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Poverty and Inequality in Sub-Saharan Africa: Literature Survey and Empirical Assessment

Delfin Go

Africa Department, the World Bank

Denis Nikitin

Development Research Group, the World Bank

Xiongjian Wang

CEMA, Central University

and

Heng-fu Zou

CEMA, Central University
IAS, Wuhan University
Peking University
Development Research Group, the World Bank
1818 H St. NW, Washington, DC 20433, USA.
E-mail: Hzou@worldbank.org

This paper surveys the literature and assesses the magnitude, persistence, and depth of poverty and inequality in Sub-Saharan Africa using empirical analysis. Our analysis explores linkages between three key facts about development in Sub-Saharan Africa: poor economic growth, poor performance in terms of public health indicators, and resilient high-income inequality. Most of the differential between growth rates in Sub-Saharan Africa and other developing countries can be explained by two measures of human capital-secondary enrolment and infant mortality. We also find that the growth trend in Sub-Saharan Africa does not significantly differ from other developing countries that have fallen into a poverty trap.

Key Words: Poverty; Inequality; African Economy.
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1. INTRODUCTION

In the 1960s, when majority of African nations gained independence, the prospects for the economic development of the newly independent African states looked promising. Four decades later, however, Sub-Saharan Africa faces the highest regional poverty rate[1] of 46.4 percent, with 313 million people living below the $1/day poverty line. Moreover the "Africanization" of poverty is increasing: 29 percent of the world's poor lived in Sub-Saharan Africa in 2001 compared it to 11 percent in 1981 (see figure 7).[2],[3]

Deteriorating welfare levels in Sub-Saharan Africa seems even more startling against a backdrop of significant worldwide declines in poverty levels. Chen and Ravallion (2004) estimate that the world poverty rate nearly halved between 1981 and 2001, declining from 40 to 21 percent. Meanwhile the level of poverty in Sub-Saharan Africa increased from 41.6 to 46.4 percent during the same period.[4]

Poverty in Sub-Saharan Africa has not only become more widespread but also much deeper when compared to the rest of the world.[5] As Chen and Ravallion (2004) point out, redistribution toward the poor will not only require higher levels of growth to lift people out of poverty, but also development policies that address the problem of acute and pervasive income/consumption inequality.

The magnitude, persistence, and depth of poverty and inequality in Sub-Saharan Africa calls for a closer look at the evolution of poverty and inequality. This paper surveys the literature on these issues and uses new empirical analysis to assess the magnitude, persistence, and depth of poverty and inequality.

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[1] Proportion of people with consumption equal to or below $1/day.

[2] The poverty figures cited here are reported by Chen and Ravallion (2004). Chen and Ravallion emphasize that "[w]hile Africa is clearly the region in which survey coverage has most improved when compared to our past estimates ... the weakness of our coverage of Africa should be kept in mind when interpreting the results." With this in mind, we will make reference to alternative of poverty-related statistics computed by Artadi and Sala-i-Martin (2003).

[3] Artadi and Sala-i-Martin (2003) estimate a 59 percent poverty rate for Sub-Saharan Africa, with 360 million poor people living in Sub-Saharan Africa, and the share of Sub-Saharan Africa in the total poor population of the world is 42 percent. By their estimates poverty is a predominantly African phenomenon.

[4] Artadi and Sala-i-Martin (2003) estimate that from 1970 to 2000 the world poverty rate declined from 37 to 17 percent, while the SSA poverty rate soared from 48 to 59 percent in the same period. The two sources use different methodologies to derive poverty rate estimates and disagree about the absolute levels of poverty, but one thing is clear- poverty in SSA increased while world poverty declined.

[5] The mean income of the poor in Sub-Saharan Africa fell from $.64 to $.60 between 1981 and 2001, while in the rest of the world the mean income of the poor has been rising over the same period from $.70 to $.77 (Chen and Ravallion , 2004))

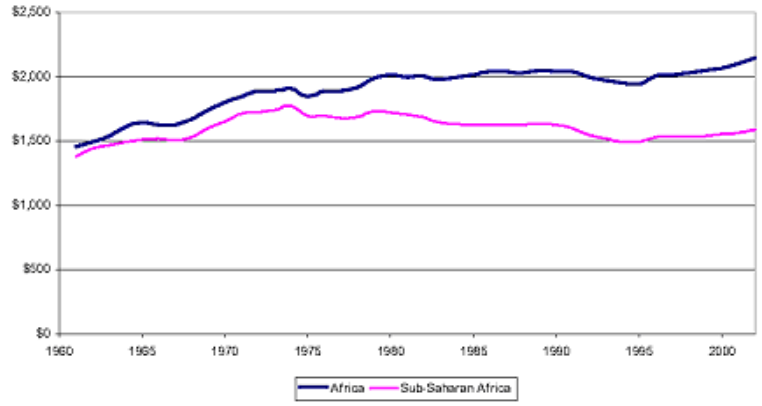
2. EVOLUTION OF INCOME, POVERTY AND INEQUALITY OVER TIME

2.1. Evolution of GDP per capita

The aggregate economic performance of Sub-Saharan Africa (SSA) can be divided into three periods: post-independence growth through the 1960s and the first half of the 1970s, two decades of decline and stagnation after 1975 through 1995, and a period of slow recovery from 1996 onward.[6]

Throughout the 1960s, the economies of Sub-Saharan Africa grew at 2 to 3 percent annually. In the early 1970s SSA per capita GDP continued to grow steadily at about 1.5 percent until 1974, peaking at $1,750. Until 1974 the growth trajectory of SSA was largely similar to North Africa's trajectory, but at a lower income level. The entire African continent along with the rest of the world went into a recession following the oil shocks of 1974. The economies of North Africa recovered from the shock quickly, but for Sub-Saharan economies the oil shock and the recession of 1975 had severe long-term consequences.

FIG. 1. Evolution of per Capita Income in Africa



Source: Artadi and Sala-i-Martin (2003), figure 1.

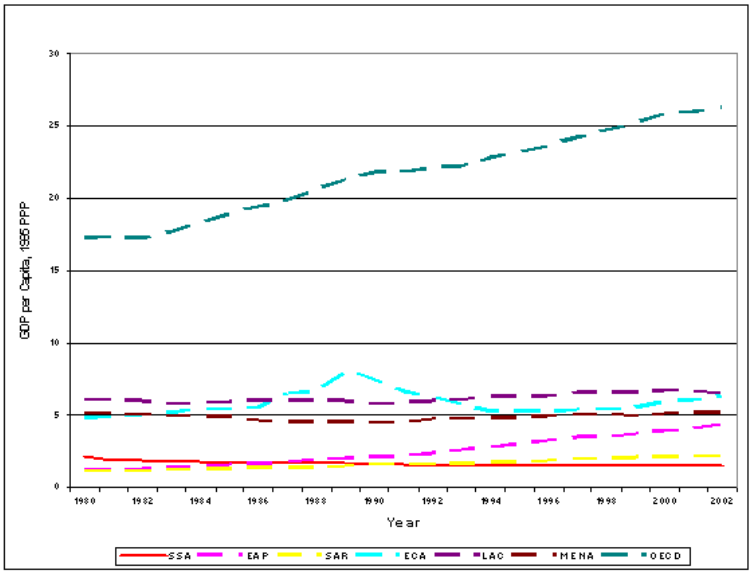
From 1976 onward, one sees a clear divergence in economic growth between North Africa and Sub-Saharan Africa; the former were able to maintain positive-albeit not spectacular-growth, while the latter proceeded to decline until 1995.[7] The average growth rate in SSA dropped to negative 1.2 percent in the second half of the 1970s, oscillated around zero from

[6]See Figure 1; discussion of the SSA's GDP per capita trends is broadly based on the data presented by Artadi and Sala-i-Martin (2003).

[7]The growth rate of SSA averaged negative 0.5 percent in the second half of 1970s, negative 1.2 percent in [year?]

1980 to 1985, and finally reached a record low of 1.5 percent in the first half of the 1990s (figure 1).

FIG. 2. Evolution of GDP per Capita Across Regions, 1980-2002



Source: World Development Indicators

The 1990s proved a crucial decade for Sub-Saharan Africa. After reaching its lowest—since the late 1960s—mark of $1,500[8] in 1993-1995, SSA's mean per capita GDP slowly began to recover; SSA showed positive aggregate growth for the first time since 1980 (figure 2).

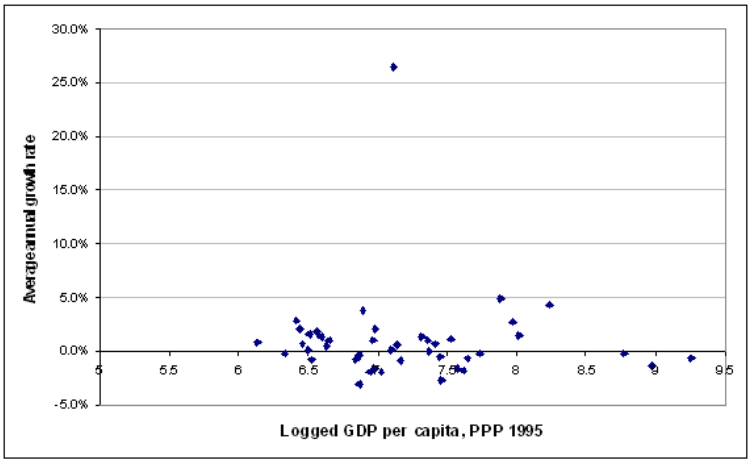
Figure 2 shows the poor economic performance of the Sub-Saharan region since 1980 using World Developments Indicators (WDI) data. In the early 1980s, SSA's level of per capita income, reported in 1995 PPP terms, was approximately the same as East Asia, but over the two decades the two regions diverged sharply. According to WDI data, SSA's per capita income declined by nearly 26 percent during 1980-2002, while East Asia's almost quadrupled.

Aggregate growth indicators for the Sub-Saharan region mask a wide range of cross-country variation, largely independent of average income per capita (figures 3, 4).[9] From 1980 to 2002, 19 out of 43 countries with available data experienced, on average, negative or zero growth. Sierra Leone

[8]Measured in 1999 purchasing power parity-adjusted dollars.

[9]McMillan and Masters (2000) report that SSA had the highest variation in growth rates between 1965 and 1995 than any other region. The coefficient of variation is 2.6 for SSA. The second highest variation in growth rates is reported in Latin America, 1.86.

FIG. 3. Average Annual Growth and GDP Per Capita in SSA Countries, 1980-2002



Source: World Development Indicators.

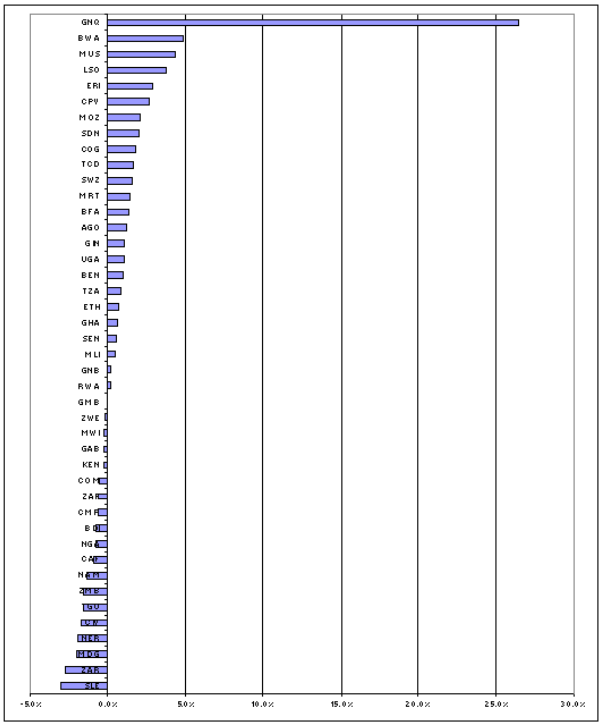
and Zaire display the worst growth record with per capita income contracting at the rate of 3 and 2.7 percent per year, respectively. Equatorial Guinea, on the other hand, experienced the fastest growth in the region, on average 26.5 percent per year, owing of course to the oil boom which began in the mid-1990s. The other top performers are Botswana and Mauritius, where GDP per capita grew of 4.9 and 4.3 percent annually, respectively.

2.2. Evolution of Poverty Indicators

Economic growth is important to poverty reduction. Cross-country regressions indicate that on average, a 3-percent increase in consumption per capita is associated with a 6 to 10 percent reduction in poverty measured as a share of population below the $1/day poverty line. Furthermore, elasticity of poverty depth and severity with respect to consumption is even higher, around −5.6, "indicating that the effects on the poor of growth and contraction in average living standards are not confined to those living near $1 per day" (Ravallion,1995). Even though the income elasticity of poverty may be substantially lower in Sub-Saharan Africa compared to other regions-as Ali (2000) claims-clearly overall economic decline is responsible for growing poverty in SSA.

How has poverty in Africa evolved over time? There is some variation in the estimates of poverty. For example estimates published by Chen and Ravallion (2004) and Artadi and Sala-i-Martin (2003) use different methods and suffer from different limitations. Chen and Ravallion (2004) base their estimates on household consumption data from household surveys; their sample covers only 12 of 46 Sub-Saharan African countries in the 1980s

FIG. 4. Average Annual Growth in SSA Countries, 1980-2002



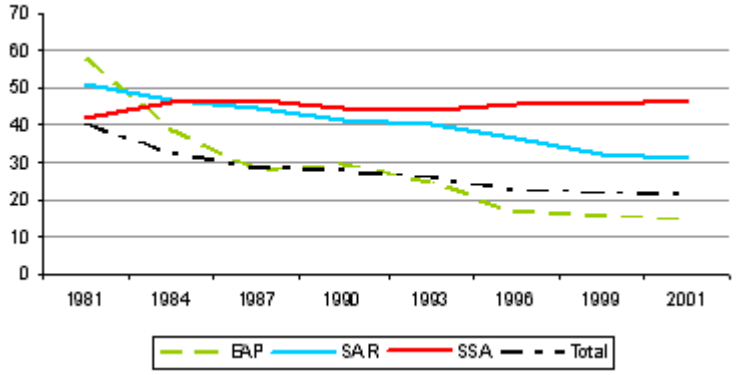
Source: World Development Indicators

Country notation: Angola (AGO), Benin (BEN), Botswana (BWA), Burkina Faso (BFA), Burundi (BDI), Cameroon (CMR), Cape Verde (CPV), Central Afr. Rep. (CAF), Chad (TCD), Comoros (COM), Congo, Dem. Rep. (ZAR), Congo, Rep (COG), Cote d'Ivoire (CIV), Equatorial Guinea (GNQ), Eritrea (ERI), Ethiopia (ETH), Gabon (GAB), Gambia (GMB), Ghana (GHA), Guinea (GIN), Guinea-Bissau (GNB), Kenya (KEN), Lesotho (LSO), Madagascar (MDG), Malawi (MWI), Mali (MLI), Mauritania(MRT), Mauritius (MUS), Mozambique (MOZ), Namibia (NAM), Niger (NER), Nigeria (NGA), Rwanda (RWA), Sao Tome and Pr. (STP), Senegal (SEN), Seychelles (SYC), Sierra Leone (SLE), South Africa (ZAF), Sudan (SDN), Swaziland (SWZ), Tanzania (TZA), Togo (TGO), Uganda (UGA), Zambia (ZMB), Zimbabwe (ZWE).

(mostly late 1980s), 22 in 1990-1995, and 15 in 1996-2000. Artadi and Sala-i-Martin's data seem to cover 35 SSA countries between 1970 and 2000, but for 23 of them the poverty rate calculations rely on imputed distributions and mean per capita GDP from national accounts.

