0	7	9.62
DOMINICAN REP.	0.13	0	4	11.66
EL SALVADOR	0.16	0	17	1.51
GUATEMALA	0.11	0	64	4.07
HAITI	0.08	0	1	2.37
HONDURAS	0.23	0	16	4.74
JAMAICA	0.14	0	5	8.16
MEXICO	0.02	0	30	14.04
NICARAGUA	0.19	0	18	9.84
TRINIDAD & TOBAGO	0.08	0	56	10.53
U.S.A.	0.01	0	50	20.90
SOUTH AMERICA				
ARGENTINA	0.05	0	31	14.70
BOLIVIA	0.18	0	68	10.50
BRAZIL	0.05	0	7	14.98
CHILE	0.15	0	14	-1.85
COLOMBIA	0.09	0	6	12.85
ECUADOR	0.11	0	53	17.41
GUYANA	0.51	0	58	1.08
PARAGUAY	0.10	0	14	12.97
PERU	0.15	0	59	12.47
URUGUAY	0.09	0	20	20.83
VENEZUELA	0.24	0	11	29.81
ASIA				
CHINA	0.02	0		22.92

HONG KONG	0.03	0	2	
INDIA	0.02	0	89	13.40
INDONESIA	0.11	0	76	20.90
ISRAEL	0.04	0	20	10.40
JAPAN	0.01	0	1	34.14
JORDAN	0.09	0	5	-8.81
KOREA, SOUTH	0.02	0	0	23.38
MALAYSIA	0.37	0	72	24.53
PAKISTAN	0.03	0	64	7.52
PHILIPPINES	0.13	0	74	14.48
SINGAPORE	0.03	0	42	29.33
SRI LANKA	0.15	0	47	8.00
SYRIA	0.08	0	22	10.61
TAIWAN	0.02	0	42	
THAILAND	0.09	0	66	15.07
EUROPE				
AUSTRIA	0.04	0	13	24.44
BELGIUM	0.11	0	55	20.87
DENMARK	0.10	0	5	19.90
FINLAND	0.07	0	16	30.80
FRANCE	0.03	0	26	25.75
GERMANY, WEST	0.02	0	3	27.05
GREECE	0.04	0	10	20.26
IRELAND	0.15	0	4	17.06
ITALY	0.02	0	4	24.89
NETHERLANDS	0.15	0	10	24.77
NORWAY	0.10	0	4	32.67
PORTUGAL	0.05	0	1	14.42
SPAIN	0.03	0	44	22.60
SWEDEN	0.05	0	8	20.08
SWITZERLAND	0.02	0	50	32.91
TURKEY	0.04	0	25	18.05
U.K.	0.03	0	32	18.65
SOUTH PACIFIC				
AUSTRALIA	0.10	0	32	23.48
NEW ZEALAND	0.18	0	37	19.15

COUNTRY	LINV7089	INFL6590	G7089N
AFRICA			
BOTSWANA	-1.27	9.49	-0.05
BURKINA FASO	-2.10	5.08	-0.80
CAMEROON	-2.29	7.06	1.05
CONGO	-2.26	5.38	-0.42
EGYPT	-2.84	8.40	1.03
GABON	-1.31	8.66	2.53
GAMBIA	-2.51	9.99	-0.03
GHANA	-2.80	27.38	-0.19
IVORY COAST	-2.13	5.82	0.15
KENYA	-1.78	7.43	1.81
MADAGASCAR	-4.21	10.92	-3.36
MALAWI	-2.06	9.42	-0.77
MALI	-2.63		1.45
MOROCCO	-2.09	5.83	2.14
NIGER	-2.53	5.43	1.64
NIGERIA	-1.86	13.52	-0.21
SENEGAL	-1.57	5.77	1.49
SIERRA LEONE	-2.24	20.86	1.29
SOMALIA	-1.56	24.66	5.55
SOUTH AFRICA	-3.55	11.39	-1.17
TANZANIA	-1.56	13.57	-0.55
TUNISIA	-2.62	6.97	2.06
UGANDA	-2.78		0.30
ZAIRE	-1.59		0.22
ZAMBIA	-1.80	18.76	-1.20
ZIMBABWE		7.89	-2.45
NORTH AMERICA			
CANADA	-1.33	6.02	1.76
COSTA RICA	-1.67	15.08	-1.33
DOMINICAN REP.	-1.65	11.75	0.00
EL SALVADOR	-2.38	9.95	0.35
GUATEMALA	-2.27	9.33	1.67
HAITI	-2.54	7.07	1.45
HONDURAS	-1.98	6.07	1.54
JAMAICA	-1.57	13.32	0.00
MEXICO	-1.70	26.79	1.66
NICARAGUA	-2.01	77.71	0.39
TRINIDAD & TOBAGO	-1.94	9.26	-1.44
U.S.A.	-1.44	5.45	2.06
SOUTH AMERICA			
ARGENTINA	-2.01	101.20	2.59
BOLIVIA	-1.79	54.80	1.59
BRAZIL	-1.54	76.53	-0.31
CHILE	-1.99	48.90	-0.94
COLOMBIA	-1.76	18.52	1.88
ECUADOR	-1.40	18.66	1.01
GUYANA	-1.58	14.99	2.11
PARAGUAY	-1.82	13.70	1.83
PERU	-1.62	68.71	1.64
URUGUAY	-1.67	46.87	1.87
VENEZUELA	-1.59	13.60	2.80
ASIA			
CHINA	-1.76	2.21	3.12

HONG KONG	-1.52	7.57	3.49
INDIA	-1.72	7.73	3.04
INDONESIA	-1.49	29.78	2.37
ISRAEL	-1.34	41.02	2.76
JAPAN	-0.97	4.66	6.78
JORDAN	-1.58		1.20
KOREA, SOUTH	-1.22	12.43	3.31
MALAYSIA	-1.28	3.45	4.60
PAKISTAN	-2.22	8.05	2.63
PHILIPPINES	-1.74	11.48	5.19
SINGAPORE	-0.95	3.90	4.80
SRI LANKA	-1.65	9.93	2.27
SYRIA	-1.81	10.45	1.63
TAIWAN	-1.28		3.49
THAILAND	-1.63	5.29	4.59
EUROPE			
AUSTRIA	-1.25	4.65	2.18
BELGIUM	-1.40	5.21	2.00
DENMARK	-1.29	7.34	2.03
FINLAND	-1.00	8.38	2.08
FRANCE	-1.23	7.06	2.21
GERMANY, WEST	-1.25	3.90	1.93
GREECE	-1.32	12.52	1.98
IRELAND	-1.24	8.95	2.20
ITALY	-1.26	10.24	1.95
NETHERLANDS	-1.38	4.83	2.13
NORWAY	-1.08	6.76	2.02
PORTUGAL	-1.38	13.21	1.99
SPAIN	-1.28	10.52	1.62
SWEDEN	-1.39	7.55	2.02
SWITZERLAND	-1.15	4.42	2.20
TURKEY	-1.39	28.89	-0.41
U.K.	-1.60	8.58	2.04
SOUTH PACIFIC			
AUSTRALIA	-1.20	7.86	4.75
NEW ZEALAND	-1.32	9.58	