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Public Health as Part of the Strategy of African Economic Growth

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## Public Health as Part of the Strategy of African Economic Growth

Every finance minister in Africa knows that Africa's poverty makes it difficult to attend to the health of the population. Budgets are scarce; doctors are few; and health systems are strained by the constant fiscal crisis facing every country on the continent. Fewer ministers and development specialists fully appreciate the converse proposition: that Africa's poor health is a fundamental obstacle to economic development. Both formal statistical analysis and detailed case studies demonstrate that poor health is as much a cause as an effect of poverty. A frontal attack on poor Africa's health status may now be the most important single strategy for economic development for the continent.

Healthy populations contribute to economic development in several ways, including:

- higher individual productivity
- greater investments in human capital by healthy individuals
- reduced losses of work time and schooling due to illness
- longer life expectancy, allowing a greater accumulation of work skills and expertise
- easier interface with the world economy through increased trade, travel, and investments

Africa's health situation is nothing short of alarming. At the top of the crisis list, of course, is HIV/AIDS, which according to UNAIDS now affects an estimated 22.5 million Africans, and which took 2 million lives last year. As described in the accompanying paper, AIDS is particularly pernicious, hitting educated, mobile, prime-age workers. War and displacement are a second fundamental feature of the continuing health crisis. The third category includes a host of infectious diseases, ranging from respiratory diseases to vector-borne diseases such as malaria and schistosomiasis. As discussed below, one feature of the African health scene is the paucity of data to make even rudimentary estimates of the extent and economic burden of these various public health crises.

### *The Macroeconomic Evidence on Health and Economic Growth*

Africa's health crisis would be worthy of dire concern even if it had no further repercussions on African economic performance. Alas, the evidence suggests that poor health is not only a direct social burden, but also a major cause of slow economic growth. This section discusses the macroeconomic analysis that demonstrates the linkage from health to economic growth.

In recent years economists have sought to uncover the basic determinants of success and failure in macroeconomic performance, most importantly the success or failure in achieving sustained economic growth. According to economic theory and to empirical studies, there are several basic factors that help to explain why some countries and regions have sustained rapid growth and others have not:

(1) physical geography. Countries that are landlocked, or that are remote from world markets, generally have a harder time achieving export-led growth than coastal economies and economies close to major world markets. While there are exceptions to this proposition, the overall tendency is very clear in the data;

(2) trade policy. Countries that are closed to international trade have consistently grown more slowly than countries that are open to international trade. For these purposes, openness is characterized by: a convertible currency; low tariffs; low quota protection on imported goods; and low barriers to export;

(3) fiscal policy. Countries that run large budget deficits grow less rapidly than countries that run small budget deficits or budget surpluses. Large budget deficits tend to lower national saving rates (and hence national investment rates), and to cause macroeconomic destabilization;

(4) quality of governance. Countries that are characterized by the rule of law, low levels of corruption, a rule-abiding civil service, and protection of physical and intellectual property rights, tend to grow more rapidly than countries which lack one or more of these attributes;

(5) demographic change. Economists describe the "dependency ratio" as the proportion of the population under the age of 15 or over the age of 65. Countries with a consistently high dependency ratio tend to grow less rapidly in per capita terms than countries with a consistently lower dependency ratio. In simplest terms, the gross domestic product is produced mainly by working-age individuals. When the share of such individuals rises, gross domestic product tends to rise relative to the overall population.

(6) public health. Countries with low levels of life expectancy tend to grow more slowly than countries with a long life expectancy, holding constant all of the other factors of economic growth. Thus, if there are two countries with identical geography, economic policy, and demographic change (dependency ratios), but one has a longer life expectancy than the other, the country with the longer-lived population tends to grow more rapidly.

(7) initial income. Countries with a low level of income -- holding constant all of the other factors -- tend to grow more rapidly than countries with a high level of income. This "convergence" property reflects the ability of poorer countries to achieve "catch-up" growth with the richer countries through the importation of technology, capital, and ideas. Of course, many poor countries do not grow rapidly, but this is the result of other problems facing the economy (such as poor geography, poor economic policies, poor public health, etc.).