Chen and Ravallion's data show a 12.5-percent increase in the poverty headcount index for Sub-Saharan Africa in 1981-87 from 41.6 to 46.8 percent below the $1/day line. From 1987 to 1993 headcount poverty slightly declined to 44.1 percent, but climbed up to 46.4 percent by 2001 (figure 5 and table 1).

FIG. 5. Headcount Index of Poverty ($1.08 poverty line)



Source: Based on data in Chen and Ravallion (2004), table 3

TABLE 1.

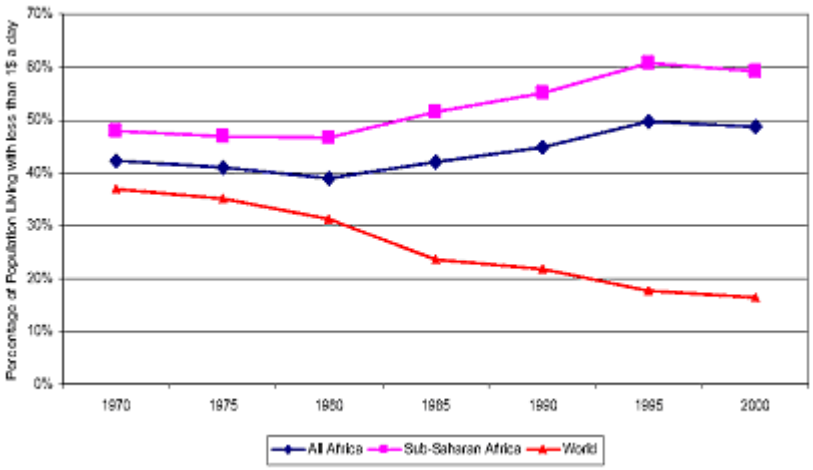
Headcount indices of poverty, $1.08 poverty line

	1981	1984	1987	1990	1993	1996	1999	2001
EAP	57.7	38.9	28	29.6	24.9	16.6	15.7	14.9
ECA	0.7	0.5	0.4	0.5	3.7	4.3	6.3	3.6
LAC	9.7	11.8	10.9	11.3	11.3	10.7	10.5	9.5
MENA	5.1	3.8	3.2	2.3	1.6	2	2.6	2.4
SAR	51.5	46.8	45	41.3	40.1	36.6	32.2	31.3
SSA	41.6	46.3	46.8	44.6	44.1	45.6	45.7	46.4
Total	40.4	32.8	28.4	27.9	26.3	22.8	21.8	21.1

Source: Chen and Ravallion (2004), table 3.

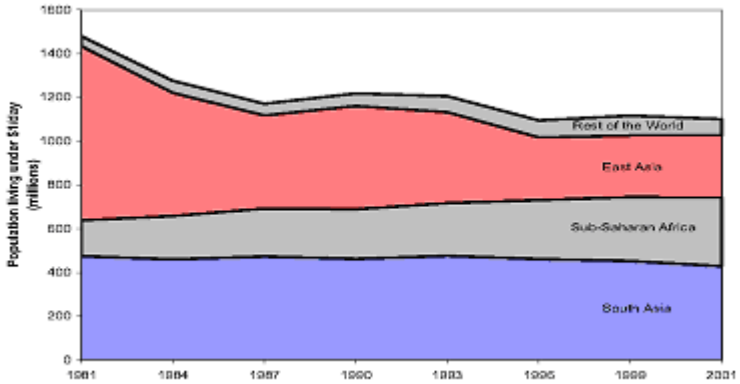
According to Artadi and Sala-i-Martin's (2003) calculations, poverty rates in Sub-Saharan Africa evolved more dramatically (figure 6). They report much higher overall poverty levels than Chen and Ravallion (2004). In 1970 the poverty rate in SSA was around 49 percent and declined to 47 percent by 1980. Poverty soared in the 1980s and early 1990s reaching 60 percent in 1995 following the deterioration of the aggregate per capita income of Sub-Saharan economies. In the second half of the 1990s the poverty rate improved slightly in response to the positive growth in the region after 1995.

FIG. 6. Absolute Consumption Poverty Rates



Source: Artadi and Sala-i-Martin (2003), figure 8.

FIG. 7. Number of poor by region: absolute poverty using $1 per day line



Source: Chen and Ravallion (2004), figure 3.

Despite their differences, Chen and Ravallion (2004) and Artadi and Sala-i-Martin (2003) agree that there has been a tremendous divergence between poverty rates in Sub-Saharan Africa and the rest of the world. While SSA experienced an increase in poverty from the early 1980s to early 2000, the average poverty rate for the world fell tremendously as a result of massive improvements in living standards in East Asia, and in particular China (figure 5). Chen and Ravallion (2004) estimate that in 1981 the average poverty rate for the world was 40.4 percent, only slightly below the SSA

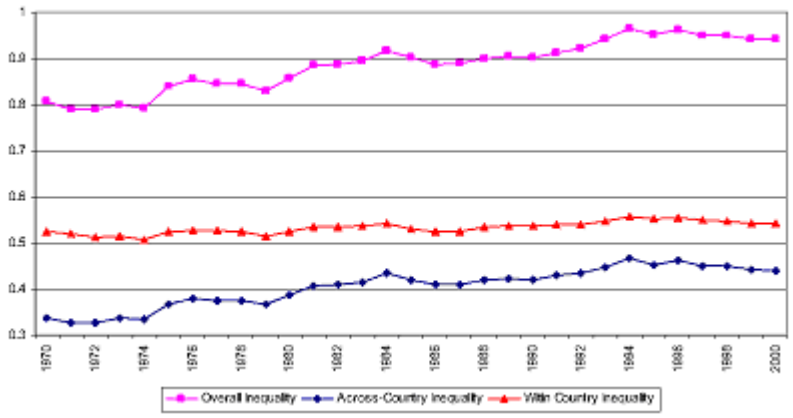
average; yet it fell by nearly a half in 1981-2001 to 21 percent at the same time that poverty increased in SSA by 11.5 percent.

Divergence is even more drastic in Artadi and Sala-i-Martin (2003) and it begins in the 1970s.[10] Even in the 1970s the pace of poverty reduction in Sub-Saharan Africa was slower than in the rest of the world despite the higher initial level of poverty. Between 1980 and 2000, Artadi and Sala-i-Martin (2003) report a nearly 50 percent reduction in the world-wide poverty rate, but estimate a much steeper 27 percent increase in SSA average poverty rate.

2.3. Evolution of Inequality

High incidence of consumption poverty in Sub-Saharan Africa (SSA) is compounded by high levels of income inequality both within and across countries. The landmark Deininger-Squire (1996) data set on inequality ranks the Sub-Saharan region second in terms of income inequality after Latin America. SSA's Gini was 43.5 in the 1980s and 48.95 in the early 1990s; Latin American Gini coefficients were, correspondingly, 49.79 and 49.31.[11] But taking into account SSA's low level of development, as Milanovic (2003) aptly points out, within-country inequality in Africa is higher than in any other region.

FIG. 8. Theil Index for Sub-Saharan Africa



Source: Artadi and Sala-i-Martin (2003), figure 6.

Artadi and Sala-i-Martin (2003) compute the Theil index for Sub-Saharan Africa for the overall, within-country and cross-country income distribu-

[10] Possibly earlier but the data do not go back any further.

[11] There is an issue of adequate coverage and representativeness of these aggregates of the true regional inequalities. Deininger-Squire data set (1996 vintage) includes only 11 (14) Sub-Saharan and 14 (12) Latin American countries in the 1980s (1990s).

tions (figure 8). Overall inequality in the SSA region rose as incomes declined and vice versa.[12] Most of the changes in the overall Theil index were due to changes in cross-country inequality, while within-country inequality showed little variation over time. In this regard, Sub-Saharan economies do not deviate from the worldwide trend for income inequalities to remain stable over time (Li, Squire, and Zou, 1998; Deininger and Squire, 1996). Low temporal variation in inequality is also broadly consistent with the thesis that distributional changes are orthogonal to growth since changes in cross-country distribution reflect differential growth rates of mean per capita income of individual countries in the Sub-Saharan region.

The evidence from microeconomic studies using household-level data suggests that economic growth in Sub-Saharan Africa since 1995-albeit low-has been pro-poor in the aggregate. That is, overall the poor in Sub-Saharan Africa benefited from growth, despite some adverse distributional shifts in favor of the better-off (Christiansen and others, 2002).

Deininger and Olinto (2000) focus on distribution of assets, specifically land, and point out that land inequality in SSA is high by international standards. In 1986-90, SSA's land Gini of 0.61 was substantially smaller than Latin America's and N. America's Ginis which were 0.81 and 0.64, respectively. These results are however confounded by the insufficient coverage of the Sub-Saharan region: only seven countries were covered.

2.4. Non-Economic Aspects of Welfare

Poverty could be defined broadly "as encompassing not only material deprivation (measured by an appropriate concept of income or consumption) but also low achievements in education and health."[13] Indeed, health and education outcomes are often correlated with income (Deaton, 1999) and those who lack income are disadvantaged in many other respects as well. By the same token, public provision of health and education weakens the link from individual/household income to educational and health outcomes. Consequently, it would be erroneous to conclude that all the needs of a poor person are unmet because his/her income is below some minimum threshold.

Following this line of thought, Lopes (2005) notes that "it stands to reason that if some of the most essential goods and services become increasingly available to the poor, not only is their state of poverty-related deprivation lessened, but so is their inequality relative to others who already had access to such goods and services." From the point of view that

[12] The overall Theil index increases from 0.8 in 1970 to 0.97 in 1994 and then declines slightly to 0.95 in 2000. The increase in the overall inequality in 1970-94 corresponds to the period of economic decline of Sub-Saharan Africa as a whole; correspondingly, as growth in the region picked up, inequality index went down.

[13] World Development Report (2000), p. 15.

welfare is essentially about satisfaction of human needs and poverty is a lack of such satisfaction, levels of income poverty and income inequality give us a skewed view about the welfare of the poor.

The methodology of UN's Human Development Reports addresses the multi-dimensionality of poverty by using a composite measure of human welfare, the human development index (HDI), an average of three differentially weighted components-income per capita, infant mortality, and life expectancy at birth. While HDI helps to capture important facts about welfare, this methodology drew some criticism because of subjective weighting of components, as well as arbitrary selection of indicators and a bias in the direction of developing nations. To account for the multi-dimensionality of poverty and inequality, we consider health and education outcomes in addition to income-consumption measures of welfare separately.

TABLE 2.

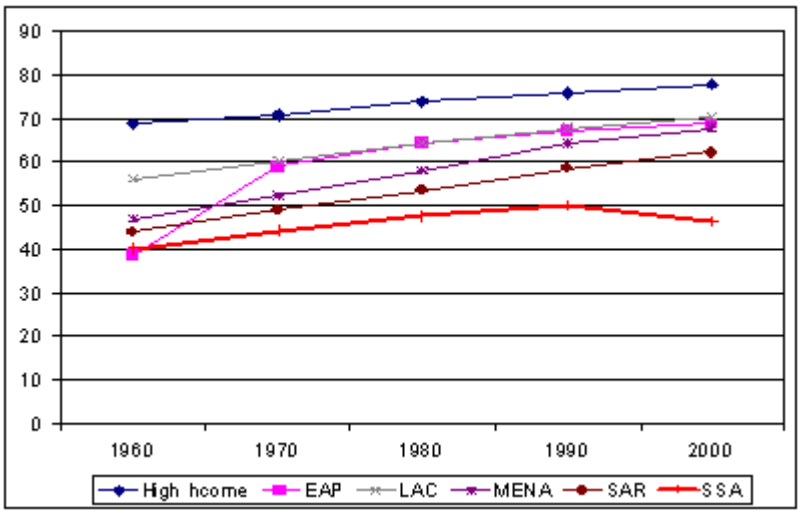
Levels and annual rates of change in LEB, 1960-2000

LEB	Levels					Average annual % rate of change			
	1960	1970	1980	1990	2000	60-70	70-80	80-90	90-00
High income countries	68.9	70.9	73.8	75.9	77.9	0.28	0.40	0.29	0.25
Low& middle incombe countries	44.4	55.2	60.0	63.1	64.4	2.20	0.83	0.50	0.20
-Low& Middle Income (excl. China & India)	48.8	53.8	58.6	61.7	62.2	0.99	0.85	0.53	0.08
-East Asia & Pacific	38.8*	59.1	64.3	67.2	69.0	4.29*	0.86	0.43	0.27
-China	36.3*	61.7	66.8	68.9	70.3	5.45*	0.80	0.30	0.20
-East Asia & Pacific (excl. China)	45.9	51.7	57.8	63.0	66.0	1.21	1.13	0.86	0.47
-Eastern Europe & Central Asia	65.5	67.9	67.7	69.4	68.5	0.37	−0.03	0.24	−0.12
-Latin America & Caribbean	56.3	60.4	64.6	67.9	70.3	0.71	0.67	0.50	0.35
-Middle East & North Africa	46.9	52.3	58.1	64.3	67.9	1.09	1.06	1.02	0.55
-South Asia	43.9	48.9	53.6	58.5	62.4	1.08	0.93	0.88	0.66
-India	44.3	49.4	54.2	59.1	62.9	1.08	0.93	0.88	0.62
-South Asia (excl. India)	42.3	47.1	51.7	56.5	61.0	1.08	0.94	0.88	0.77
-Sub-Saharan Africa	40.2	44.2	47.6	50.0	46.5	0.94	0.75	0.48	−0.71
World	50.2*	58.6	62.6	65.3	66.5	1.55*	0.65	0.42	0.19
World excluding SSA	50.2*	58.6	62.6	65.3	66.5	1.55*	0.65	0.42	0.19
World excluding SSA and EECA	50.1*	59.4	63.5	66.6	68.9	1.72*	0.67	0.48	0.34

source: authors' calculations on WDI (2004) and UN Population Prospects, 2000 Revision (2002).
Notes: the regional aggregates include only developing countries (e.g. East Asia dose not include Japan);
* values are influenced by the famine that hit China during the Big Leap Forward of 1959-1961.
Source: Cornia and Menchini (2005), table 5.

Emphasis on health and educational outcomes has serious implications for Sub-Saharan Africa. Despite the declining per capita income and rising poverty rate, health and education indicators showed consistent improvement during the 1960s, 1970s and the 1980s. According to Cornia and

FIG. 9. Life Expectancy at Birth, 1960-2000



Source: Based on data in Cornia and Menchini, 2005.

Menchini (2005), life expectancy at birth (LEB)[14] grew at 0.94 percent per year in the 1960s, 0.75 percent in the 1970s and 0.48 percent in the 1980s (figure 9 and table 2). During the 1990s, however, LEB significantly declined at the annual rate of 0.7 percent. Europe and Central Asia was the only other region that experience a decline in health indicators in the 1990s, but the decline in SSA is much more alarming given its low initial level of LEB (46.5 years versus 68.5 years in ECA in 2000).

Even though there was positive growth in health outcomes in SSA, the pace of improvement in the rest of the world was considerably higher. For instance, in 1960-90, during the period of positive gains in health, LEB increased by 24.4 percent in SSA, while in the rest of the world LEB grew by 33.3 percent. When compared with East Asia and the Pacific, the divergence of the Sub-Saharan trend is even more striking. In 1960 the life expectancy in SSA and EAP was approximately the same, around 40 percent, yet by 1990 life expectancy in EAP increased by nearly 77 percent.

Looking beyond regional aggregates, Sahn and Stifel (2003) report declines in infant mortality rates in all but four countries (Kenya, Cameroon, Zambia and Zimbabwe) out of 24 with available Demographic and Health Survey (DHS) data.