In a recent study, my colleague David Bloom and I (Bloom and Sachs, 1998) tried to determine the causes of Africa's poor economic growth. We looked at the growth of GDP per working-age population during the period 1965-90. Over those years, Africa grew 3.6 percentage points per year less rapidly than East Asia, 0.4 percentage points less rapidly than Latin America (which had its own growth crisis), and 1.7 percentage points less rapidly than the average of all non-African developing countries. Since Africa started out poorer than these other regions, we might have expected Africa to grow faster, because of the forces of "convergence." Instead, Africa grew more slowly. What were the relative factors behind that shortfall in growth?

Using a statistical model linking economic growth to factors listed above, we created a quantitative allocation of Africa's growth shortfall according to the various factors. While details must be found in the original paper (Table 7, p. 261), we reproduce the basic table here and give a summary account of the finding (table 1). If we compare Africa with East Asia for example (the first two columns of the table), we find that Geography, demography, and health account for 73 percent of the overall shortfall in African growth, or 3.23 percentage points per year. The two biggest factors are demographic change (listed in the table as "difference in population growth") and life expectancy in 1965. The demographic factor accounts for 1.14 percentage points per year of the growth shortfall, while the life expectancy variable accounts for 1.19 percentage points per year.

The demographic (population) variable reflects the fact that Asia benefited from a "demographic transition" while Africa did not. By the 1960s and 1970s in Asia, women had begun to have many fewer children. (Technically, the Total Fertility Rate, or TFR, went down). As a result, there were fewer children born in Asia per adult population, and the dependency ratio declined. This provided a boost to GDP per capita. In Africa, by contrast, the TFR remained

very high throughout the 1970s and 1980s, and as a result, Africa's youth dependency ratio remained very high.

The life expectancy variable reflects the fact that African life expectancy in 1965 averaged around 42.6 years, while life expectancy at birth in Asia in 1965 averaged around 58.7 years (these are unweighted averages across countries in the respective regions). This difference in life expectancies, according to the statistical evidence, accounts for more than 1 percentage point of annual economic growth!

If one looks at the rest of the table, there are two major findings that are worthy of emphasis. First, the "geography, demography, and health" variables explain most of Africa's growth shortfall with respect to each counterpart group (Asia, Latin America, Non-Africa). Thus, the reasons for Africa's poor growth apparently have more to do with Africa's geography, population dynamics and public health than with economic policy and governance. This is not the usual view of the matter in official discussions. Second, economic policy does matter, but has explained less than half of the shortfall in African performance. The major source of policy problem, it seems clear from the data, has been Africa's relative closure to international trade. Africa remained a closed economy (through high tariffs and licenses, currency inconvertibility, export monopolies which depressed export growth, and other barriers to trade) at a time when other parts of the developing world were benefiting from rapid export-led growth. Thus, export industries such as apparel, textiles, and electronics assembly, which could have come to Africa, instead went to East Asia and the Caribbean, thus limiting Africa's chances for export-led growth.

The gap in life expectancy between Africa and the rest of the world accounts for a great deal of the growth shortfall, but we still lack a deep understanding of the precise channels by which one affects the other. As mentioned earlier, low life expectancy and related higher disease-associated morbidity imposes direct costs on productivity (less time in the workplace, lower work capacity, higher medical costs) as well as indirect costs (lower accumulation of skills, lower investments in education because of a shorter life span, and so on), each of which contributes to the shortfall in growth. Also, bad health imposes a direct burden on foreign investment and international travel, as Africa is avoided for foreign investments because of fears of greater disease burdens. Much serious research work remains to test these various channels for their practical importance.

Unfortunately, the gap in life expectancy between Africa remains large, and is actually increasing once again because of the AIDS epidemic. As discussed in an accompanying paper, the economic growth implications of HIV/AIDS are serious. As of 1996, Sub-Saharan Africa's life expectancy at birth was 51 for males and 54 for females, compared with 67 for males and 70 for females in the low and middle income countries of East Asia and the Pacific. This gap in life expectancy, of 16 years, would account for around 1.1 percentage points in economic growth per year using the same statistical model as was used to make Table 1. Thus, the health burden remains huge. Africa's life expectancy is a decade lower than in South Asia (which is 61 for males, 63 for females).