Health is one of the key determinants of long-term-growth and SSA's secular improvement in health-despite the decline in living standards-inspires

[14]The trend in infant (see Table 3) and under-five mortality are similar to trends in LEB and are not discussed here. For more information see Cornia and Menchini (2005).

TABLE 3.

Levels and annual average percentage rates of change in IMR, 1960-2000

	Levels					Average annual rate of change			
	1960	1970	1980	1990	2000	60-70	70-80	80-90	90-00
High income countries	36	22	12	8	6	−4.8	−5.9	−4.0	−2.8
Low & middle incombe countries	138	107	86	69	62	−2.5	−2.2	−2.2	−1.1
Low & Middle Income (excl. China & India)	129	111	94	75	70	−1.4	−1.7	−2.2	−0.7
-East Asia & Pacific	134*	85	56	43	34	−4.4*	−4.1	−2.6	−2.3
-China	150*	85	49	38	32	−5.5*	−5.4	−2.5	−1.7
-East Asia & Pacific excl. China	91	85	72	52	38	−0.7	−1.7	−3.1	−3.2
-Eastern Europe & Central Asia	68	53	45	37	32	−2.5	−1.6	−1.9	−1.4
-Latin America & Caribbean	102	86	61	43	31	−1.7	−3.4	−3.4	−3.2
-Middle East & North Africa	163	131	94	57	46	−2.2	−3.3	−4.9	−2.1
-South Asia	147	129	115	88	71	−1.3	−1.1	−2.6	−2.1
-India	146	127	113	84	68	−1.4	−1.2	−2.9	−2.1
-South Asia (excl. India)	150	135	121	99	79	−1.0	−1.1	−2.0	−2.3
-Sub-Saharan Africa	164	141	116	110**	104**	−1.5	−1.9	−0.5**	0.6**
World	122	97	79	64	57	−2.3	−2.0	−2.1	−1.2
World excluding SSA	115	91	72	54	45	−2.3	−2.2	−2.8	−1.9
World excluding SSA and EECA	119	93	75	56	45	−2.4	−2.2	−2.9	−2.0

Source: authors' calculations on WDI (2004) and UN Population Prospects, 2000 Revision (2002).
Notes: * these values are influenced by the famine that hit China during the 1959-1961 Big Leap Forward;
** The WDI IMR data for Sub-Saharan Africa for the 1980s ans 1990s have been recently revised and describe a less dramatic trend in the 1990s as they spread the deterioration over the last two decades. Such revision is however puzzling as a main factor in infant and child mortality has been the rise in HIV adult prevalence rate, a phenomenon that has sharply accelerated in the 1990s in relation to the 1980s.
Source: Cornia and Menchini (2005), table 7.

hope about Southern Africa's economic development. By the same token, the decline in life expectancy, infant and under-five mortality due to the HIV/AIDS epidemic has the potential of undermining these positive prospects.

2.5. What Inequalities?

While unequal distribution of economic and social outcomes (income, wealth, expenditure, access to health and education, etc.) has the prima facie importance as determinants of future growth, these inequalities themselves could reflect other societal features. Taking such inequalities at face value and addressing them as such would be a serious mistake: if income inequalities are markers of some underlying characteristic, e.g., status, power, position in a social hierarchy, ethnicity, race, or gender, a policy targeting income redistribution is bound to prove ineffective. In a study of mortality

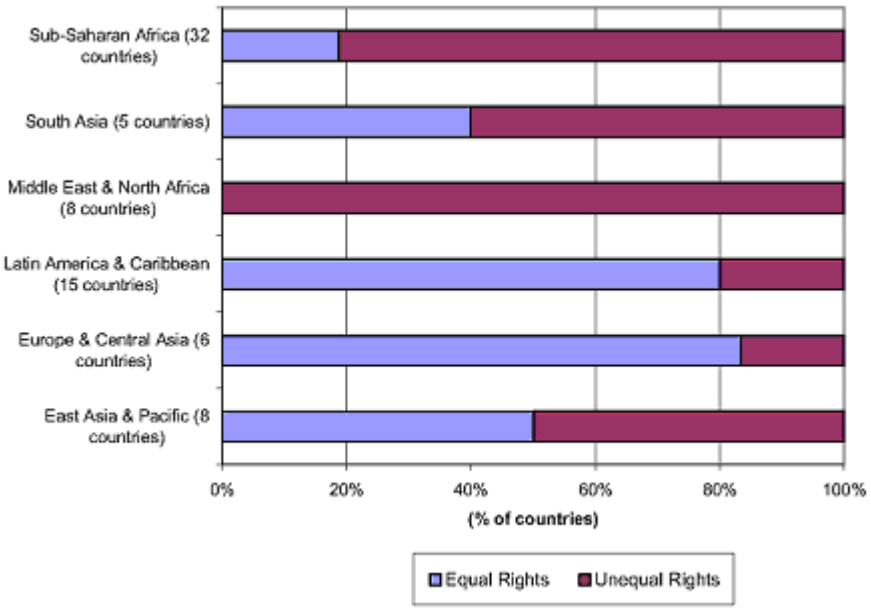
rates in U.S. cities and states, Deaton and Lubotsky (2003) demonstrate that the effect of inequality on mortality conceals the effect of racial composition of communities. A policy which changes distribution of disposable income per se is unlikely to lead to sustainable improvements in distribution of health outcomes (Deaton, 2003). Cornia and Menchini (2005) also argue that without addressing across-group differentials in health, overall progress is unlikely to erase those differences. On the contrary, "targeting health intervention on the deprived groups would permit to achieve faster average improvements than if it were directed to the general population" (p. 3).

Across-group differences, such as gender, type of residence (urban versus rural), membership in a social class, ethnicity, or race, contribute-at times substantially-to overall inequality. These group differences are morally problematic themselves and do not justify inequality, despite the fact that they "explain" it well in a regression context as significant right-hand side variables. Indeed they are indicators of the exclusions underpinning the skewed distribution of economic and social outcomes.

How do Sub-Saharan African countries fare with regard to between-group inequalities? Araujo, Schady and Ferreira (2004) report that between-gender disparity in education (years of schooling) declined substantially in SSA over the last four decades. The differential in educational attainment across sexes among the 1975-79 birth cohort is 41 percent lower than among the 1935-39 birth cohort. Lloyd (forthcoming) points to sizable across-gender inequality in the access to inheritance rights; women and men have equal inheritance rights in only 6 of 32 Sub-Saharan countries in her sample. Only in one other region, Middle East and North Africa, do women fare worse in terms of access to equal inheritance rights (figure 10).

The differential between rural and urban areas in Sub-Saharan countries is substantial and has remained fairly constant over time. Sahn and Stifel (2000) calculate relative poverty lines for 11 SSA countries. For each country the poverty lines are set at the 25th and 40th percentile of the national distribution. In all countries poverty is largely a rural phenomenon; rural poverty headcounts are many times higher than the urban ones. Zimbabwe in 1992 provides the most striking example of rural-urban differences in poverty incidence; the rural poverty headcount was 164 times higher than in urban areas. In Zambia in 1992 and in Kenya in 1993, rural poverty rates were respectively 37 and 27 times higher than the urban rates. Despite the overall decline in poverty in the 1990s, the gap between the rural and urban areas in terms of poverty incidence has increased in the majority of the sampled countries, because urban poverty rates declined faster than the rural ones. Poverty proves particularly resilient in rural areas (table 4).

FIG. 10. Access of Women to Equal Inheritance Rights, by Region (percentage of countries)



Source: Lloyd (forthcoming).

The urban-rural difference is pronounced in education as well (table 5). In 10 countries reported by Sahn and Stifel (2003), the rural enrolment rate of 6 to 14 year-olds is substantially lower than in urban areas. And while in one half of the reported countries we observe convergence in rural and urban enrolment, in the other half the rural-urban gap grew in the 1990s. There is interaction between across-gender differences and the urban-rural differences (table 6): girls-to-boys primary enrolment ratios were lower in the rural areas (Sahn and Stifel, 2003).

Cornia and Menchini (2005) calculate rural-urban differentials in infant mortality rates (IMR) for 13 countries in SSA in the mid-late 1980s to mid-late 1990s (table 7). Over the entire coverage period all 13 countries rural areas have higher IMR and in 10 countries the rural-urban gap is at least 10 percent. Over time, there is no clear trend toward convergence or divergence between rural and urban IMR in SSA.[15]

Wodon (2005) reports substantial differences between urban and rural areas in 15 African countries with regard to access to health. Drawing

[15]Between the mid-1980s and late 1990s, five SSA countries experienced a rise in rural-urban IMR gap, in six countries the gap declined and in two countries it remained the same.

TABLE 4.

Poverty Headcount Using the 25 Percentile* Relative Poverty Line

		National poverty headcount			Urban poverty headcount			Rural poverty headcount			Rural-urban gap**	
Country	Years of survey	1st year	2nd year	Change	1st year	2nd year	Change	1st year	2nd year	Change	1st year	2nd year
Cameroon	(1991,1997)	27.11	24.48	−2.63	9.56	6.55	−3.01	37.76	33.6	−4.16	4	5
Ghana	(1988,1993)	24.97	8.54	−16.43	3.77	0.82	−2.95	34.72	13.91	−20.81	9	17
Kenya	(1988,1993)	25.45	25.09	−0.36	1.72	1.11	−0.61	30.79	30.15	−0.64	18	27
Kenya	(1993,1998)	25.09	21.37	−3.72	1.11	1.2	0.09	30.15	27.18	−2.97	27	23
Kenya	(1988,1998)	25.45	21.37	−4.08	1.72	1.2	−0.52	30.79	27.18	−3.61	18	23
Madagascar	(1992,1997)	25.47	12.5	−12.97	2.93	5.81	2.88	29.86	14.68	−15.18	10	3
Mali	(1987,1995)	23.02	16.02	−7	3.12	2.1	−1.02	29.46	22.03	−7.43	9	10
Senegal	(1986,1992)	24.58	28.8	4.22	2.8	2.66	−0.14	36.78	47.61	10.83	13	18
Senegal	(1992,1997)	28.8	24.67	−4.13	2.66	1.59	−1.07	47.61	40.29	−7.32	18	25
Senegal	(1986,1997)	24.58	24.67	0.09	2.8	1.59	−1.21	36.78	40.29	3.51	13	25
Tanzania	(1991,1996)	22.6	19.13	−3.47	3.73	2.13	−1.6	28.65	24.01	−4.64	8	11
Togo	(1988,1998)	25.04	20.15	−4.89	4.9	1.71	−3.19	34.94	29.87	−5.07	7	17
Uganda	(1988,1995)	26.77	24.35	−2.42	3.12	3.3	0.18	29.59	27.75	−1.84	9	8
Zambia	(1992,1996)	24.87	18.21	−6.66	1.18	0.73	−0.45	44.02	28.49	−15.53	37	39
Zimbabwe	(1988,1994)	23.33	30.11	6.78	0.21	1.01	0.8	34.51	43.58	9.07	164	43

* Twenty-fifth percentile of the asset index.
** Rural-urban gap = Rural P0 / Urban P0.
Source: Adapted from Sahn and Stifel (2000), table 2; data comes from DHS surveys.

on household data, he reports that on average only one-half of the rural households live within an hour of a health center.

On the one hand, education is an outcome of other group differences; while on the other, to the extent that education serves as one of the markers of social status, differences across groups with different education levels capture an important dimension of inequality based on social class, again a morally irrelevant difference. Cornia and Menchini (2005) report differentials between infant mortality rates among newborns to mothers with no education and to mothers with a primary education (table 8). For thirteen SSA countries included in their sample, the authors report 31 valid observations of differences across educational groups for the mid-late 1980s, early 1990s and mid-late 1990s. In 23 of these 31 cases the differentials, IMR among children of mothers with no schooling is at least 5 percent higher than among children whose mothers had primary schooling.[16]

[16]In 15 cases IMR was at least than 20 percent higher of children of mothers with no schooling.

TABLE 5.

Enrolment rates for children age 6-14.

Country and year	Enrolment in first year	Enrolment in last year	Change between first and last year	t-test of difference*
Burkina Faso (1992, 1999)				
National	26.9	24.8	−7.8%	
Urban	65.4	68.8	5.2%	
Rural	19.5	18.3	−6.2%	
Cameroon (1991,1998)				
National	68.4	74.5	8.9%	
Urban	76.7	86.7	13.0%	
Rural	63.6	68.9	8.3%	
Ghana (1993,1998)				
National	76	77.2	1.6%	not sig.
Urban	86.4	87.1	0.8%	not sig.
Rural	71.3	73.2	2.7%	
Kenya (1993,1998)				
National	76.8	87.4	13.8%	
Urban	78.7	88	11.8%	
Rural	76.6	87.3	14.0%	
Madagascar (1992,1997)				
National	56.2	58.1	3.4%	
Urban	79.7	76.7	−3.8%	
Rural	52.2	52.4	0.4%	not sig.
Niger (1992,1997)				
National	16.1	22.9	42.2%	
Urban	44.2	55.5	25.6%	
Rural	10.3	14.6	41.7%	
Nigeria (1990,1999)				
National	56.7	64.7	14.1%	
Urban	75.3	77.8	3.3%	
Rural	50.8	59.4	16.9%	
Tanzania (1991,1996, 1999)				
National	46.5	49.6	6.7%	
Urban	51.8	66.7	28.8%	
Rural	45.1	45.3	0.4%	not sig.
Zambia (1992,1996)				
National	70.8	60.2	−15.0%	
Urban	83.2	72.9	−12.4%	
Rural	59.3	52.3	−11.8%	

TABLE 5—*Continued*

Country and year	Enrolment in first year	Enrolment in last year	Change between first and last year	t-test of difference*
Zimbabwe (1988,1994)				
National	84.9	83.3	−1.9%	
Urban	90.7	87.4	−3.6%	
Rural	83.4	82.1	−1.6%	

* Not significant if fails t-test at 90% level of confidence.
Source: Adapted from Sahn and Stifel (2002), table 3, using DHS data.

TABLE 6.

Ratio of Girls-to-Boys Enrolled in Primary and Secondary Schools

Country and year	Enrolment in first year	Enrolment in last year	Change between first and last year	t-test of difference*
Burkina Faso (1992, 1999)				
National	66	67.5	2.3%	not sig.
Urban	79.4	90.7	14.2%	
Rural	56	53.4	−4.6%	not sig.
Cameroon (1991,1998)				
National	86.2	87	0.9%	not sig.
Urban	91.2	91.1	−0.1%	not sig.
Rural	82.1	83.3	1.5%	not sig.
Ghana (1993,1998)				
National	81	86.6	6.9%	
Urban	90	89.8	−0.2%	not sig.
Rural	76.2	85	11.5%	
Kenya (1993,1998)				
National	98	93.6	−4.5%	
Urban	101.5	92.7	−8.7%	not sig.
Rural	97.6	93.7	−4.0%	not sig.
Madagascar (1992,1997)				
National	94	91.9	−2.2%	not sig.
Urban	96.3	84.7	−12.0%	
Rural	93.1	96.2	3.3%	not sig.
Niger (1992,1997)				
National	56.3	65.8	16.9%	
Urban	77	85.8	11.4%	
Rural	39.1	46.8	19.7%	

3. CAUSES OF POVERTY AND INEQUALITY

To summarize, we have observed several facts about the evolution of income, poverty and inequality in Sub-Saharan Africa. First, from the

TABLE 6—*Continued*

Country and year	Enrolment in first year	Enrolment in last year	Change between first and last year	t-test of difference*
Nigeria (1990,1999)				
National	81.2	83.6	3.0%	not sig.
Urban	91.5	86.7	−5.2%	not sig.
Rural	76.6	81.8	6.8%	
Tanzania (1991,1996, 1999)				
National	88.3	105.2	19.1%	
Urban	80.4	111.4	38.6%	
Rural	91	103	13.2%	
Zambia (1992,1996)				
National	92.2	88.3	−4.2%	not sig.
Urban	97.9	92.1	−5.9%	not sig.
Rural	84.7	84.8	0.1%	not sig.
Zimbabwe (1988,1994)				
National	90.2	91.6	1.6%	not sig.
Urban	93.5	97.3	4.1%	not sig.
Rural	89.3	89.7	0.4%	not sig.