There is considerable debate and uncertainty, of course, about the reasons for Africa's particularly poor health status. It is partly a result of poverty. It is also, no doubt, partly a result of specific failures of public health systems to use existing technologies to best advantage. Many deaths in Africa are due to easily treatable diseases, but these cases go unattended because of ignorance, lack of supplies, breakdowns of local health systems, and so on. Part of the disease burden, however, is a result of Africa's special geographical and ecological conditions. As a tropical region, Africa has a special burden of infectious diseases that thrive in the tropics and that are easily controlled in the temperate climates. Moreover, some of these diseases, as well as the vectors which transmit them, may have coevolved with humankind in Africa, and are

therefore even more difficult to control in Africa than in other tropical regions, to which they were imported more recently. Also, many parts of Africa face severe limitations on agricultural productivity. As a result of the widespread malnutrition in communities which face these limitations, diseases take a much higher toll in terms of morbidity and mortality.

### *The tropical burden in African Health: the example of malaria*

This short note can't go into the details of tropical disease ecology in any depth. Instead, it is illuminating to illustrate the general problem by focusing on one disease, *malaria*, which is the vector-borne disease with the greatest prevalence and highest disease burden in the tropical world. It is also a disease that hits Africa especially hard. Sub-Saharan Africa has an estimated 90 percent of the world's clinical malaria cases each. Nobody knows for sure, however, since the record keeping and data systems for malaria in Africa and other tropical regions are notoriously deficient.

Because of the underlying biology of the disease -- in particular, the way in which malaria is transmitted by *Anopheles* mosquitoes, which require warm temperatures to be effective vectors of the disease -- malaria tends to be holoendemic (or "stably transmitted") in perennially hot climates; epidemic (or "unstably transmitted") in seasonally warm but not hot climates such as the subtropics or lower tropical highlands, and absent in cool climates (such as above the 2000m level in the tropics, or in most temperate zones). This crucial ecological point helps to explain the critical facts of Figure 1, which describe the prevalence of malaria in three years of observation, 1946, 1966, and 1996, based on maps of the World Health Organization. In 1946, malaria extended to many sub-tropical regions, such as Southern Spain and Italy, the Levant, and Central Asia. The U.S. Government and the World Health Organization spearheaded a global eradication campaign, with various phases, during the 1960s and 1970s. The campaign had an "attack phase" during which indoor DDT spraying was designed to kill recently blood-fed mosquitoes before they became infective, followed by a "consolidation phase," which involved intensified case management for infected individuals. The campaign was a failure relative to its initial bold goal of malaria eradication, but as the figure shows clearly, it did succeed in a limited range of areas, mainly the areas of the sub-tropics where malaria was still prevalent in 1946, such as Southern Europe. Other regions where malaria was successfully controlled included Hong Kong, Singapore, and Mauritius (which were greatly advantaged by their island geography), and parts of Malaysia, where mosquito prevalence was easier to control for other reasons. It is important to note that Africa was excluded from this program, with the exceptions of South Africa, Lesotho, and Mauritius, which were among the last countries in the world to be permitted to join.

The lesson of Figure 1 is quite dramatic. Malaria was controlled in the sub-tropics rather than the tropics. *The failure of Africa to control the disease is not mainly the result of poor public health measures, or unresponsive governments, or the poverty of Africa, but rather of the natural environment.* Actually, Africa's malaria problem is the world's worst for additional ecological reasons. It turns out that *Anopheles gambiae* is indigenous to Sub-Saharan Africa, and is observed only focally in those few tropical regions outside of Africa where it has been imported. For a variety of species-specific reasons, *Anopheles gambiae* is by far the most competent vector of falciparum malaria.

Sachs and Gallup (1998) have found in cross-country growth regressions that falciparum malaria is associated with a substantial reduction in annual GDP growth, perhaps of more than one percentage point per year, even after controlling for other standard variables. We surmise that these high costs of malaria come not only through the direct effects (lost work time, lower worker productivity) but also by raising barriers against technical diffusion and foreign investment into endemic malarial regions. Historical accounts of Africa's interactions with the rest of the world in the past 500 years repeatedly stress that malaria was a major barrier, perhaps