* Not significant if fails t-test at 90% level of confidence.
Source: Sahn and Stifel (2002), table 4, using DHS data.

mid-1970s to the mid-1990s Sub-Saharan economies were in a period of economic decline, but showed slow recovery since 1996. Second, during this time income poverty steadily increased, notwithstanding the differences in estimates of the extent of the increase. Notably, poverty in SSA grew while the rest of the world experienced a dramatic reduction in poverty rates. In terms of education and health outcomes, people's welfare in Sub-Saharan Africa improved in the 1960s, 1970s and 1980s, but deteriorated in the 1990s. Third, SSA has one of the highest average regional income inequality levels, and high income inequality within countries has remained more or less constant over the last four decades, despite the fact that between-gender inequality in educational attainment has dramatically declined. The rural-urban gap did not show any systematic improvement for the Sub-Saharan region as a whole. In the vast majority of Sub-Saharan countries, poverty-measured in economic terms as well as in terms of access to health and education-is concentrated in rural areas.

3.1. Growth and Inequality Effects on Poverty-Reduction

Growth leads to poverty reduction, yet income elasticity of poverty varies across countries, that is in different countries a unit increase in income leads to more or less poverty reduction. The rate at which income growth trans-

TABLE 7.

IMR by Rural/Urban Residence in Selected Countries

Country	Mid-late-80s				Early-90s				Mid-late-90s			
	IMR	Urban IMR	Rural IMR	R/U Ratio	IMR	Urban IMR	Rural IMR	R/U Ratio	IMR	Urban IMR	Ryral IMR	R/U Ratio
B. Faso					104	71	110	1.54	111	64	116	1.81
Cameroon	63	61	64	1.05					76	75	76	1.01
Ghana	89	75	94	1.26	62	50	66	1.31	64	48	69	1.43
Kenya	71	69	72	1.03	71	74	71	0.96	68	54	71	1.33
Madagascar	95	63	100	1.58					81	89	79	0.89
Mali	142	98	156	1.59	109	80	119	1.49				
Niger	134	84	144	1.70					91	58	98	1.70
Senegal	109	94	117	1.24	72	50	83	1.65	80	56	912	1.63
Tanzania	91	121	83	0.69	90	68	95	1.40				
Togo	97	83	102	1.24					69	61	71	1.17
Uganda	121	114	122	1.07	76	79	75	0.96				
Zambia	110	90	126	1.41	115	113	117	1.04				
Zimbabwe	55	36	62	1.72	54	47	57	1.23				
Bolivia	91	77	105	1.36	65	56	76	1.35	67	47	92	1.98
Brazil	75	55	116	2.10	79	59	100	1.68	41	32	68	2.13
Colombia	36	36	39	1.11					33	30	37	1.23
Peru	94	64	127	1.98	54	37	80	2.14	47	33	68	2.08
Guatemala	89	72	96	1.34	53	37	61	1.66				
Dominican R	70	70	70	1.00					51	41	64	1.56
Egypt	70	50	81	1.63	65	47	76	1.61				
Indonesia	73	55	80	1.46	68	34	81	2.41	46	31	52	1.67

Source: authors' calculations on selected DHS
Source: Cornia and Menchini (2005), table 12.

TABLE 8.

IMR by Mother's Education Level in Selected Countries

Country	Mid-late-80s			Early 90s			mid- and late-90s		
	Panel A								
	IMR No educ	IMR Prim educ	No educ/ primary	IMR No educ	IMR Prim educ	noed/prin ratio	IMR No educ	IMR Prim educ	Noed/prin ratio
B. Faso				105	107	0.99	113	88	1.28
Cameroon	96	43	2.25				92	73	1.26
Ghana	97	81	1.20	75	56	1.33	67	71	0.94
Kenya	84	73	1.13	68	81	0.84	72	89	0.81
Madagscar	121	102	1.18				107	79	1.36
Mali	152	77	1.97	111	100	−1.11			
Niger	138	116	1.19				94	71	1.32
Senegal	114	84	1.35	78	56	1.39	85	73	1.17
Tanzania	90	92	0.98	115	82	1.40			
Togo	101	98	1.03				68	72	0.95
Uganda	127	119	1.07	81	77	1.05			
Zambia	134	109	1.23	119	119	1.00			
Zimbabwe	79	49	1.60	66	60	1.11			
Egypt	81	66	1.24	91	51	1.79			
Indonesia									
Bolivia	120	103	1.17	96	79	1.21	99	84	1.18
Brazil	106	82	1.29	135	63	2.14	102	53	1.94
Peru	177	100	1.77	84	78	1.08	69	62	1.12
Guatemala	93	94	0.98	67	51	1.32	48	59	0.82

lates into poverty reduction depends on the distributional changes which accompany growth; if growth is associated with more equitable income distribution, then poverty declines elastically with respect to growth.

Even in the absence of distributional shifts, a given rate of growth may be associated with a range of poverty outcomes due to the effect of initial inequalities. In countries with higher initial inequality, growth "buys" less poverty reduction because it is likely to take greater growth to lift a person out of poverty. In addition to attenuating the poverty-reducing effect of growth, initial inequality can hinder growth itself. Initial inequality affects growth by undermining economic efficiency, impeding social cooperation and collective action, producing dysfunctional institutions and policies, contributing to political instability, etc. (World Bank, 2000).

High and persistent within-country income inequality in Sub-Saharan economies (Artadi and Sala-i-Martin, 2003; Milanovic, 2003) and slow or negative growth are consistent with the thesis that high initial inequality

TABLE 8—*Continued*

Country	Mid-late-80s			Early 90s			mid- and late-90s		
Panel B									
	IMR 2ary eduction	No-educ/ secondary	Primary/ secondary	IMR 2ary eduction	No-educ/ secondary	Primary/ secondary	IMR 2ary eduction	No-educ/ secondary	Primary/ secondary
Cameroon	41	2.36	1.05				61	1.51	1.19
Kenya	46	1.79	1.58	48	1.42	1.7	41	1.77	2.19
Madagascar	52	2.31	1.95				53	2.02	1.49
Zambia	89	1.49	1.21	102	1.16	1.17			
Zimbabwe	50	1.57	0.98	45	1.48	1.33			
Egypt	50	1.64	1.32	40	2.28	1.27			
Indonesia									
Bolivia	50	2.40	2.06	35	2.72	2.25	37	2.67	2.26
Brazil	20	5.21	4.02	25	5.39	2.52	25	4.16	2.15
Peru	47	3.74	2.11	29	2.85	2.65	31	2.23	1.99
Domin. Rep.	58		1.30	30		1.58	36		1.54

Source: authors' estimates on selected DHS
Source: Cornia and Menchini (2005), table 14.

stunts development. According to this thesis, the fact that income inequality has shown little recovery over the past three decades suggests that it will continue to undermine future growth efforts. Contemporaneous inequality[17], however, has been reported to have no systematic relationship to income growth (Ravallion, 1995) as proposed, for instance, by the famous Kuznetz hypothesis.

Deininger and Olinto (2000) find that asset inequality, specifically distribution of land, has an economically significant negative effect on growth; additionally, higher land inequality significantly lowers returns to education, thus slowing accumulation of human capital and impeding development.

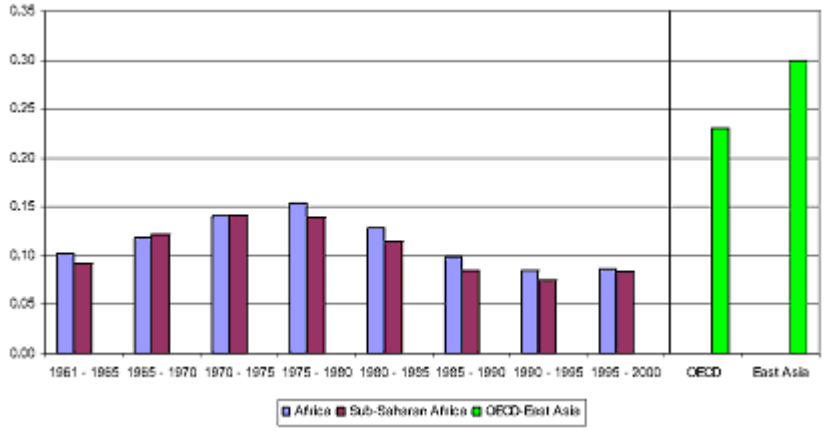
3.2. Investment

Investment is crucial to growth both in the classic Solow model and in the endogenous growth model. Both models suggest that growth in Sub-Saharan Africa is correlated with investment. Artadi and Sala-i-Martin (2003) report that over the last 40 years investment in Sub-Saharan Africa averaged at 12 percent, while in OECD countries the investment rate over the same period was around 23 percent and for East Asian countries the investment rate was 30 percent, on average. Time-wise, investment in SSA peaked around 1974 at around 14 percent, after which it started to decline

[17]Proxied by Gini coefficients.

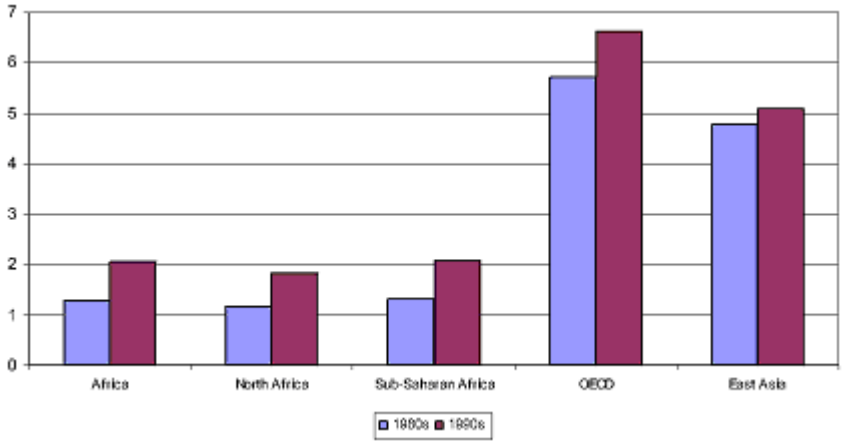
up until the mid-1990s, dropping to 7.5 percent, the level of 1950s (figure 11).

FIG. 11. Figure 11: Total Investment Rates



Source: Artadi and Sala-i-Martin (2003), figure 10.

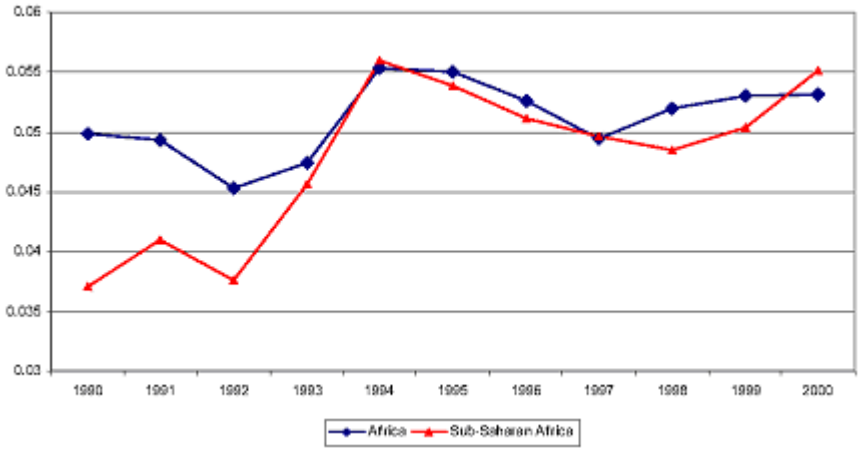
FIG. 12. Private to Public Investment Ratio



Source: Artadi and Sala-i-Martin (2003), figure 11.

Public investment accounts for the greater part of total investment in SSA (figures 12 and 13). Since public investment often reflects political agendas of the government-as opposed to economic consideration-it is considered much less productive than private investment and thus less likely to generate growth. Growth-inducing private investment in Sub-Saharan Africa constituted only 12 percent of public investment in the 1980s and

FIG. 13. Private Investment in 1990s



Source: Artadi and Sala-i-Martin (2003), figure 12.

21 percent in the 1990s. By comparison, in OECD countries, private to public investment ratio was at 57 percent in the 1980s and at 66 percent in the 1990s.

Notably, the private to public investment ratio in North Africa was even slightly lower than those for Sub-Saharan Africa, yet North African economies showed positive if modest growth during the 1980s and 1990s. This suggests that the link between public investment and growth is more complex: public investment promoted growth as in North Africa, but in SSA it was particularly unproductive.

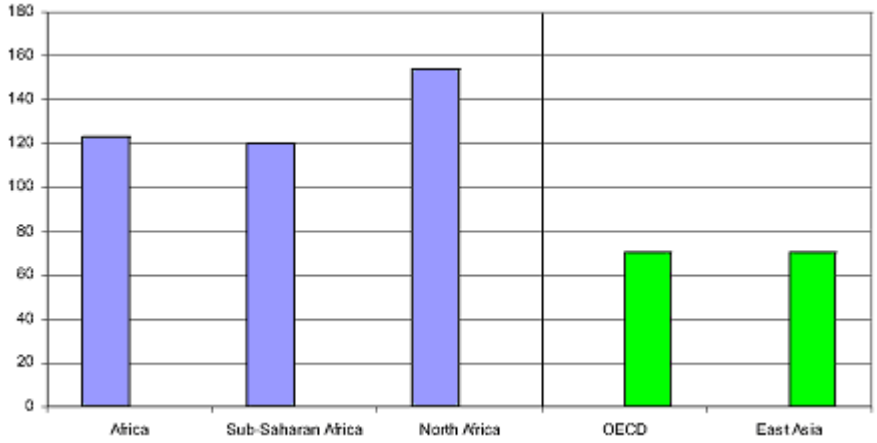
Why was the investment rate, especially the private investment rate, so low in SSA? And why was public investment so unproductive?

3.3. Investment Climate

Investment is bound to be low when the expected returns on investment are low. In Sub-Saharan Africa, the rate of return on investment was equivalent to approximately 1/3 of the average rate of return to investment in other regions (Collier and Pattillo, 2000). Investing in Sub-Saharan countries appears less lucrative than in other places. The relative costs of investment, on the other hand, are considerable.

Sala-i-Martin and others (2004) conclude that the relative price of investment is a robust determinant of log-term growth: economies where the price of investment goods relative to consumption goods is high tend to grow slower. Sub-Saharan African countries fit this pattern: by comparison with OECD or East Asia, the relative price of investment goods in Sub-Saharan Africa seems prohibitively high (figure 14). Specifically, the

FIG. 14. Relative Price of Investment



Source: Artadi and Sala-i-Martin (2003), figure 13.

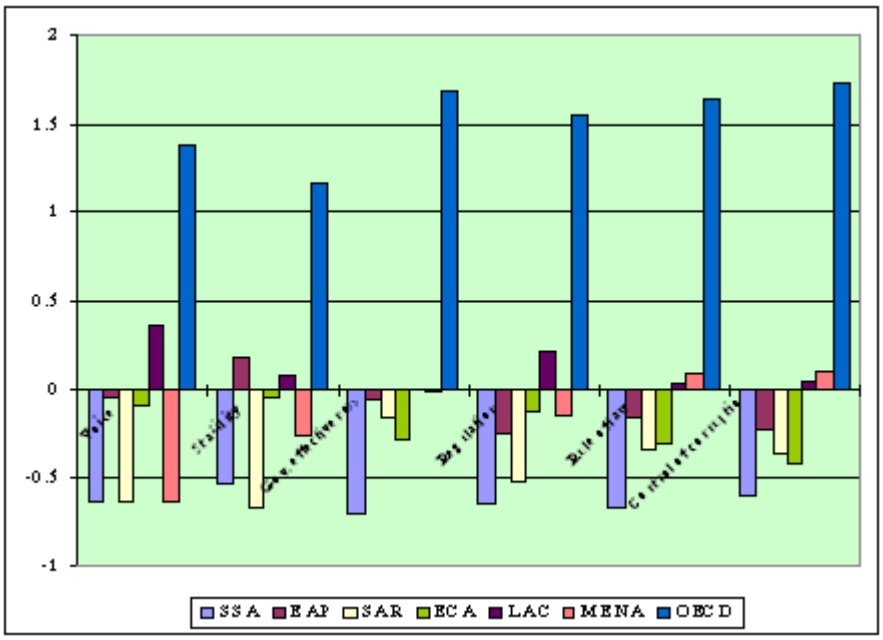
average ratio of the price of investment goods to the price of consumption goods is 120 in SSA and 70 in OECD countries (Artadi and Sala-i-Martin, 2003). Note, however, that North African economies constitute a notable exception to the regularity observed in Sala-i-Martin and others (2004) since they have performed substantially better than SSA despite an even higher investment price ratio of around 150.

An unfavorable investment climate is one of the most significant barriers to investment. Sub-Saharan African countries have consistently received unfavorable ratings from investment risk assessment services. Indeed, the proliferation of civil strife, sudden changes in government policy, political instability, lack of enforcement of property rights, volatile prices and an uncertain macroeconomic environment make investment in Sub-Saharan Africa a risky undertaking (figure 15).

Interestingly, several authors (e.g., Collier and Patillo, 2000; Collier and Gunning, 1999; Haque and others, 1999) have emphasized, however, that a substantial component of Africa's risk ratings remains unexplained by standard economic considerations which should underpin judgments about investment risks-hence they conclude that the risks to investments in Africa have been exaggerated due to the stereotypical view of Africa as a "bad neighbor."

Some authors attribute Africa's weak economically inefficient institutions to its colonial heritage. For instance, Acemoglu (2001) traces the lack of property rights to colonization. In cases when the European colonizers faced high settler mortality they set up purely extractive institutions for the transfer of resources to the metropole and did not seek to create a favorable

FIG. 15. Regional Difference in Quality of Governance, 2002



Source: Kaufmann, Krayy, Zoldo-Lobaton data set.

institutional climate for investment in the colonies. Such were the cases of the Congo and the Gold Coast in Africa. Present day institutions in the post-colonial developing countries, argues Acemoglu (2001), still bear the stamp of extractive colonization.

3.4. Human Capital

Human capital is commonly cited as a key private endowment associated with exiting poverty in the 1990s[18] (Christiansen and others, 2002). From a macroeconomic perspective, the importance of human capital for growth exceeds private returns to schooling. One big reason is complementarity between investment in physical and human capital, i.e., the marginal productivity of physical capital is higher-all else equal-in a country with a more educated labor force. In comparison with OECD and East Asian economies, the level of human capital in Sub-Saharan Africa in the 1960s was substantially lower. The primary enrolment rate was around 40 percent, while in OECD countries or East Asian countries it reached nearly 100 percent. A low initial level of human capital at the time of achieving independence slowed the growth of African economies in the subsequent

[18]The other private endowment key to escaping poverty is access to land.

TABLE 9.

Composition of total expenditure, 1980 and 1998 (percent)

	Africa		Asia		Latin America	
	1980	1998	1980	1998	1980	1998
Total	100	100	100	100	100	100
Agriculture*	6	5	15	10	8	3
Education	12	16	14	20	16	19
Health	3	5	5	4	4	7
T&C	6	4	12	5	11	6
Social Security	5	3	4	3	19	26
Defense	12	10	18	11	7	7
Other**	55	57	33	47	35	32

Note: T & C stands for transportation and communication.
* Includes agriculture, forestry, fishing, and hunting.
** Includes fuel and energy; mining, manufacturing, and construction; general administration. Sources: Calculated using data from International Monetary Fund's Government Finance Statistics (various issues).
Source: Fan and Rao, 2003, table 2.

decades. Artadi and Sala-i-Martin (2003) consider SSA's education gap from the growth-accounting point of view and calculate that Africa could have grown at 2.3 instead of 0.9 percent if its initial average education level was equivalent to the OECD level.

In the 1980s and early 1990s, African countries sought to boost their stock of human capital through public investment in education. Even though education is the biggest item on the government budget[19] (table 9), the share allocated to education in Africa appears somewhat low compared to the share of public spending allocated toward education in Asia (20 percent) and LAC (19 percent) (Fan and Rao, 2003).

Improvements in health have even greater returns in terms of growth than investment in education. Artadi and Sala-i-Martin (2003) estimate that the low initial level of life expectancy and the high malaria prevalence in the 1960s together "cost" Africa around 3.3 percent in annual growth in subsequent decades.

Since the 1960s, life expectancy in Africa was significantly improving through the mid-1990s, but has been deteriorating since around 1995 as the effects of the AIDS pandemic continued to accumulate. The share of health expenditure (table 9), around 5 percent in Africa in 1998, is comparable to other regions (4 percent in Asia and 7 percent in LAC), but given the

[19] The top three categories of public expenditure in Africa are education (16 percent), defense (10 percent), and health (5 percent).

HIV/AIDS pandemic and malaria prevalence one would expect a greater share of public resource allocation to health (Fan and Rao, 2003).

3.5. Infrastructure

The condition of transportation and communications infrastructure in Sub-Saharan Africa leaves much to be desired (table 10). Only 20 percent of the roads are paved versus 61 percent in East Asia and the Pacific and 79 percent in the OECD countries. Although the share of paved roads in LAC is only slightly higher than in SSA, the condition of communications infrastructure in Latin America is by far better in terms of coverage and reliability, with 111 phone mainlines per 1,000 inhabitants and only 19 faults per 100 phone mainlines. SSA countries on average have only 13 mainlines per 1,000 inhabitants with 95 faults per mainline.

TABLE 10.

Transportation and Communication Infrastructure in 1995-1999

	SSA	LAC	EAP	OECD
% Roads Paved	20	21	61	79
Radios per 1000 people	210	409	303	1319
Phone Mainlines per 1000 people	13	111	69	562
Faults per 100 Phone Mainlines	95	19	37	11
Telephone average cost of local call (USD per 3 min)	0	0	0	0

Source: World Development Indicators.

Governments in Sub-Saharan Africa tend to invest less in transport and communications (table 9). While Latin American governments invest on average 6 percent of transportation and communications infrastructure, African countries invest 4 percent (Fan and Rao, 2003).

Meanwhile, according to IFPRI's projections, payoffs from investment in infrastructure in terms of agricultural export growth could be substantial: a 30 percent increase in productivity of the transport sector in South Africa coupled with a 50 percent increase in other Sub-Saharan countries will lead to a 28 percent rise in SSA's total agricultural exports and a 22 percent increase in interregional trade (Diao and others, 2005). Investments in infrastructure will likely produce additional spillovers across sectors and across countries in the region since improved infrastructure will facilitate exports of higher value agricultural products (perishable and processed goods) and increase exports of traditional crops.

3.6. External Orientation

Openness to trade can fuel growth because an open country can benefit from trade was well as from technological innovation through foreign direct investment (FDI). Sub-Saharan African countries have adopted a variety

of trade regimes, but on average Sub-Saharan economies have remained relatively closed to foreign trade and FDI. Sachs and Warner's (1997) index of openness rates Africa (including North and Sub-Saharan countries) at 0.10, which compares unfavorably with the OECD and East Asia average openness of 0.65 and 0.85 respectively.

A number of factors account for SSA's low outward orientation. Some of these constraints are "indigenous" to the African countries. For instance, inadequate transportation/communications infrastructure in Sub-Saharan countries adds significantly to the marketing costs of their agricultural products. Other constraints originate outside Africa's borders and include trade tariffs, an inefficient system of standards, and customs corruption. Subsidies to agricultural producers in Europe and North America contribute to the distortion of trade with Africa. Full liberalization of trade would tremendously boost agricultural exports from Sub-Saharan countries: IFPRI estimates a 19-percent potential increase in Africa's exports from elimination of trade distortions (Diao and others, 2005).

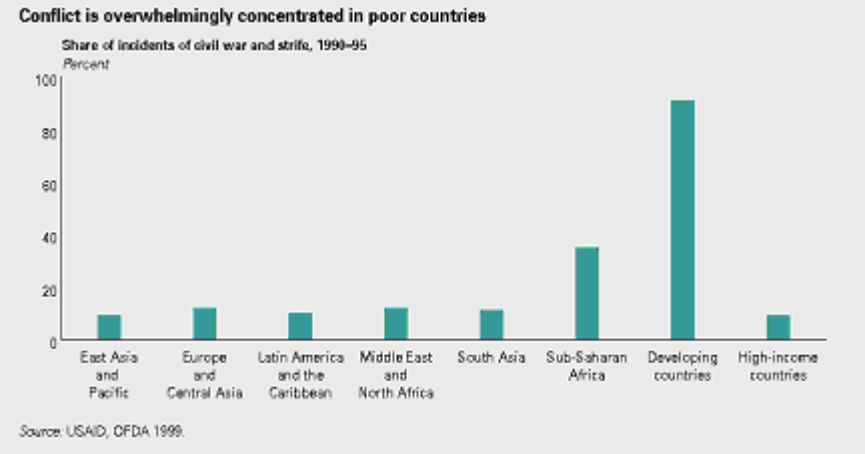
External orientation-through imports of new technologies and advancement in technological frontiers-promotes accumulation of human capital, assuming that technology and human capital are complimentary inputs. For instance, advances in the technological frontier generate demand for a more educated labor force (Gradstein and Nikitin, 2004).

3.7. Conflicts, State Failure, and Predatory Governments

Conflicts-internal or international-have a significant negative impact on human welfare. They directly impact the well-being of individuals by causing deaths and suffering of the victims and their family members. In a less direct fashion, conflicts affect welfare by undermining economic life of the societies where they take place, devastating physical, social, and human capital. They destroy investment, lead to the migration of skilled labor, erode social cohesion and trust, and channel public spending away from productive activities. Internal conflict disproportionately afflicts developing societies, and takes a particularly high toll on Sub-Saharan African countries (figure 16). Between 1987 and 1997, fourteen internal conflicts were fought in Africa, fourteen in Asia, and one in Europe (World Bank, 2000). A USAID report estimates that during 1990-95, Sub-Saharan Africa accounted for approximately 40 percent of the incidence of civil war and strife in the developing world (USAID, 1999).

Violent conflict-or a real threat of violent conflict-is an obvious fact of life in many African societies and without exploring the link between conflict and welfare any discussion of development in Sub-Saharan Africa would be incomplete. Moser and Ichida (2001) observe substantial differentials in a number of key development indicators between conflict and non-conflict countries. Specifically, they report that in 1972-97 infant mortality de-

FIG. 16. Incidence of Conflict



Source: USAID, OFDA 1999, reported in World Development Report (2000/2001), box 3.2.

TABLE 11.

Quality of Governance in Conflict and Non-conflict* Countries

Year	Type	Voice	Stability	Gov. effectiveness	Regulation	Rule of law	Control of corruption
1996	conflict	−1.022308	−1.24	−0.9307692	−0.9969231	−0.9938462	−1.079
	non-conflict	−0.3026471	−0.0889655	−0.5076471	−0.4064706	−0.377	−0.3221739
1998	conflict	−1.109231	−1.431538	−0.9169231	−1.041538	−1.09	−0.8407692
	non-conflict	−0.2938235	−0.1889655	−0.4332353	−0.2832353	−0.4273529	−0.4752941
2000	conflict	−1.177692	−1.49	−1.000769	−0.9392308	−1.032308	−0.8246154
	non-conflict	−0.3341176	−0.2517241	−0.4929412	−0.2705882	−0.4241176	−0.4332353
2002	conflict	−1.093846	−1.454615	−1.086923	−1.076923	−1.160769	−0.9453846
	non-conflict	−0.4561765	−0.1905882	−0.5552941	−0.4876471	−0.4829412	−0.4641176

* Countries identified as conflict or non-conflict following Moser and Ichida (2001).
Source: Kaufmann, Kraay, Zoido-Lobaton dataset.

clined more rapidly in non-conflict than in conflict countries (32.5 percent decline in the former versus 25 percent decline in the latter); they also report substantial differences in improvements in life expectancy over the same period. Additionally Moser and Ichida (2001) report higher primary enrolment and higher growth of per capita GDP in non-conflict countries. As table 11 demonstrates, political and economic institutions deteriorate during conflict.

Several factors have contributed to conflict since independence. In the first place, political boundaries arbitrarily drawn by the colonial powers

were contested by the independent African states or ethnic groups, as was the case, for instance, with Eritrea's resistance to incorporation by Ethiopia. In the 1970s, post-colonial struggle among African regimes for repartitioning the continent became an instrument of Cold War politics; the super-powers manipulated local enmities to advance their agendas. In the 1980s, as the Cold War ended, an "indigenous" source of conflict gained importance-the failure of the state to exercise legitimate control over a given territory and to secure a monopoly on violence and protection of individual and property rights.

What makes states in Sub-Saharan Africa vulnerable to failure and why do they slip into internal conflict? Bates (2005) models the existence of a state as an outcome of a game between citizens and the political forces claiming monopoly on violence, i.e., the government. A viable political order emerges when the government chooses to use physical force to ensure the security of citizens' lives and property rights instead of engaging in predation at the expense of the citizens; at the same time the citizens must find the government's commitment to protection credible and choose to disarm. Such an equilibrium, Bates (2005) argues, happens when the government is rich enough to maintain a police or military force capable of effectively protecting the citizens and when the political leadership does not have alternative ways of enrichment apart from provision of government services. In cases where the government's revenues fall, making it difficult to provide effective protection (or similar public services), individual citizens, groups, or territorial units may choose to take the task of protection in their own hands, withdrawing their support from the no longer credible government.[20] Petroleum booms (as well as other easily appropriated resources) provided a windfall of profits to some African governments and eliminated economic incentives for government to protect the citizens since the government and its apparatus no longer depended on the taxation of the population.[21] Bates (2005) also argues that the likelihood of predation and conflict increases when governments face uncertainty in their political future, e.g., when the incumbent authority is threatened by a contender in elections.

Broadly understood, internal conflict is the most severe symptom of weak governance. From this point of view, the discussion of state failure has a greater import, extending to those countries which have not slipped into conflict but suffer from other symptoms of weak governance. MacMillan and Masters (2000) present a political economy model which also explains predatory government policies of high taxation despite low or negative

[20] Unable to raise revenue, a government's military may turn to looting as, for instance, in Benin (Decalo, 1997), Central African Republic (O'Toole, 1997), Gabon (Yates, 1996), Ivory Coast (Hills, 2000), Zaire, Liberia.

[21] Nigeria, Sudan, Liberia, Angola furnish examples.

growth. The equilibrium emerges from a game between the government and agricultural producers. If the government's tenure of the office becomes threatened and if the returns from productive activities are expected to be low, the government is likely to opt in favor of unsustainable predatory taxation to the detriment of growth. The producer in turn is likely to curtail production if he believes that the government can impose a predatory tax and if the sunk costs of production are high. Many Sub-Saharan societies seem to satisfy these conditions for the emergence of growth-reducing equilibria: the low odds of retaining political power faced by the government, production technologies (especially in agriculture) with substantial sunk costs, and lack of commitment mechanisms, such as representative governments, etc.