the major barrier, to Africa's normal integration into the world economy. Malaria continues to present serious obstacles to foreign investment and tourism in many parts of Africa. Foreign businessmen lack the partial immunity to malaria acquired by African adults who have experienced repeated bouts of the disease since early childhood. Prevention via existing medicines is imperfect, and not feasible for prolonged stays beyond a few weeks. Similarly, malaria presents an obstacle to Africans traveling abroad for a prolonged stay, since the acquired immunity of adult Africans who have been exposed to malaria since infancy is quickly lost in the absence of chronic re-infection. There may be other indirect costs of malaria endemicity. For example, among the clinical outcomes attendant on chronic malaria infection are lung and kidney problems, impaired motor function, and iron deficiency anemia. Such syndromes and diseases are detrimental to the economic potential of the communities in which they occur.

#### *A New Focus on African Health and Development.*

In the past twenty years, African economic development has focussed almost entirely on issues of economic policy (such as opening the economy, budget deficit reduction, and improved governance), rather than on issues of poor public health and other geographical barriers to development. Of course, these other issues have not been completely neglected, but they have been overshadowed by the economic reform agenda during the era of structural adjustment programs. It is time to restore a balance to the vision of Africa's development strategy, by putting due weight -- that is, increased emphasis -- on issues of tropical public health, care of the natural environment, and improved agricultural productivity through scientific research. This would be true even if Africa were not now succumbing to an HIV/AIDS epidemic that is unrivaled in modern history in its destructive force. But in view of that epidemic, the case for shifting our attention to critical issues of public health is of course even greater.

We have explained one of the major reasons why finance ministers, economy ministers, and trade ministers need to care about the health crisis. Improving public health is a basic part of the economic strategy, not just the social strategy. Finance ministers need to understand health issues in order to allocate domestic and foreign aid resources appropriately in national spending. Economy ministers need to work closely with public health colleagues to formulate a health strategy as part of the overall development strategy. And trade ministers need to understand that poor public health, including high prevalence of malaria, HIV/AIDS, and even tainted blood supplies used for transfusions, pose major barriers to attracting foreign direct investment and export diversification.

A companion paper discusses some of the options for improving public health systems in Africa. Without duplicating that material, I should like to close with a strong plea to policy makers in Africa and the United States. Public health challenges in Africa tend to have two characteristics that are very different from many other development issues. *First, advances will require an improved base of science and technology.* The barriers to overcoming malaria, for example, are more a question of science (e.g. the availability of an effective vaccine) than of governance (e.g. the functioning of local health clinics). *Second, advances will require -regional cooperation rather than simply national programs.* This is obviously true of scientific advances -(we don't need separate national vaccines!), but also true of many crucial public health interventions, such as HIV/AIDS control, since diseases like HIV/AIDS are spread especially through travel and cross-border migrations. Thus, as we design appropriate policies to address African public health, special attention needs to be put on international and regional programs, in contrast to the usual approach of country-level programs.

Underlying all of these considerations is the dearth of reliable data regarding health issues of special interest to Africa. For example, data on the incidence of tropical diseases such as malaria or schistosomiasis rely on rough approximations. There are no virtually long-term, longitudinal studies on the interactions between diseases and nutritional status, for example, or on the social and community impact of long-term disease exposure. Such information is essential to

inform effective development policies for the future. African governments together with multilateral organizations like the WHO, UNDP, and the World Bank must encourage such long-term data collection and research, and should sponsor the efforts of African and international scientists, clinicians, and epidemiologists. Today, health issues pose enormous obstacles to African growth, but often some of the most fundamental issues are barely understood.

As for spurring the needed scientific advances, we will need to think in innovative ways. Almost all scientific advances in biotechnology in recent years, whether in pharmaceuticals or in agricultural production, have involved joint actions of the public and the private sectors. Africa's health challenges must engage not only the research laboratories of national governments, but also the world's major pharmaceutical companies. Yet those companies have almost wholly neglected Africa in recent years (with notable exceptions, such as Merck's development and promotion of Ivermectin, to cure onchocerciasis), mainly because they perceive the market to be too small and far too risky to engage in expensive, long-term research and development. Even if they succeed in developing a malaria vaccine, for example, an initiative that would cost several hundred million dollars at least in risky R&D expenditures, they believe that they would reap precious few commercial benefits at the end.