Collier and others (2003) observe that over the past several decades the incidence of conflict became concentrated in a few countries mainly in Sub-Saharan Africa. These conflicts are protracted internal wars; Collier and others (2003) propose that these countries have been caught in a "conflict trap," a tragic equilibrium state, a vicious circle in which conflict undercuts economic development and economic deprivation, in turn, leads to further escalation of conflict. Once a country has fallen into a conflict, the likelihood of continuing on the conflict path soars; internal strife has a way of fueling itself because it creates scarcity and grievances as well as a class of people interested in perpetuating conflict, for whom war has become a way of life and who profit from it.

One important feature of Sub-Saharan Africa has been argued to underlie SSA's vulnerability to conflict-the failure of states and economically inefficient policies, as well as the continent's great ethno-linguistic fractionalization. Easterly and Levine (1997) find evidence that ethno-linguistic fractionalization correlates negatively with growth. The adverse effect of fractionalization of development need not be channeled through violent internal conflict exclusively. Ethnic strife can lead to economic inefficiencies without turning bloody as various ethno-linguistic groups seek to hijack the government apparatus and the public budget to advance their agendas or to appropriate resources.

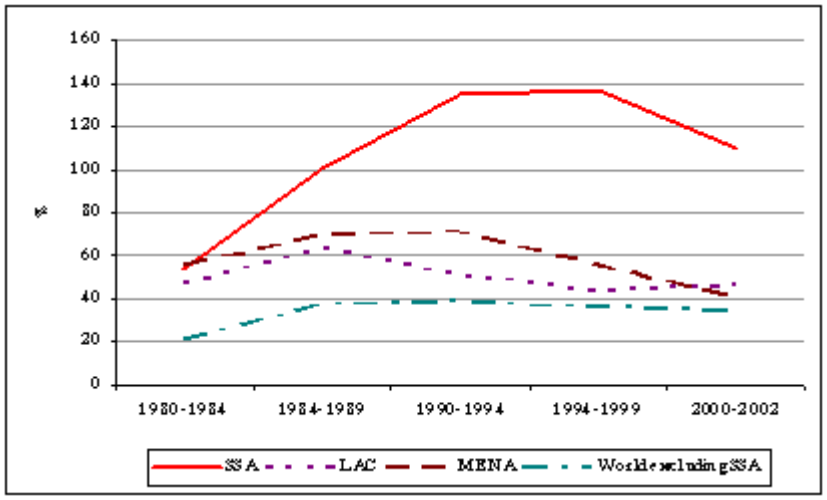
3.8. Foreign Aid and Debt

Pervasiveness and persistence of poverty in Africa attracted the attention of development economists a long time ago and since the early days of development economics the idea that African economies need an intensive one-time intervention to propel them into sustained growth received currency. From the 1950s until now, each decade seems to have featured a new brand of the "big push" doctrine.[22] The differences concerned mainly

[22]See Thornbecke (2005) for historical review of the theoretical discourse in development economics.

the details of structuring the intervention, but the central notion of giving an external developmental impetus to a backward economy by means of injection of overseas development assistance (ODA) remained unchanged.

FIG. 17. External Debt as a Share of GNI



Source: World Development Indicators

TABLE 12.

External debt as a share of GNI, %

	1980-1984	1984-1989	1990-1994	1994-1999	2000-2002
SSA	54	101	135	137	109
EAP	12	35	37	34	31
SAR	18	26	36	29	27
ECA	35	48	27	44	54
LAC	48	64	52	44	47
MENA	56	70	71	56	41
World excluding SSA	21	38	39	36	34
Total	25	46	50	48	44

Source: World Development Indicators

As a result, the "big push" experiments failed to produce development. Instead it left developing countries with massive debts (figure 17, table 12). Sub-Saharan Africa now boasts the highest regional rate of indebtedness-in 2000-02, its debt exceeded its GNI by 9 percent, a marked improvement over 1995-99 when SSA's debt was 37 percent higher that its GNI. No other region has such a heavy (relative to its economic size) debt burden.

The failure of aid to buy development in the 1960s, 1970s and 1980s led to the "aid fatigue" of the 1990s, when donors began to reevaluate the question of aid effectiveness. In the late 1990s a consensus emerged that aid would be more effective if it was used in a favorable policy environment (Burnside and Dollar, 2000). Svensson (2000) presents a model explaining the low development impact of foreign aid. Within his theoretical framework a windfall of economic aid lowers the provision of public goods because the aid is appropriated for private consumption by corrupt governments. One implication of this model is that the welfare-increasing effect of foreign aid will be greater in countries where the governments enter into a binding policy commitment with the donors.

While in the 1980s there seems to be no correlation between aid and policy, in the 1990s, the correlation became significant. Dollar and Levine (2004) argue that aid allocation has become more selective: more aid has flowed to countries with better policies. Conditional allocation of aid is likely to increase overall effectiveness of aid in producing growth. However, if donors base their decision on the recipient's quality of governance, there is a danger that aid will be distributed to well-governed countries which are not very poor, thus reducing the poverty minimizing effect. The optimal strategy of aid allocation then balances the emphasis on good governance against poverty reduction.

Some donors managed to balance their emphasis on policy with the emphasis on poverty reduction, while others did not. For instance, the World Bank's International Development Association (IDA), IMF's Enhanced Structural Adjustment Facility, Denmark, the United Kingdom, Norway, Ireland, and the Netherlands are donors who are highly selective with regard to both policy and poverty criteria. The United States and France are not selective with regard to either criterion, and Japan attaches a much heavier weighting to good policies than to need in their aid allocation.

3.9. Poverty Trap

Persistent and increasing poverty coupled with low average income, and low to negative growth rates of many Sub-Saharan countries since their independence are facts consistent with a poverty trap scenario. The recent UN Millennium Report (U.N. Millennium Project, 2005) argues precisely this; many Sub-Saharan economies have been caught in a vicious cycle when the current state of underdevelopment fails to produce conditions for growth. Bowles and others (2004) broadly classify various poverty trap mechanisms identified in the development literature into threshold poverty traps, institutional poverty traps, and neighborhood poverty traps.

The first variety of explanations for the existence of poverty traps points out that a critical threshold must be reached before the forces of growth can

begin to operate. In some cases growth may depend on "lumpy" research and development investments or investments in human capital which cannot be accomplished by societies with low savings and investment rates. The second variety of poverty trap arguments looks to institutions to explain why some societies linger in low-growth equilibria. Institutions may create poverty traps in a number of ways. A property rights structure or customs may reflect initial inequalities and perpetuate them; alternatively, behaviors such as corruption and bribery may be economically inefficient from the point of view of a social utility maximizing planner, yet the institutional matrix may reward bribes and corrupt practices and impose sanctions on the deviants. Once the institutional arrangement has come into existence, despite being a poverty trap and causing underdevelopment, the poor face substantial coordination problems making it extremely difficult to reform corrupt institutions. The third broad set of sources of poverty traps relates to neighborhood effects. A neighborhood effect emerges when groups demand or encourage behaviors among their members in ways which constrain economic efficiency; individuals in turn conform to the "neighborhood's" pressure not to jeopardize their membership.

Clearly, there is a wide range of mechanisms through which poverty traps emerge and persist. The broad facts we have established about poverty, growth, and inequality in Sub-Saharan Africa are consistent with many of these mechanisms and it would be useful to sketch the most likely causes of poverty traps of Sub-Saharan countries.

In a recent contribution, Sachs and others (2004) seriously consider Africa's poverty trap problem and identify the mechanisms which bring it into existence. On theoretical grounds, they isolate three conditions for the emergence of poverty traps: low level of capital deepening, low savings rate, and high population growth rate. They further explore which of the specific structural features of Sub-Saharan Africa empirically allow the favorable trap-inducing conditions to emerge. These are (a) high transport costs and small market size; (b) low productivity of agriculture; (c) high disease burden; (d) adverse geopolitics; and (e) slow diffusion of technology from abroad.

More specifically, high transport costs inhibit FDI and increase costs of utilizing fertilizers; as a result the level of capital remains low, creating conditions for capital poverty traps. Low capital investment in turn keeps agricultural productivity low; additionally, high transportation costs lower total factor productivity. Low-productivity subsistence agriculture generates little surplus income, making it difficult to save (savings trap) and to invest in better agricultural technologies, e.g., fertilizers (capital trap). High disease burden undermines human capital making labor less productive and high risk of contracting diseases frustrates FDI. Additionally, high infant mortality due to diseases delays demographic transition

(demographic trap). Under the heading of adverse geopolitics, Sachs refers both to the features of countries' internal political life (specifically civil wars and conflicts) and to international geopolitical position of Sub-Saharan States. Wars directly destroy physical and human capital and create an unfavorable investment climate (capital trap); conflicts also tend to cause the deterioration of welfare to the point where saving is not feasible; conflicts are sure to undermine trust and potentially worsen credit constraints since informal borrowing/lending becomes even riskier (savings trap). SSA countries are relatively unimportant players in the political arena and suffer from exclusion from European and U.S. markets due to lack of political weight. Lastly, highly productive agricultural technologies developed for temperate climates are not fit for the tropics and their adaptation requires costly R&D, which keeps the productivity of agriculture and individuals/households, as well as their earnings, low.

Sachs and others (2004) theorize Africa's poverty trap as a critical threshold poverty trap. Consequently, the proposal for African development is somewhat reminiscent of the "big push" theories of the 1950s and 1960s, with the characteristic recommendation that

> ...what is needed is a "big push" in public investments to produce a rapid "step" increase in Africa's underlying productivity, both rural and urban. The intervention of foreign donors will be critical to achieving this step increase. In particular, we argue that well-governed African countries should be offered a substantial increase in official development assistance (ODA) to enable them to achieve the Millennium Development Goals (MDGs), the internationally agreed targets for poverty reduction, by 2015 (Sachs and others, 2004, p. 122).

In contrast to his theoretical predecessors, he proposes to focus development aid on several key areas (mainly health and agricultural technologies), to avoid spreading resources thinly across numerous projects. These are reasonable modifications to the big push approach of the earlier development initiatives, yet the dismissal of institutional factors is striking, even more so when we consider that institutions loom large in explaining the failure of aid.

To justify moving his focus away from institutions, Sachs and others (2004) point to the fact that the Africa dummy remains significant even when we control for institutional effects (table 13). And elsewhere (Sachs, 2003) he demonstrates that malaria transmission has a significant effect on growth even in the presence of controls for institutional quality, suggesting that improvement in malaria-control measures will produce growth regardless of the shortcomings in institutional quality. These exercises do not, however, systematically consider the role of institutional factors in the emergence of growth traps in the presence of additional controls (only

TABLE 13.
Regressions Explaining Economic Growth in Tropical Sub-Saharan Africa with Governance Indicators

Independent variable	3-1	3-2	3-3	3-4	3-5
Dummy variable for tropical sub-Saharan Africa[b]	−3.28 (−6.56)	−3.06 (−6.50)	−2.68 (−6.11)	−3.43 (−7.05)	−3.40 (−6.46)
Corruption Perceptions Index, 2003[c]	0.83 (5.23)				
Index of Economic Freedom, 2001[d]		−0.96 (−2.75)			
Average Kaufmann, Kraay, Zoido-Lobaton indicators, 2000[e]			1.89 (5.91)		
Average ICRG indicators, 1982-97[f]				1.56 (5.29)	
Average ICRG indicators, 1982[f]					0.68 (3.78)
Logarithm of GDP percapita (at purchasing power parity), 1980	−2.07 (−7.02)	−1.65 (−6.06)	−1.75 (−7.07)	−2.00 (−7.01)	−1.82 (−5.84)
R^2	0.58	0.46	0.59	0.59	0.54
No. of observations	60	71	78	65	52

Sources: Authors' regressions using data from Transparency International (2004); Miles, Feulner, and O' Grady (2004); Kaufmann, Kraay, and Zoido-Lobaton (2002); PSR Group (2004); World Bank (2003a).

[a] The dependent variable is average annual growth of GDP percapita, 1980-2000. The sample consists of ninety-two countries worldwide, excluding high-income countries and former republics of the Soviet Union. All regressions are ordinary least squares and include a constant term (not reported). Numbers in parentheses are t statistics; all coefficients reach statistical significance at the 1 percent level.

[b] Variable equals 1 if the country is one of the thirty-three countries listed in table 2.

[c] See table 2 for description.

[d] The index is published by the Heritage Foundation and the Wall Street Journal and ranges from 1 to 5, where 5 indicates the greatest government interference in the economy and the least economic freedom.

[e] Average of six World Bank governance indicators measured in units ranging from about −2.5 to 2.5, with higher values corresponding to better governance outcomes.

[f] Average of six governance indicators from the International Country Risk Guide, with values ranging from 1 to 6, with higher values reflecting better governance.

Source: Sachs (2004), table 3.

income, population density, and malaria prevalence are accounted for). Additionally, the possible interaction between institutional characteristics, such as inequality, and other features of African economies are ignored.

Past development efforts failed to a large extent because conditions for sustainable growth did not emerge. Inequality can be one of such structural

factors capable of undermining growth by impeding the accumulation of human capital, a key component of sustainable economic development.

4. EMPIRICAL ANALYSIS

The survey of literature on poverty and inequality in Sub-Saharan Africa has considered a variety of explanations for the low level of welfare in the sub-continent. In this section we look at the robust correlates of welfare outcomes with particular attention to the role of income inequality. Our literature review has highlighted high income inequality as one of the distinct attributes of Sub-Saharan economies. Having considered the causes of growth in general, we take seriously the thesis that Sub-Saharan countries may have fallen in a poverty trap and examine whether the growth-related factors operate similarly above and below a specific income threshold. We define the threshold as the level of per capita income below which the vast majority of the SSA countries, except for a few outliers, fell around 1980.

We continue with the argument that the economic effect of inequality is due to its negative role in accumulation of human capital in education and health. Subsequently, we consider the effect of inequality in Sub-Saharan Africa and outside it separately within the context of a model where the accumulation of human capital is driven by advancement of the technological frontier.

4.1. Data

The inequality data come from the new data set WIID2a. It contains 4,664 Gini coefficients and covers 152 countries from 1864 through 2003. The geography of coverage grows more unbalanced the further we go back in time. Sub-Saharan economies are grossly under-represented in the data set until the late 1970s. Similarly, the coverage of the most recent years 2001-03 is also incomplete. Thus, to ensure a reasonably extensive and balanced coverage of Sub-Saharan economies, we focus on the 1980-2000 period. The data has further limitations. Not all Gini coefficients reported in WIID2a are representative of the entire population of the country-some describe only rural or urban areas, while others exclude certain regions. We retain only those coefficients which are representative of the vast majority of the country (at least 90 percent). WIID2a rates the quality of the coefficients in terms of availability of information about the concept of the welfare measure used for calculating Ginis and the extent of coverage of the welfare measure. We ignore those coefficients with the lowest rating of quality (4), but retain all others as long as they are representative. Gini statistics have been calculated on the basis of individual or household-level income/expenditure surveys. Using a 1996 version of the Deininger-Squire inequality data set, Li, Squire and Zou (1998) find that the coefficients from

household and individual-level surveys had no statistically significant differences. This observation largely holds for the WIID2a data set. Deininger and Squire (1996) find that in their data set inequality statistics derived from expenditure data were systematically lower by 6.6 points on average from those derived on the basis of the income data. Similarly, Milanovic (2004) reports a similar difference of 5.8 to 6.8 percentage points between income-based and expenditure based Ginis. To account for these differences we adjust the source of welfare data following the procedure described in Deininger and Squire (1996).