The result is painfully clear. Malaria vaccine research is currently carried out mainly in government research institutes, all suffering from under-funding and hugely competing claims on scarce budgets. The Wellcome Trust estimated recently that the worldwide total malaria vaccine research effort amounted to around \$60 million, or perhaps \$65 per annual case fatality due to the disease. This compares, for example, with annual research funding of around \$140 million for asthma, a disease which is common in the "rich" temperate zones, amounting to around \$790 annual spending per fatality. In short, the 2.4 billion people in the tropics that are vulnerable to malaria provoke remarkably little research effort on their behalf, since the "market demand" is so extremely weak.

We need a dramatic new approach in such cases, using new and creative ways to link market incentives with social goals. In the case of malaria, for example, the key action is to create incentives for private pharmaceutical companies and biotechnology firms to invest heavily in a malaria vaccine. Several researchers at Harvard and MIT are examining the possibility that foreign aid funds be used to *guarantee a market for malaria vaccine at the end of the vaccine development process*. The leading governments would pledge today that they will purchase, for mass distribution, an effective malaria vaccine whenever such a vaccine is successfully developed. For example, the U.S., Europe, and Japan, on behalf of the World Health Organization, would pledge that they will form the relevant market for buying the vaccine. These governments could establish a Malaria Vaccine Trust Fund, capitalized with the needed funding, to prove that they stand ready to "make the market" when and if an effective vaccine arrives.

No money would be expended until an effective vaccine is proved. No large bureaucracy would choose among scientific approaches, or would subsidize research. No government agency would decide in advance who is worthy to lead the anti-malaria campaign. We believe in the urgent need for a decentralized approach, in which the smallest to the largest private biotechnology and pharmaceutical companies are energized in the search for an effective virus. Market forces, rather than unwieldy public agencies, would be harnessed to tackle the key steps in vaccine development. We can even put a little flesh on the proposal, though very speculative and rudimentary. Suppose that the leading governments commit to purchase enough vaccine to immunize all of the newborn children in Africa each year. There are, throughout the region, around 25 million births per year. A very rough estimate of the starting price for an effective vaccine, based on comparable cases for other diseases, might be around \$40. A price in this range would likely be enough to cover development costs plus the marginal costs of vaccine production and distribution. In effect, the Trust Fund would be guaranteeing a market of around \$1 billion per year to immunize all of Africa's newborns (\$25 per case times 25 million regimens

per year). A global Malaria Vaccine Board, under the auspices of the World Health Organization, would administer the fund, confirming for example the efficacy of all vaccines purchased by the Fund. Would such an effort be worth it? Almost surely. Foreign aid to Africa now totals around \$16 billion per year, so a \$1 billion per year anti-malaria vaccine effort would amount to around 6 percent of total aid, and would be spent only when an effective vaccine is actually developed.

This is just one example of the kind of thinking that will be needed to push forward a major initiative on African health. This new focus will require partnerships all around -- between the U.S. and Africa, among African government, between Finance Ministers and Health Ministers, and between governments and international agencies. The effort will be strongly repaid, not only in a healthy population but also in accelerated economic development.