All other data come from World Bank's WDI database, with the exception of data on official development assistance (ODA) and conflict data. The former comes from the OECD's DAC database, while the latter comes from Gleditsch and others (2002). To smooth out short-term variation and business cycle effects in growth regressions, we use four-year averages instead of yearly data.

4.2. Growth regressions

Table 14 presents a set of random-effects regressions for average annual growth rate. In the initial specification (1), to address the question of the role of inequality in economic growth we include lagged Gini. We control for the level of per capita income to account for the convergence effect. Following Li, Squire and Zou (1998), who have demonstrated that the level of financial development and democratization significantly predict growth, we further account for the extent of financial development by including the variable for money supply (M2/GDP) and for the level of democratization using the Freedom House index of civil liberties. The civil liberties scale ranges from 1 (most politically free) to 7 (least politically free). We include a measure of corruption, ICRG, to proxy for the investment climate. FDI, measured as a share of GDP, captures the extent of external orientation of the economy. Since changes in prices of consumer goods can affect households' propensity to save and affect growth, especially in a short-to-medium term (see, for instance, Faria and Carneiro, 2001), we introduce into the model a CPI inflation measure. Lagged ODA relative to GDP directly measures the importance of foreign and multilateral aid in the economy. To account for economic effects of conflict we include a measure of severity of internal armed conflict, which is a product of conflict incidence (number of conflicts in a given country over a four-year period) and conflict intensity measured on a scale from 1 to 3. Data cover all conflicts with at least 25 casualties. Measures of initial level of human capital in education and health are omitted in the first three specifications.

In the full sample we observe the following stylized facts. Notably, inequality is negatively and significantly associated with growth: more egalitarian economies tend to grow faster. A 10-percentage point increase in in-

TABLE 14.

Dependent variable: average annual growth rate (%), 1980-2002. Random effects regressions.

	1	2	3	4	5	6	7	8
Lagged Gini	−0.062	−0.048	−0.051	−0.013	−0.013	−0.018	−0.042	0.013
	[3.12]***	[2.42]**	[2.54]**	[0.61]	[0.59]	[0.81]	[2.02]**	[0.52]
Log GDP per capita, lagged	−0.706	−1.218	−1.098	−1.911	−2.046	−1.810	−1.507	−1.849
	[1.75]*	[2.86]***	[2.40]**	[4.46]***	[4.67]***	[3.84]***	[3.26]***	[3.72]***
Lagged M2/GDP	−0.030	−0.030	−0.029	−0.022	−0.023	−0.023	−0.027	−0.026
	[3.03]***	[3.04]***	[3.03]***	[2.50]**	[2.55]**	[2.53]**	[3.00]***	[2.56]**
Civil liberties	0.110	0.091	0.074	0.179	0.171	0.139	0.148	−0.027
	[0.62]	[0.53]	[0.42]	[1.11]	[1.06]	[0.84]	[0.88]	[0.15]
ICRG	0.078	0.092	0.094	0.080	0.087	0.091	0.087	0.089
	[3.38]***	[3.98]***	[4.03]***	[3.67]***	[3.90]***	[4.04]***	[3.80]***	[3.96]***
Log population size	0.349	0.312	0.340	0.529	0.492	0.540	0.468	0.459
	[2.06]**	[1.88]*	[2.01]**	[3.46]***	[3.17]***	[3.41]***	[2.96]***	[2.87]***
FDI, % GDP	0.267	0.226	0.220	0.209	0.194	0.181	0.230	0.185
	[4.19]***	[3.54]***	[3.37]***	[3.34]***	[3.06]***	[2.81]***	[3.56]***	[2.85]***
CPI inflation	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002
	[3.53]***	[3.53]***	[3.54]***	[3.43]***	[3.44]***	[3.47]***	[3.41]***	[3.01]***
Lagged ODA/GDP	−3.204	−1.043	−0.587	−0.160	0.510	1.037	1.908	0.291
	[0.96]	[0.31]	[0.17]	[0.05]	[0.16]	[0.33]	[0.58]	[0.09]
Severity of conflict	0.04809	0.00347	−0.00467	0.11065	0.08817	0.06717	0.1075	0.05891
	[0.25]	[0.02]	[0.02]	[0.64]	[0.51]	[0.39]	[0.61]	[0.33]
Gross secondary enrolment, 1980				0.037	0.03477	0.03608		0.019
				[3.23]***	[3.01]***	[3.14]***		[1.40]
Infant mortality rate, 1980				−0.023	−0.02053	−0.0188	−0.033	−0.022
				[2.57]**	[2.22]**	[2.06]**	[3.22]***	[2.34]**
Gross primary enrolment, 1980							−0.010	
							[0.83]	
Sub-Saharan Africa dummy		−2.388	−2.257		−1.04314	−0.801	−1.158	−1.137
		[3.25]***	[3.02]***		[1.41]	[1.05]	[1.61]	[0.76]
OECD dummy			−0.587			−0.943	−0.728	
			[0.61]			[1.03]	[0.82]	
Latin America and Caribbean dummy								−0.799
								[0.75]
Europe and Central Asia dummy								1.573
								[1.67]*
South Asia dummy								0.349
								[0.23]
East Asia and Pacific dummy								0.721
								[0.62]
Middle East and North Africa dummy								1.17693
								[0.96]
Constant	4.81596	8.16444	7.18979	10.93603	11.85931	9.76821	12.48743	10.51309
	[1.23]	[2.06]**	[1.72]*	[2.71]***	[2.91]***	[2.24]**	[2.78]***	[2.05]**
Observations	271	271	271	261	261	261	265	261
Number of countries	89	89	89	84	84	84	86	84

Absolute value of z statistics in brackets
* significant at 10%;
** significant at 5%;
*** significant at 1%
Source: Authors' calculations.

equality (approximately 1 standard deviation of Gini is SSA) lowers growth rate by 0.6 percentage points. We find evidence of conditional convergence of growth rates during 1980-2002. The level of financial development (M2) is negatively and significantly correlated with growth. The extent of democratization represented by the measure of civil liberties proves orthogonal to growth in our specification; however, the better institutional quality has a positive effect on growth. Other things equal, more populous countries tend to grow significantly faster, owing perhaps to the economies of scale. External orientation, proxied by FDI, pays off in terms of faster growth. The fact that aid is unrelated to economic growth would seem disappointing given that a big push is widely seen as one of the solutions to Africa's poverty trap. However, this result warrants cautious interpretation: the effect of the aid in our specification is likely "diluted" because we focus on both advanced and developing countries. Severity of conflict also proves uncorrelated with growth in our model despite the fact that meaningful and significant association between growth and conflict has been reported by several researchers (e.g., Collier, McMillan, and Masters, etc.). Again, while conflict incidence and severity is a key factor for the development paths of countries in conflict, in the world as a whole, conflict incidence or severity is not a key determinant of growth. Additionally, the direct effect of conflict on growth in the long run is not as prominent as its indirect effect through stunted accumulation of human capital (the effect of conflict on education and mortality rates has been documented above).

Specifications (2) and (3) contain dummies for SSA's regional effect. The dummy is significant, suggesting that there is still a significant regional effect unexplained by our model. That is, Sub-Saharan economies-even after we control for all of the variables mentioned above-still have significantly lower growth rates than other developing countries. They grow, on average, 2.3 percentage points slower than their developing counterparts. Inequality in (2) and (3) still remains a significant predictor of growth.

The regional effect of Sub-Saharan Africa disappears once we augment our specification with measures of human capital around 1980, secondary enrolment, and infant mortality. Within our framework, a low initial level of human capital is crucial to understanding Africa's developmental failure: once we account for its high infant mortality and low secondary enrolment circa 1980, Africa's low growth falls in line with other developing countries.

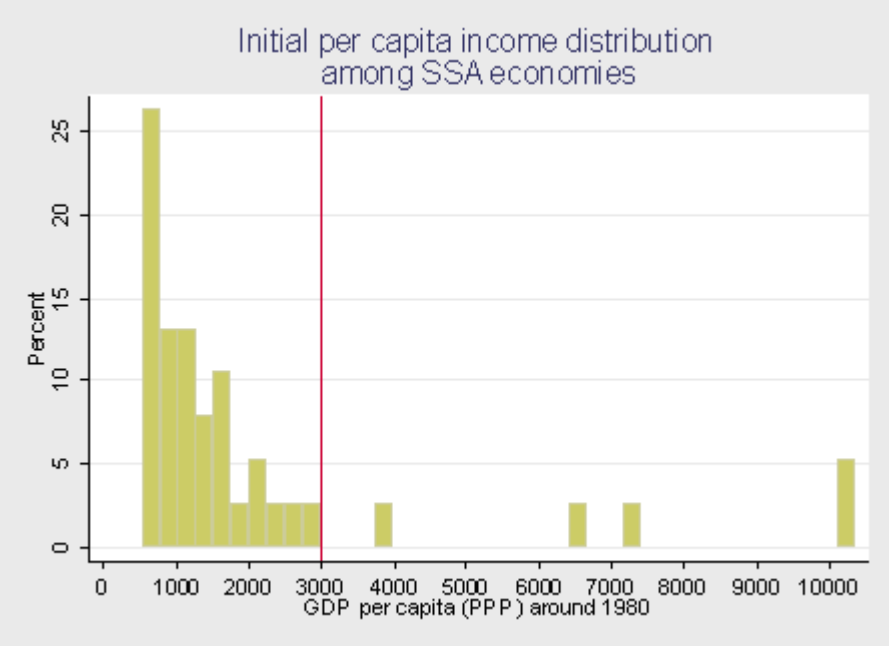
The inequality effect becomes insignificant once we control for the initial level of human capital (4), represented here by educational attainment and infant mortality. That initial human capital stock affects subsequent growth rate is common knowledge, but we want to emphasize here the connection between inequality and human capital. Measures of the initial level of human capital circa 1980 capture the secular effect of inequality because inequality stunts economic growth primarily by interfering with

the accumulation of human capital since inequality leads to exclusion from education and health. Even though the inequality measure in these regressions is an income Gini coefficient, these results resonate with the finding in Deininger and Olinto (2000) that inequality-of land assets in their study-undermines the returns from investment in human capital.

The inclusion of initial primary enrolment does not capture the effect of inequality to the same extent secondary enrolment does-the coefficient on Gini is negative and significant in specification (7). This hardly comes as a surprise since advances in public provision of primary schooling made it less susceptible to income inequality.

We will pursue the connection between inequality and human capital further below. At the moment, however, let us consider the possibility that African countries had fallen into a poverty trap of the kind Bowles and other (2005) identify as "threshold" poverty. Presuming that this is the case, forces of development may operate quite differently in an economy which had fallen below the threshold.

FIG. 18. Initial Per Capita Income Distribution among SSA Economies



Source: World Development Indicators

We identify the threshold as $3,000 PPP, the level of income below which 33 out of 38 Sub-Saharan African economies with available income data

fall around 1980 (see figure 18).[23] In addition to the 33 African countries, there are 22 countries with per capita incomes below the threshold in other regions.[24] The same growth model as described earlier is applied to this subset of countries; the results are reported in table 15.

TABLE 15.

Dependent variable: average annual growth rate (%), 1980-2002. Random effects regressions

	Income in 1980 <=$3000 PPP		Income in 1980 >$3000 PPP	
	1	2	4	5
Lagged Gini	−0.01349	−0.00754	−0.05386	−0.05483
	[0.36]	[0.20]	[1.56]	[1.57]
Log GDP per capita, lagged	−0.70249	−1.1234	−2.08429	−2.01672
	[0.73]	[1.04]	[3.12]***	[2.70]***
Lagged M2/GDP	−0.0295	−0.03003	−0.01293	−0.01304
	[1.26]	[1.26]	[1.16]	[1.17]
Civil liberties	0.03019	0.07521	0.12564	0.12029
	[0.11]	[0.28]	[0.52]	[0.48]
ICRG	0.08714	0.09845	0.059	0.05975
	[2.23]**	[2.37]**	[1.94]*	[1.92]*
Log population size	1.05408	0.934	0.42433	0.43269
	[3.07]***	[2.52]**	[2.23]**	[2.16]**
FDI, % GDP	0.13289	0.12553	0.22779	0.22579
	[0.87]	[0.82]	[2.73]***	[2.58]***
CPI inflation	−0.0072	0.00058	−0.00233	−0.00234
	[0.19]	[0.01]	[3.74]***	[3.72]***
Lagged ODA/GDP	10.59006	9.77113	−9.36895	−9.21409
	[2.28]**	[2.04]**	[1.77]*	[1.70]*
Severity of conflict	0.00333	0.02079	−0.19651	−0.20407
	[0.02]	[0.10]	[0.68]	[0.70]
Gross secondary enrolment, 1980	0.00924	0.0013	0.03143	0.03174
	[0.44]	[0.06]	[1.70]*	[1.69]*
Infant mortality rate, 1980	−0.04005	−0.04116	−0.00053	−0.00005
	[3.38]***	[3.40]***	[0.03]	[0.00]

Growth in the trapped economies is significantly and positively correlated with investment climate (ICRG), population size, and the share of aid in GDP and negatively and significantly with infant mortality. Secondary enrolment is uncorrelated with growth in countries below the $3,000 thresh-

[23] The exceptions are Gabon, Namibia, Mauritius, Seychelles, and South Africa.

[24] In the end the sample is reduced to 86 observations covering 30 countries. Seventeen of these 30 countries are SSA countries, accounting for 40 out of 86 observations.

TABLE 15—*Continued*

	Income in 1980 <=$3000 PPP		Income in 1980 >$3000 PPP	
	1	2	4	5
OECD dummy				−0.15526
				[0.13]
Sub-Saharan Africa dummy		−0.81925		
		[0.83]		
South Asia dummy				
Latin America and Caribbean dummy				
East Asia and Pacific dummy				
Europe and Central Asia dummy				
Middle East and North Africa dummy				
Constant	2.69836	5.72835	15.32709	14.72099
	[0.31]	[0.61]	[2.37]**	[2.05]**
Observations	86	86	144	144
Number of countries	30	30	39	39

Absolute value of z statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Authors' calculations.

old, but significantly predicts growth in countries above the threshold. In contrast, infant mortality takes a greater toll on growth in the trapped economies, but has no significant economic effect in the initially better-off economies. Consistent with the poverty trap thesis, among "trapped" economies development assistance is associated with faster growth; among the economies that do not meet our poverty trap criterion, aid is associated with slower growth. If there is a tendency-as Burnside and Dollar (2000) argue-among the donors to favor those countries which have better institutional environments and deemphasizing the role of need, such a pattern of aid allocation has significant costs it terms of growth. Not only may those who need aid receive too little of it, but in those countries which thus receive aid based on their policy but not need, aid may undermine optimal growth conditions.

The SSA dummy proves insignificant, suggesting that trapped Sub-Saharan African countries do not differ from other developing countries; the model describes SSA economies to the same extent as non-SSA economies.

4.3. Secondary enrolment and infant mortality regressions

Returning to our earlier thesis that inequality does not affect growth directly, but does undermine accumulation of human capital, we look at the association of secondary enrolment and income mortality with inequality. An unequal society at a given level of income will have a greater share

of people unable to finance their own or their children's education or to afford a minimal necessary standard of health care. While public spending can-as it should by design-offset the effect of income inequality on access to education and health, in most cases governments can do only so much given their budgetary constraints.

We explore the effect of inequality on human capital in education and health in the context of the model developed in detail in Gradstein and Nikitin (2004), where human capital is a function of the advancing technological frontier. Their model is designed with educational outcomes in mind: when human capital and physical capital are complementary inputs, technological innovation-embodied in FDI-generates demand for a more educated labor force. This model can be easily extended to account for health outcomes. Technological innovations in the form of new vaccines, other drugs, new knowledge about sanitation, etc. directly increase the productivity of health care leading to improvements in health indicators, including infant mortality.

TABLE 16.

Changes in FDI elasticity of infant mortality and secondary enrolment across Gini quartiles

	Gini quartiles			
	1	2	3	4
Elasticity of infant mortality	−0.17	−0.16	−0.13	−0.10
Elasticity of secondary enrolment	.5	.10	.5	.09

Source: Authors' calculations

We use FDI as a proxy for technological diffusion, controlling for per capita income, the quadratic term of per capita income to capture diminishing returns to scale, and population size. Indeed, table 15 demonstrates a significant negative relationship between inequality and health. Table 17 presents results of regressions for secondary enrolment and table 18 shows regressions for infant mortality. Specification (1) in both tables corresponds closely to the modes in Gradstein and Nikitin (2004). Their results hold: FDI is a significant predictor of health and education outcomes, with elasticity of 0.03 in both cases.

We further augment their equation with a measure of inequality (see specification (2) in both tables). Inequality is significantly and negatively correlated with secondary enrolment and infant mortality. As expected, controlling for Gini raises the magnitude of the coefficient on FDI, because in specification (1) the negative effect of inequality attenuated the correlation between foreign direct investment and education and health outcomes. Elasticity of secondary schooling with respect to FDI is now 0.05 and that of infant mortality is 0.08.

TABLE 17.

Dependent variable: Log secondary enrolment, 1980-2002

	1	2	3	4	5
Log GDP per capita, lagged	1.02439	2.05516	2.05357	2.07849	1.05064
	[2.79]***	[5.46]***	[5.42]***	[5.40]***	[2.43]**
Log squared GDP per capita	−0.03082	−0.09511	−0.09501	−0.09612	−0.03916
	[1.38]	[4.17]***	[4.14]***	[4.05]***	[1.47]
Log FDI, lagged	0.0313	0.04848	0.00741	0.04811	0.04451
	[4.15]***	[5.12]***	[0.07]	[5.03]***	[4.93]***
Log population size	0.05179	0.04969	0.04935	0.05399	0.02579
	[2.84]***	[2.27]**	[2.27]**	[2.35]**	[1.16]
Log Gini, lagged		−0.16946	−0.16895	−0.16926	−0.05242
		[2.28]**	[2.24]**	[2.27]**	[0.73]
Interaction: FDI*Gini, logged			0.01119		
			[0.38]		
Civil liberties				0.00829	0.01899
				[0.26]	[0.58]
Severity of conflict				−0.02153	−0.02175
				[1.08]	[1.16]
Sub-Saharan Africa dummy					−0.64219
					[7.04]***
OECD dummy					−0.03219
					[0.23]
Constant	−2.51267	−5.88525	−5.88085	−6.04093	−1.76277
	[1.68]*	[3.79]***	[3.78]***	[3.87]***	[1.00]
Observations	594	350	350	350	350
Number of countries	154	121	121	121	121

Absolute value of z statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Authors' calculations.

Specification (3) in tables 17 and 18 further explores the link between human capital and inequality by introducing an interaction between Gini and FDI. In terms of our model of human capital accumulation as a result of improvement in technology, it would mean that changes in the technological frontier yield greater gains in health care and education in more egalitarian economies. We find that this thesis holds with regard to health outcomes; the Gini-FDI interaction is highly significant (table 18, specification 3). In education, however, the effect of FDI does not change systematically with changes in levels of inequality (table 17, specification 3). Additionally, table 16 details the changes in the magnitude of the effect of FDI on secondary enrolment and infant mortality across quartiles of Gini.

TABLE 18.

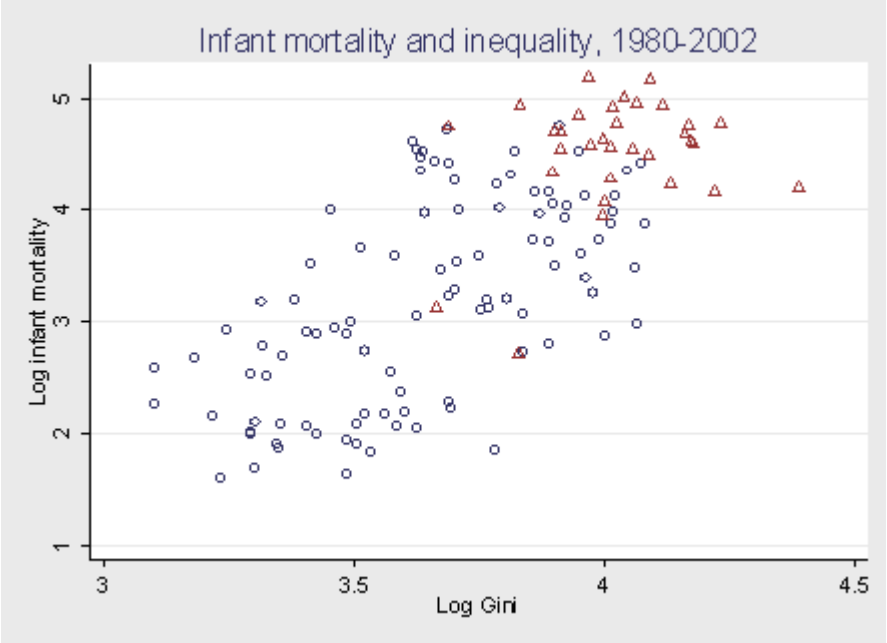
Dependent variable: Log infant mortality, 1980-2002

	1	2	3	4	5
Log GDP per capita, lagged	1.77094	0.63866	0.47465	0.09345	1.0412
	[4.64]***	[1.46]	[1.08]	[0.21]	[1.92]*
Log squared GDP per capita	−0.1564	−0.08558	−0.07535	−0.04031	−0.09707
	[6.76]***	[3.25]***	[2.84]***	[1.49]	[2.89]***
Log FDI, lagged	−0.03428	−0.08352	−0.46512	−0.47284	−0.4715
	[3.86]***	[5.77]***	[2.99]***	[3.23]***	[3.30]***
Log population size	0.00087	−0.01379	−0.01256	−0.03878	−0.03661
	[0.05]	[0.59]	[0.54]	[1.59]	[1.48]
Log Gini, lagged		0.53564	0.57567	0.46625	0.34935
		[4.15]***	[4.45]***	[3.73]***	[2.73]***
Interaction: FDI*Gini, lagged			0.10428	0.11181	0.1125
			[2.47]**	[2.81]***	[2.89]***
Secondary enrolment, lagged				−0.00484	−0.00399
				[3.96]***	[3.24]***
Civil liberties				0.09437	0.10904
				[2.65]***	[2.90]***
Severity of conflict				0.05116	0.06089
				[1.99]**	[2.39]**
Sub-Saharan Africa dummy					0.34564
					[3.04]***
OECD dummy					0.17559
					[1.13]
Constant	−0.40879	2.01493	2.50167	3.63296	−0.03793
	[0.26]	[1.11]	[1.38]	[2.05]**	[0.02]
Observations	393	213	213	213	213
Number of countries	154	115	115	115	115

Absolute value of z statistics in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Source: Authors' calculations

Controlling for the initial level of civil liberties, the severity of conflict and the initial level of human capital in education (in the IMR regression) in specification 4 of tables 17 and 18, does not substantially alter these results. We find that neither the level of civil liberties nor the severity of conflict significantly explain expansion of secondary schooling. Infant mortality, however, proves to be significantly affected by all three factors: initial level of secondary enrolment, civil liberties, and conflict severity. Despite the fact that the direct effect of conflict on growth was negligible, it

FIG. 19. Infant Mortality and Inequality, 1980-2002



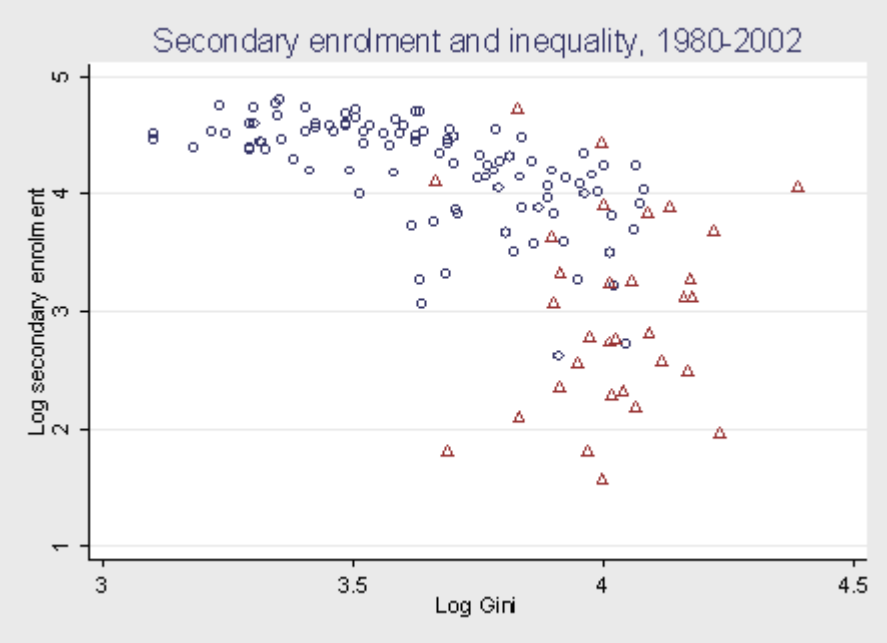
Source: World Development Indicators and WIDER data

significantly affects human welfare by undermining the standards of health of the populations of conflict countries, as proxied by infant mortality rates.

What conclusions regarding Sub-Saharan Africa can be drawn from this? Specification 5 in tables 17 and 18, adds a dummy for Sub-Saharan Africa into the equation. With regard to both secondary education and infant mortality, SSA countries perform-other things being equal-significantly worse than other developing countries. The SSA dummy captures the effect of inequality as well as other relevant idiosyncratic regional characteristics of Sub-Saharan economies; as a result, once we control for the regional effects, the coefficient on Gini becomes insignificant. The effect of FDI remains significant.

When it comes to infant mortality, the SSA dummy indeed captures a significant regional effect: Sub-Saharan economies have a significantly higher mortality even holding all other variables constant. Nevertheless, inclusion of the SSA regional effect into the model does not undermine the significance of the coefficients on either Gini, the FDI, or the interaction between the two. Even the magnitude of the effects remains largely the same.

FIG. 20. Secondary Enrolment and Inequality, 1980-2002



Source: World Development Indicators and WIDER data

In table 19, we apply the same model to Sub-Saharan and non-Sub-Saharan countries separately to compare the degree to which it can describe the African experience. Secondary enrolment in SSA is significantly correlated only with the initial level of democratization circa 1980 and with population size. Neither inequality nor FDI have a significant effect on secondary schooling. However, our model does much better in predicting health outcomes in Sub-Saharan African countries. Infant mortality is significantly correlated with foreign direct investment and income inequality. Similar to the overall sample, in the SSA sample the interaction between Gini and FDI is significant, signaling that even within the region, advances of the technological frontier lead to greater improvement in mortality rates in more egalitarian societies.

4.4. Conclusion

The purpose of our empirical assessment was to (a) consider the performance of Sub-Saharan countries within a general growth model; and (b) consider the role of income inequalities in development in general and in Sub-Saharan Africa in particular. Our analysis explores the linkages between three key facts of development in Sub-Saharan Africa: poor growth

TABLE 19.

Human capital accumulation in Sub-Saharan economies 1980-2002

	Log secondary enrolment	Log infant mortality
Squared log GDP per capita, lagged	−0.11866	0.02692
	[1.11]	[0.38]
Log GDP per capita, lagged	2.50692	−0.64446
	[1.57]	[0.62]
Log FDI, lagged	0.07884	−1.22901
	[0.13]	[2.25]**
Log population size	0.1326	−0.02418
	[2.27]**	[0.59]
Civil liberties, 1980	−0.15313	0.26227
	[1.74]*	[4.26]***
Severity of conflict	−0.04958	0.01928
	[0.57]	[0.23]
Log Gini, lagged	−0.01144	0.41061
	[0.06]	[1.75]*
Interaction: FDI*Gini, lagged	−0.01307	0.31134
	[0.09]	[2.29]**
Secondary enrolment 1980		−0.00277
		[0.63]
Constant	−8.27268	4.97169
	[1.41]	[1.35]
Observations	59	34
Number of countries	29	25

Absolute value of z statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' calculations.

record, poor performance in terms of public health indicators, and resilient high income inequality.

First, we find that differences in levels of human capital largely explain the differential between the growth rates of Sub-Saharan and other developing economies. Of the two measures of human capital-secondary enrolment and infant mortality-infant mortality is particularly prominent. We also find that the growth trend of Sub-Saharan economies does not significantly differ from other developing countries that have fallen into a poverty trap. Consistent with the poverty trap thesis, we observe substantial differences in determinants of growth between countries located below and above the poverty trap threshold. Variation in growth rates among the trapped economies-and the likelihood of escaping from the poverty trap-can

be attributed to differences in investment climate, presence of economies of scale (measured by population size), share of economic aid in GDP, and infant mortality. Notably, infant mortality proves a significant deterrent to growth in trapped economies but is unrelated to growth in economies above the threshold; education level (secondary enrolment) does not significantly affect the chances of exiting the poverty trap, but does significantly contribute to growth in non-trapped countries.

Second, with regard to the role of income inequality in SSA's development, we find that within a comprehensive framework with many controls, income inequality has no significant direct effect on growth. Instead, income inequality has an indirect effect on economic performance by undermining the accumulation of human capital, especially in health. We build on a model where the accumulation of human capital is driven by advancement of the technological frontier captured by FDI. Persistently high levels of inequality in Sub-Saharan economies go a long way in explaining high infant mortality and-albeit less successfully-low secondary schooling, but do not predict them completely. In health care, we find that the magnitude of the impact of technological advances on the productivity of health care is significantly lower in less equal societies.

The results of our study offer a qualification to the new version of the big push approach to poverty reduction in Sub-Saharan Africa (see Sachs and others, 2004). The benefits of technology transfer-be it health care or agricultural technologies-seem self-evident: potentially, they can induce productivity in these fields leading to growth and-in the case of health-to immediate improvements in welfare without costly R&D investments and coordination efforts. The current contribution, on the one hand, highlights the growth-inducing role of improvements in the health of the population and of the development assistance in economies trapped below the critical threshold. On the other hand, however, our research scrutinizes the link between technological transfers and improvements in health care, demonstrating that inequality undermines the gains from advances in the technological frontier. We suggest that optimism regarding the ability of technology transfers (in health-related technologies) to induce sustainable development in Sub-Saharan Africa may be misguided due to insufficient appreciation of the effect of inequality on diffusion of benefits from new technologies.

Further, a more thorough investigation of the role of inequality in the diffusion of benefits from foreign direct investment and the technologies imbedded in it is required. First, the emphasis should be put more squarely on specific technology transfers (e.g., medical or agricultural technologies). Second, the role of inequalities in ownership of land, as opposed to income inequalities, should be explored. The research of Deininger and Olinto (2000) is a step in this direction, but the availability of land Ginis of Sub-

Saharan countries remains very limited. Further follow-up should be given to our finding that income inequality plays a significantly more important role for health outcomes than for education outcomes, despite the fact that our model predicted that accumulation of human capital in education and health should similarly respond to technology transfers. Inequalities of land distribution could be more relevant to the accumulation of human capital in education.

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