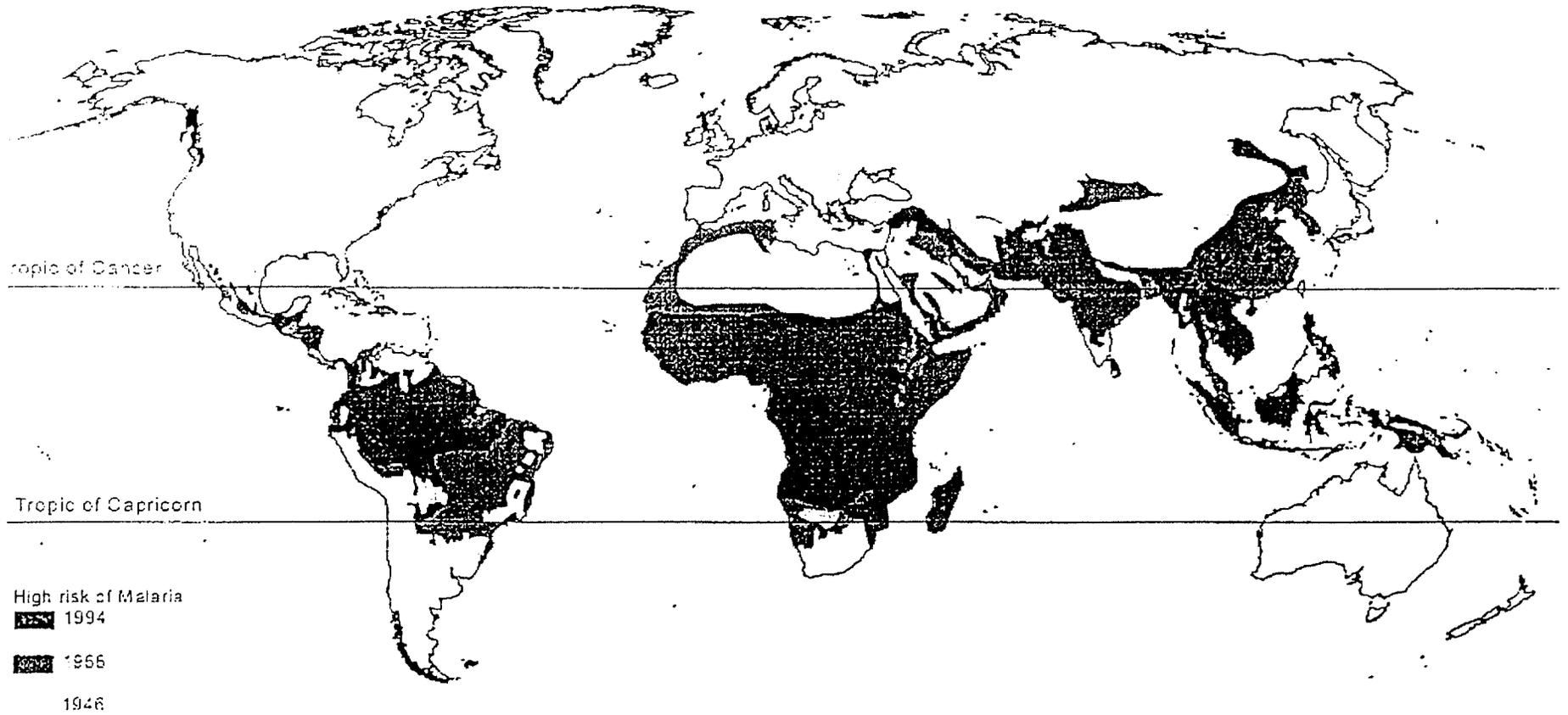
**Table 1. Explaining Africa's Growth Gap**

Geography, Demography, and Health	East/SE Asia Gap Impact Impact	Latin America Gap Impact		World Gap		
Portion land area in geographical tropics		7%		-0.30	7%	-0.16
Log population density w/ 1 00km coast		14%		-0.61	9%	-0.19
Log population density inland		0%		0.01	3%	-0.06
gpopdife		26%		-1.14	33%	-0.72
Log of life expectancy at birth, 1965		27%		-1.19	52%	-1.12
<i>Sub-total</i>		73%		-3.23	103%	-2.24
<b>Economic Policy and Governance</b>						
Trade openness		32%		-1.40	13%	-0.27
Quality of government institutions'		5%		-0.22	1%	0.02
government budget deficit		1%		-0.03	9%	0.20
<i>Sub-total</i>		37%		-1.65	2%	-0.05
<b>Total Gap explained</b>		<b>110%</b>			<b>105%</b>	

**Notes:** The observed growth gaps were: Africa-East/Southeast Asia: -3.6%, Africa-Latin America: -0.38%, Africa-Non-Africa: -1.7%. These gaps were then adjusted to reflect differences in the expected rate of convergence. Since Africa is the relatively poorer region, this adjustment "widened" the effective gaps to: Africa-East/Southeast Asia: -4.4%, Africa Latin America: -2.2%, Africa-Non-Africa: -3.6%.

a Difference of average growth rate of working-age population, 1965-1990 and average growth rate of total population over the same period. b Unweighted average of 5 sub-indices 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." See Sachs and Warner (1997) for details. c Average over the period 1970-1990, as proportion of GDP

Figure 1.  
Malaria risk - 1946, 1966, 1994



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